UNITED STATES ARMY MARCH 1968

AVIATION DIGEST

ESCAPE AND EVASION

PAGE 1

UNITED STATES ARMY AVIATION DIGEST

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MARCH 1968 VOLUME 14 NUMBER 3

ESCAPE AND EVASION, John P. Jones 1
CHECK THAT FUEL CONSUMPTION, CPT Robert D. Taylor 6
DEAD RIGHT, CW2 Robert R. Vaughan, Jr. 8
I HAVE THE AIRCRAFT, CPT S. C. Allison and CPT W. P. Campbell 10
A DUTY DAY IN VIETNAM, CPT John L. Brown 12
WITH THE INFANTRY, MAJ Howard J. Stiles 14
VIEWS FROM READERS 18
"KITTEN" IN THE TANK, Francis P. McCourt 20
YOU NEED A UNIT SURVIVAL OFFICER, CPT John R. Ulbinski 24
THE GREATEST AVIATOR, by Ivan Slipshod 26
THE MISADVENTURE OF BUDDY BUG, CPT Robert S. Fairweather 31
YOU HOLLER, WE FOLLER, MAJ Norman W. Kemp 32
CRASH SENSE 36
PEARL'S 53
TALES FROM THE TROJAN 56
AIRMOBILE ARTILLERY PLATFORMS 64

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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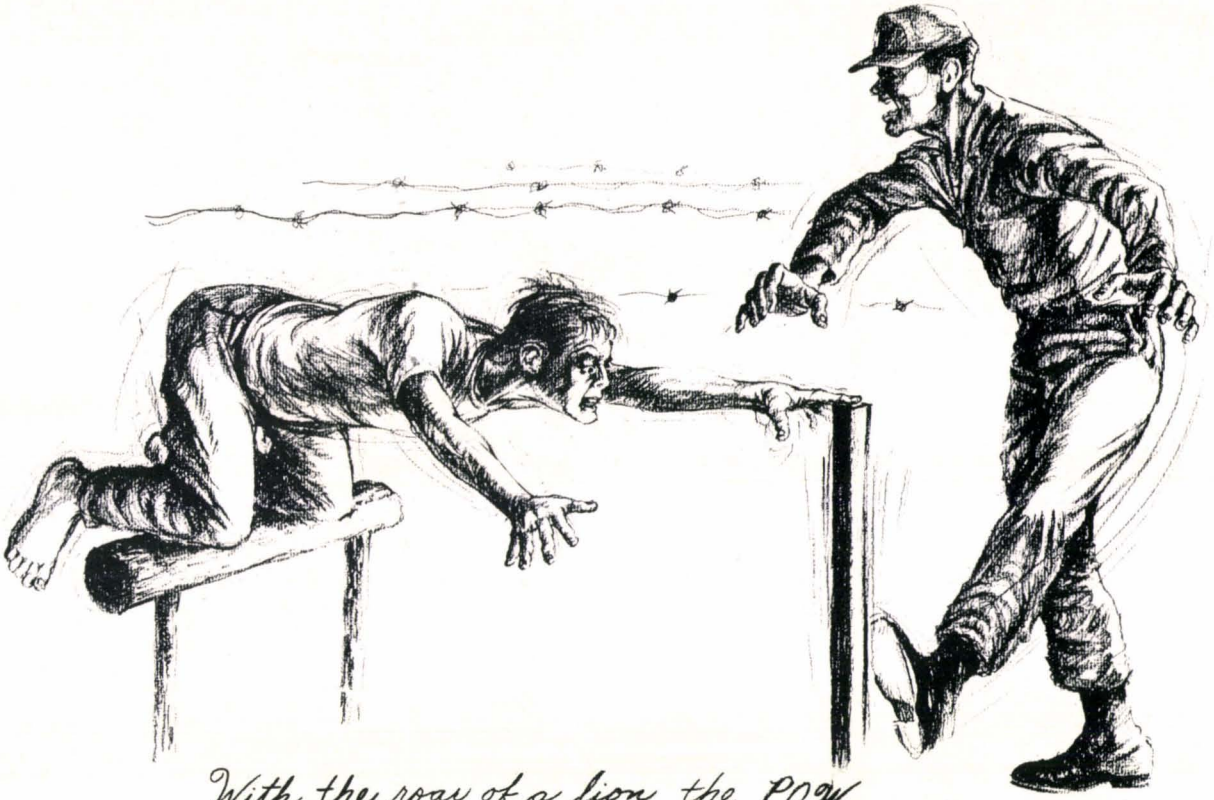


With the roar of a lion the POW commander tried to break his prisoner.

Escape and Evasion

John P. Jones

THE NAME OF THE course was Escape and Evasion—and that's just what most of us wanted to do. Escape our certain plight and evade having to weave our way through the tangled woods in the middle of the night.

But like all escape and evasion situations this was forced, leaving no room for debate as to whether or not it should be accomplished.

Speaking strictly from hearsay, it can best be compared to motherhood. It's just plain agony while it's happening, but when it's over, the relief of having it behind you is more than enough to compensate for the suffering.

The only evidence that life could survive in this pit of misery was the occasional idiot hoot, hoot of an owl and rather frequent utterances of "oh [curse word, curse word]" as someone fell into a hole or pulled a thorn from his nose. I can guarantee you I feared I might freeze to death in the middle of the nastiest bunch of briars, ravines, and mud I have ever seen.

The group to which I was assigned expressed the expected amount of elation at "being able to take a civilian through the course." Oddly enough though, they somehow got my name confused and insisted on calling me Millstone!

After the instructor told us that we were to establish a tactical encampment, cook our meal (we had had nothing to eat all day long), and then begin the E and E, we voted on whether we wanted rabbit or chicken.

One thinking lieutenant suggested we get a rabbit since it would be easier to clean. Having shown this obvious flair for the culinary art, he was immediately appointed chef and told to go pick up our rabbit. We knew it was a rabbit he brought back because that's what we decided we wanted, but this rabbit had just two legs, two wings and a beak.

We set out, all 18 of us, carrying our airborne rabbit, two onions and two carrots, with our chef ceremoniously leading the way. When we reached the site where we were to make camp, the captain in charge finally

found a task for which he felt I was qualified. I was proud and felt I had really become one of the troops as I gathered the firewood.

To cook our meal, which turned out to be half a canteen cup of some pretty tasty soup, we dug a rectangular trench, built the fire and, sticking their handles into the earth, hung the cups over the flames.

Not to dampen your spirits, but in case you haven't already discovered, one winged rabbit, two onions and two carrots will not make stew for 18 people. A broth with an occasional lump of something is about as far as you can stretch it — even if you add a dash of dirt, a sprinkling of leaves, and a few unfortunate insects.

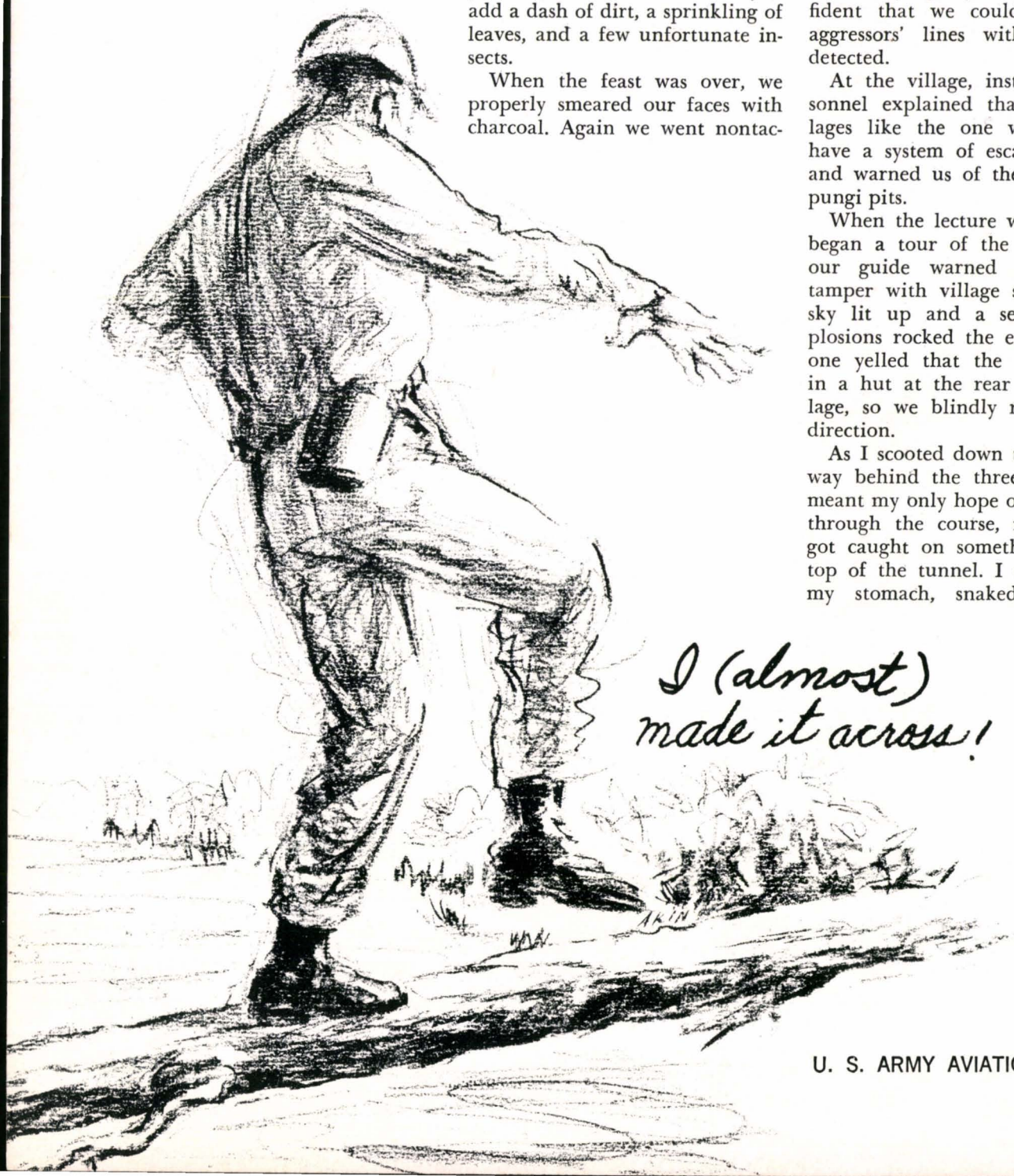
When the feast was over, we properly smeared our faces with charcoal. Again we went nontactical for our trek to a "Vietnamese village" where the actual escape and evasion would begin.

A Daniel Boone I'm not, and tripping the light fantastic in the glare of flashlights I ended up kneedeep in water even before the "good part" began. The three other men assigned to my E and E team were obviously delighted to see my agility and were confident that we could cross the aggressors' lines without being detected.

At the village, instructor personnel explained that most villages like the one we were in have a system of escape tunnels and warned us of the danger of pungi pits.

When the lecture was over we began a tour of the village. As our guide warned us not to tamper with village shrines, the sky lit up and a series of explosions rocked the earth. Someone yelled that the tunnel was in a hut at the rear of the village, so we blindly ran in that direction.

As I scooted down the passageway behind the three men who meant my only hope of making it through the course, my poncho got caught on something at the top of the tunnel. I dropped to my stomach, snaked my way



through the narrow portion, and scurried out at the other end.

Then it hit me: here I was in the middle of a clearing, didn't have the faintest idea of which direction I was supposed to go, and the back of one running GI looks just like another. When my panic had nearly reached a point of calling the whole thing off, someone grabbed my shoulder and said, "Come on; this way." Whether out of pity or what, it didn't matter; my buddies had saved me.

With all the stealth and cunning of a Caterpillar tractor, I followed them through the brush. A volley of shots was fired and a voice yelled "Halt!" Ah, but that was too far away to be meant for us. We crept on a little farther until we came to a road.

Our point man, who gave me great confidence because he was an infantry officer, told us we would meet by the tallest tree on the other side if we were detected crossing the road and had to flee.

One by one we made our way across without being discovered. When we had penetrated far enough into the woods on the opposite side, we stopped to get a compass reading. Confident that we were on the right track in spite of having a broken compass, we again set out through the boonies. The farther we went, the more dense the forest became.

Our point man assured us that this was as it should be because we had to go through a valley and across a river. We had one flashlight with a red lens and a set of weak batteries. We used it only for a moment at a time when the going got particularly rough.

After a while I got hopelessly hung in a "wait-a-minute" briar and asked the lieutenant to turn on the light for a minute. He turned it on and whistled in relief. Had he taken one more step he would have gone off the edge of a 10-15 foot ravine.

After what seemed like an eternity we finally heard sounds of other life. "Purple," the other group challenged. "Passion," we replied.

"Hey, how did you guys get across this stream?" one of them yelled to us. Feeling the chill of our wet socks and pants legs, we told them there was a bridge a little ways back. Not buying our story they asked us to wait a minute until they crossed so we could compare compass readings.

"Our compass doesn't work," they told us, and oddly enough their problem was the same as ours. The dial wouldn't turn. Since both of the instruments provided the same "inaccurate" infomation, they went their way and we ours.

Somewhere ahead of us we heard a truck. The chef, who really was a transportation officer, said it was a six-by. We reached the road and took another reading from the map.

"We must be here," one of my

What the lieutenant brought back was the weirdest looking rabbit we had ever seen.

buddies said, pointing to the map.

"No, we can't be. We have to be here," another answered, pointing to a second location.

Finally we all agreed that we didn't have the slightest idea of where we were. The two lieutenants headed down the edge of the road in opposite directions to see if they could find some landmark that would be on the map. The WOC and I remained in the brush.

Because of a unique intersection and a road sign we were able to find our location, and decided to remain near the road for direction. Our spirits heightened since we knew we were headed in the right direction. We moved right along toward our partisan point.

After about an hour I heard a motor running in the distance and remembered the warning they had given us earlier in the day.

"We used to have a 24-volt generator at the POW compound and some of the guys would pull the wires out to help their buddies. Our new generator is 110 volts and to avoid possible electrocution we have to forbid this," the major had said.

He also told us that if we followed a straight line we would go right past the compound. Well, there it was just as big as life,

right in the middle of our path.

It was obvious that the only way we could get around it without ending up as residents in the middle of all that barbed wire was to cross the road. Fortunately, the woods on that side were relatively clear and we made pretty good time, with my falling into a waist-deep hole the only incident.

A short distance beyond the compound was the trail leading to our partisan point. As we crossed back to the other side we heard someone walking in the woods. We stopped and he stopped. We heard the bolt of an M-14 (at least that's the nomenclature our transportation officer offered and we decided to wait a few moments.

When it appeared safe to resume our trek, we again moved out. We reached the warmth of the fire at our partisan point without further incident.

I was informed that I was to remain there and my friends, who had somehow gotten me through the whole mess, were given their coordinates to the pickup point.

A short time later I was picked up and taken back to the POW compound so I could observe the activities there. It didn't take long for me to appreicate that we had not been caught.

A captain who was commandant of the compound, like the mother in "My Fair Lady," had a voice that would shatter glass. He surely must have spent many sleepless nights devising new methods of breaking a man. One such device looked like a fat hitching post similar to those in television westerns.

When I arrived at the compound the captain had a lieutenant kneeling on the cross member, balancing himself with one finger on a length of two-by-four. The captain made him extend his free arm in front of him to further aid the misery.

The commandant fired question after question at the lieutenant while he kicked lightly at the two-by-four as if to knock it out from under his prisoner.

Bit by bit the lieutenant drooped lower and lower as fatigue overcame him. When it became apparent he would drop at any moment, the commandant harshly ordered him to get up and run around the compound. After two or three laps the captain ordered him to get back on the log, and began the whole grueling ordeal again.

Meanwhile, other aggressor personnel were subjecting the other prisoners to similar treatment in an effort to break their resistance.

As the sun finally rose in the east, 180 tired but hopefully wiser aviators began boarding Hueys for the end of their E and E.

Incidentally, the broken compasses weren't broken at all. It seems that lifting the sighting device unlocks the dial so it may be turned. It's such a simple thing, but I can assure you at least eight of us are living testimony that the simple things can make THE difference.

It became apparent we were lost as the lieutenants argued over which way to go.

Check That Fuel Consumption

Captain Robert D. Taylor

AN OPPORTUNITY for a TDY flight to Fort Worth, Texas. This is always appealing to a bachelor. Our job would be to fly out, drop off some parts to the Bell people, and return. Nothing real exciting or real critical, but an opportunity to go cross-country. I competed for the opportunity, since I knew a young lady going to an airlines stewardess school, same location.

Our section leader got out his highly unofficial TDY roster, titled "Good Deals Duty Roster," and decided, with everything considered, that I (a recent Vietnam returnee) and another lieutenant (a recent graduate of the school) would go. We were both new in the unit and my flight time was confined recently to renewing my instrument ticket and one radio relay mission in our old reliable U-6A. I was warned that the aircraft had been scheduled for salvage before the unit was formed, and that they were not in good condition.

We made a preflight, checked weather, and were ready to go. After filing a flight plan with Lawson ops at Fort Benning, Ga., with a fuel stop at Jackson, Miss., we took off. Our flight was uneventful until we were about 25 miles short of Jackson. Weather was moving in and we made a normal VOR approach in heavy rain, and filed a flight plan en route with the FSS at Jackson.

We parked the aircraft as directed and charged through the rain to the terminal. After a short snack, again we checked weather and found that low ceilings were predicted at Greater Southwest International; however, our weather forecasted was sufficient. It was still raining hard when I crawled into the left seat and started my pre-takeoff check (no thorough preflight was made—*it was raining*). I was interested in doing the flying because the pilot was very unsure of himself upon landing at Jackson. I had to take over the controls after the second, drifting bounce.

I called out "switches on" and checked the fuel. The tanks were indicating full. As copilot on the first leg I had no idea of how much fuel was used. I asked my copilot how much fuel was added. He didn't know. As I was strapping in, he had sought out the contract fuel people and had signed for the fuel. He told me the tip tanks were full.

We received an IFR clearance and took off, headed for Jackson VOR. About 15 minutes out of Jackson we were advised by radar that we were "10 miles right of course." Our omni, however, indicated on course. I advised center of this fact. They "rogered" our transmission.

Our winds were very poor and quite different from forecast. As we droned on in our reliable Beaver I became more and more worried over the fuel supply. The weather was clear and darkness was setting in. You could see a dark area ahead and I felt a great surge of excitement. I enjoy actual instrument flying and love to fly

CPT Taylor was assigned to the U.S. Army Aviation School's Department of Tactics at the time his story was written. He based his account on actual experience with the hope it may save others the mental anguish he and his copilot encountered.

in weather. Of course, I avoid dangerous weather that produces thunderstorms, ice, or a moderate to heavy turbulence. I had just returned from Vietnam where I had several times flown AI in my 0-1 Bird Dog and loved it.

My VOR had settled down and Fort Worth center picked us up on radar. Apparently our VOR trouble had only been temporary. We were able to see the VOR stations on the ground en route, and with the use of available ADF stations, we checked and found that the VOR appeared reliable.

We hit the weather at 6,000 feet about 50 miles short of Dallas. My map light was burned out, (written up, but not taken care of—EDP). I pulled my flashlight out of my Jepp case. Dead! It had been a long time since I had tried it out. I started studying Greater Southwest's approaches, and to do it I used the available light from my copilot's map light. He took over the controls and flew for about 20 minutes before I noticed that ice was building up on the wings. I advised center; they rogered and told us to expect a lower altitude after passing Dallas.

I had drained the tip tanks very quickly. Remembering what one of my old instructors had told me during instrument phase, I placed the tip-tank selector to "right" in hopes of drawing every possible drop. Fuel was getting critical and I leaned it out some more. It was difficult to understand why our fuel was so low since we had only been flying 3 hours and 50 minutes, and we only had 16 gallons of fuel left. Also I was confused as to why I could only get 10 gallons out of the tips.

We were vectored for a final approach course and turned over to Greater Southwest tower, who advised us our weather was dropping very quickly. I advised them that our fuel was getting low and requested Dallas weather. We had been monitoring our weather and it had closed in around us. There was not one airport within our fuel range with an acceptable forecast. The tower advised us that Dallas was closed and that our alternate was reporting weather below our minimums.

I knew then that our only hope in getting on the ground safely was this approach. I had long since given up on my copilot, as he now sat frozen in the right seat. I turned the fuel selector switch to rear and flew until the fuel pressure dropped, and I did the same on the middle tank. I had fuel in the front tank only.

I might mention that fuel management was something that I placed stress upon. In Vietnam we leaned our engines out in an attempt to get as much time as possible. On many occasions we flew right up to the last moment when we had enough fuel to get us home. (On one occasion I ran out of gas at about 3,000 feet, 2 miles from our airstrip at Quang Ngai, and landed with a dead engine.)

Then the copilot's map light burned out! I had already memorized the minimum altitude though, and continued descending. However, my copilot was getting very excited.

Greater Southwest tower must have sensed my apprehensiveness and seriousness, because after we reported the outer marker inbound the controller said the weather was a heavy rainshower over the south half of the field, moving very quickly, the ceiling was below minimums, and *continue approach*. He continued to talk to me and kept me advised for the remainder of the approach.

I descended quickly to minimums and was relieved to see the ground momentarily. The approach lights were in sight. I was still in the clouds though. In desperation I descended another 100 feet. The bright strobe lights were giving me vertigo, and I called the tower controller to turn them off. He didn't turn them off. I frantically called him again as the lights seemed to fill the cabin. They continued. I didn't know I was descending. I looked up at my selector panel and checked my switches. I was on intercom. I switched to number two and yelled to approach to turn the strobe lights off. They went out immediately.

I then remembered that I had to give instructions to my copilot to tune in the locator middle marker and had forgotten to switch back. I looked at my altimeter and was 50 feet above field elevation. I looked out, and could see nothing but heavy rain. I was pouring the coal to my R-985 and just beginning to climb when I saw a portion of the runway and the numbers. As I touched down the rain seemed to increase in intensity. I gave a sigh of relief and looked over at my copilot. He was staring out as though he had been struck by lightning. His white appearance startled me back into reality.

I taxied to the ramp and shut down. We had flown 4 hours and 10 minutes. I was interested in finding out just how much fuel we had left. (I didn't even dare look at the fuel gauge the last few minutes of flight.) After refueling we found we had 3 gallons of fuel left in our front tank. A little too close for me.

I closed the flight plan and called approach control to say thanks. I still enjoy weather flying, but I am not nearly as trusting. I plan closer, make sure my copilot is qualified, and I check the consumption ratio of fuel for each aircraft instead of putting down the amount of fuel time I am supposed to get. I also keep a check on my own qualifications.

DEAD RIGHT

The General does not know it yet, but he is dead! There remains only the mechanics of dying

CW2 Robert R. Vaughan, Jr.

THE MORNING is still dark, and would be silent if it were not for the many things that make up the beginning of a new day on an Army post. There is the high pitched whine of a 3/4 ton truck as it drops off new guards and picks up the ones who, while waiting to be relieved, have been staring at their watches in impatience. There are the spasmatic coughs of the outside men on KP in the various mess halls as they bang garbage cans around, hoping to wake up some of the lucky ones who are still lying, cocoon like, in the warm protection of their bunks. It is a day like any day and could be on any post within the entire United States Army.

0700, 15 November: Major General P. T. Hennison has just finished breakfast. He ate well—two eggs (over easy), bacon (well done), toast (dry), and coffee (black). He is looking over the papers that he must present to the meeting at Fort Bains today. Mrs. Hennison asks his opinion of the small dinner she is planning for Colonel and Mrs. McKay tonight. The general answers noncommittally, preoccupied with the papers that he is studying. He does not realize that he won't be at the dinner party. As a matter of fact there will be no dinner party at all. The general does not know it yet, but he is dead. There remains only the mechanics of dying.

0715, 15 November: CW3 Ray Vane, maintenance officer for A Company of the aviation battalion, checks his distribution and notices a TWX safety of flight message concerning UH-1 aircraft. It is an inspection that must be made before the next flight. He initials the TWX, puts it in a red folder for his tech inspectors to see, and makes a note that all aircraft scheduled to fly in support of the FTX today must have this accomplished before they fly. Number 555 is down for an intermediate, so there is no immediate problem with it.

0745, 15 November: 1LT Jerry Teas, the general's aide, dials G3 to arrange for an aircraft. He had no time to do it the day before, and now he is really pressed for time because the Old Man, assuming that everything is already prepared, is busy preparing for the trip.

0800, 15 November: The weatherman is compiling the weather forecast and readying it for posting. Although he doesn't realize it, he is this very minute concerned with the weather en route to the general's destination. It is 0/0 in the hills, clear in the valleys.

0815, 15 November: WO1 Larry Newpilot is just finishing his first tour of duty as staff duty officer. He was so intent on doing well on this first strictly officer type duty that he stayed awake the whole night. He turned in a voluminous duty report, covering everything from the results of his tours of inspection to a running account of the temperature during the night. He is very tired now, but at least he has the satisfaction of knowing that he has performed his first tour of duty in an outstanding manner. It is also his last tour of duty.

0830, 15 November: SFC Naimec, A Company's operation sergeant, indicates completion of the inspections on all aircraft that are to fly today and stands at the window watching as they take off. He notices that no pilots are left behind, but it doesn't really matter; there are no aircraft available now anyway. The telephone rings and the caller requests an aircraft, but SFC Naimec informs him of the current status of no aircraft, no aviators.

CW2 Vaughan, a member of the Maintenance Training Department at Ft Eustis, offers the knowledge he has gained of aircraft maintenance limitations. Through his fictitious account he vividly drives home the need for inspection and maintenance when it is due, not when it is convenient.

0845, 15 November: Captain Minz, post G3, has just received word that there is neither aircraft nor aviator available, and he is flabbergasted. He looks on the chart for A Company, and notices that sixteen UH-1s are assigned and eighteen aviators. He wonders if the people just don't realize the importance of this mission. He decides to apply a little pressure, to let them know how important the mission really is.

0900, 15 November: SFC Thomas of Aviation Battalion S-3 is manning the phone in the absence of the S-3 Officer. It rings, and when he answers it he receives a more strongly worded request for an aircraft. Sergeant Thomas promises to see what he can do, so he calls A Company one more time. This time SFC Naimec gives him the exact status. Two pilots on leave, six TDY, nine on the FTX support mission, and Mister Newpilot, who just completed a 24 hour duty. As for aircraft, one UH-1 is just beginning intermediate, three are on TDY, eight flying on the FTX, and five EDP. Sergeant Thomas thanks him and hangs up. He calls the post G3 with the information.

0915, 15 November: Captain Minz remarks to someone how exasperating it is to have all those aircraft and pilots assigned, and then not be able to use them when he really needs one. He reads off the status of all the aircraft and aviators. One of the other men mentions that he knows what an intermediate is, and it seems to him that the solution is right there. Stop the intermediate since it isn't very important anyway, and get Mister Newpilot to fly. Captain Minz decides to take it upon himself to consider this an emergency condition. He begins anew his fight for the aircraft, this time with all the pressure of the post behind him.

0930, 15 November: SFC Naimec receives still another call concerning the flight, and this time the pressure of the whole system is on him. He pleads for a few minutes to see what he can do. During the few minutes, to keep the pressure on, Captain Minz has several other members of various staffs call both A Company and the battalion S-3, demanding quick action. The aviation battalion succumbs to the pressure and orders A Company to roll 555 out of the hangar. SFC Naimec is told to call WO1 Newpilot's BOQ room and direct him to get dressed and be down to the field for a 1030 takeoff.

1015, 15 November: WO1 Newpilot is drinking a cup of coffee and filing for his flight. He sees that it is 0/0 in the hills and calls the operations sergeant and tells him that he can't go. This information is relayed back through channels until someone higher up calls the weatherman and gets the information that it is clear in the valley and a VFR can go. Newpilot is told this, and he begrudgingly agrees to go.

1020, 15 November: The general's staff car arrives to take him to the airfield. He knows nothing of the fight to get him an aircraft, and assumes that everything had already been laid on and he is leaving with the minimum of flap.

1025, 15 November: The tech inspector pulls a very hasty, incomplete inspection to comply with the TWX, so he can sign the message off the book on 555. Mister Newpilot is sitting in the seat napping, and the crewchief is still tightening screws in inspection panels.

1028, 15 November: The general's car pulls up to the helicopter. Mister Newpilot and the crewchief are standing at attention beside the aircraft, and the driver of the car gets out and runs around to open the door for the general. General Hennison returns the salutes and strides toward the aircraft. The crewchief puts the star plates on the outside of the aircraft and gets aboard, with the blades already spinning above his head.

1030, 15 November: The powerful throb of the aircraft as it passes over post causes many members of the various staffs who were involved in this morning's pressure proceedings to look up. They smile inwardly as they realize that the general probably little knows or appreciates the effort they have put into securing an aircraft for him. They take another swallow of coffee, smugly content that they have done their part this morning. Probably none of them realize that they have just committed murder.

POSTSCRIPT

ON 25 NOVEMBER, IN AND FOR THE DEPARTMENT OF THE ARMY, A TRIAL WAS HELD IN THE FORM OF AN ACCIDENT BOARD. NONE OF THE TRUE CRIMINALS WERE ARRAIGNED BEFORE THIS COURT, AND THE RESULTS THOUGH ENLIGHTENING WERE INCONCLUSIVE. THE AFOREMENTIONED GUILTY PARTIES ARE STILL AT LARGE, CALLOUSLY ARRANGING THE MURDERS OF OTHER VIP'S UNDER THE AUSPICES OF "CUTTING THE RED TAPE" (AND SOMETIMES RED X) TO GET AIRCRAFT FOR THEIR COMMANDERS.

I Have The Aircraft

The instructor must know not only how but, more important, when to take control

Captain S. C. Allison and Captain W. P. Campbell

ACCIDENT FILES are filled with cases where instructor pilots have allowed students to go too far before attempting to take the controls, or where there was a misunderstanding, as to who actually had control of the aircraft.

In an attempt to reduce the probability of future accidents caused by any misunderstanding between an instructor pilot and a student as to who has control of the aircraft, the Standardization Branch, Department of Rotary Wing Training at Fort Rucker, Ala., published Standardization Memo number 67-3, dated 9 January 1967. This memo dictates proper procedure for relinquishing control of an aircraft from instructor to student or student to instructor.

Briefly the memo states: When transferring control of the aircraft from instructor to student, the instructor will state, "You have the aircraft." The student will then reply, "I have it." Before relinquishing the controls, the instructor will look to see that the student is physically on the aircraft controls.

When the instructor takes control of the aircraft from the student, the sequence begins with the instructor saying, "I have the aircraft." The student will look to make sure the instructor has control of the aircraft then state, "You have it." Then and only then will he release control of the aircraft.

Strict adherence to these procedures should greatly reduce or completely eliminate accidents caused by a misunderstanding of which pilot has control of the aircraft.

Now that our problem of misunderstanding has been solved, let us proceed to the case where the instructor has allowed the student to go too far before taking over the controls.

Occasionally the instructor pilot fails to recognize an accident-producing situation in progress. Either through his neglect to analyze the situation and apply corrective action in time, or through his inability to recognize the situation as exceeding limitations on either the aircraft or his student, he allows the accident to occur. It then becomes an accident on file in USABAAR with the contributing factor, "Instructor pilot failed to take control of the aircraft in time to prevent the accident."

To prevent accidents of this nature the instructor must know not only *how* but, even more important, *when* to take control. As a general rule it is safe to say that whenever there is doubt in the instructor's mind as to the safety of any part of a particular maneuver, he should assume control of the aircraft. As simple as this rule is, it is violated almost daily in our training because not enough instructors believe it, or if they believe it they become hypnotized when confronted with the tight situation.

An example of this hypnotic effect occurs when you are doing 80 mph in a 60 mph zone and you see the two timing ropes which clock your speed stretched across the highway. You know you should hit your brakes or reduce speed before you run over them but you are slow reacting because of a hypnotic type condition. The speeding situation may cost you a few dollars or your driver's license, but the situation you would be confronted with as a helicopter instructor pilot might well cost you much more. The real trick is to be able to anticipate

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CPTs Allison and Campbell were assigned to the U.S. Army Aviation School's Rotary Wing Qualification Course at the time they authored their article. It was through their experience and observation that they formulated the opinions expressed in "I Have The Aircraft." CPT Allison currently is serving in Vietnam and CPT Campbell has reentered civilian life.

rough situations just moments away and take over.

Another and more desirable way to prevent a dangerous situation from going to termination is to never let the situation begin. Several techniques can be employed to attain this desirable condition. One method is to tap the particular control the student is having problems with in the desired direction. This method will be similar to verbally telling the student he is making the wrong response to a given situation.

Another and probably the best method is to let the student perform a maneuver in the manner he thinks it should be done while the instructor simultaneously performs the same maneuver. The point of error will be where the student feels resistance to his efforts. From this the student can analyze the reason for his error and correct it.

This latter technique is considered better because the student performs the maneuver himself with good firm guidance from a knowing hand. With the instructor so close to the controls though the complaint that the instructor infringes on the student's privilege of flying the aircraft—better known as riding the controls—is sometimes heard.

I think most instructors will agree that while the student has the controls, the less riding of the controls by the instructor the better. Riding the controls tends to suppress the student's ability to perceive his faults. It increases the time required for him to learn the control touch and pressures required to obtain a desired result. It also gives the student the feeling that he is not really responsible for the actions of the aircraft. He is unable to experiment and finally becomes much too dependent on the instructor.

While the above statements in favor of the student are very good in basic concept, they have numerous flaws which are, as we hope to show, accident causing factors.

First, let us examine a situation that might be somewhat different from what we normally think of as an accident. An accident it is though and can be measured in dollars or manhours for repair. The particular situation is an engine or rotor system overspeed.

There are two ways to overspeed the rotor system and one way to overspeed the engine.

In one instance both the engine and rotor system will get the overspeed simultaneously. The case where the rotor system only is damaged from an overspeed we will just mention, since the student seldom feels enough at ease in the aircraft to accomplish it. This would be in a sharp deceleration

Continued on page 35

A Duty Day In Vietnam

Captain John L. Brown

IT WAS THE tenth of February 1965 when I awoke from a night's sleep to a new challenge. The U. S. Army Airfield at Vinh Long in the Republic of South Vietnam burst into life as the men stationed there made ready to wage war against the Viet Cong.

0500 hours was a time for speed as the men ran to the latrine, since hot water was hottest for those lucky individuals who were first in line at the wash basins.

0530 hours and another line, as I awaited my order of breakfast (or whatever they call it in the "Mekong Manor Officers' Club"). If only the food were as fancy as the name!

0600 hours and time was precious, as I had no desire to be rushed during my preflight inspection of my armed UH-1B helicopter. It was an important day for me, for I was no longer a "worm," but a full-fledged member of the "Cobras," as the armed helicopter platoon was known. My initial training period was over, and I was assigned for the first time as aircraft commander of an armed helicopter on a combat mission.

0630 hours found my ship airborne at last in a flight of six armed helicopters flying a tight V formation en route to the airfield at Soc Trang. I was assigned to the second fire team as wingman for the fire team leader. It was a strain to stay in the number four position in the formation but our platoon leader helped me by giving command guidance over the radio: "Move up, four, move back, four too high, four too low, four." The blacktop runway at Soc Trang was a most welcome sight as we turned final in preparation for landing and a premission briefing.

0800 hours and combat at last as our armed helicopter platoon arrived on station over the village of Cau Ke. The Viet Cong were there as their accurate fire knocked out the hydraulics of Cobra One, forcing him and his wingman to return to Soc Trang for repairs. My moment of truth had arrived also. I was ordered to exchange places with my fire team leader; he had experienced FM radio failure and could no longer communicate with the ground troops. I took command of the fire team while he covered me. As we conducted a low level reconnaissance, a call came from our platoon leader: "Cobra Lead receiving fire; automatic weapon at eight o'clock, red smoke is out!" My fire team conducted a firing pass on the enemy position using machineguns, but as my ship broke off to the right, 200 meters short of the target, a loud explosion was heard from the engine compartment followed by the low audio warning and the flashing of assorted lights on the caution panel. The UH-1B fell out of the sky as I at-

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CPT Brown based his article on personal experience encountered while he was a member of an armed helicopter platoon during 1965 in Vietnam. After serving as an instructor at the Army Aviation School's Department of Tactics at Ft Rucker, he recently was reassigned to Vietnam.

tempted an autorotative landing from 250 feet absolute altitude: a critical maneuver for a ship loaded to maximum gross weight with fourteen 2.75" rockets, 10,000 rounds of 2.76 mm machinegun ammunition and a crew of four.

The main rotor was dangerously low as the copilot calmly called out the airspeed. A full flare was executed just before touchdown, thus stopping the ship about 10 feet short of a dike that could easily have overturned it. The ship was moderately damaged by the main rotor blades which flexed down and hit the tail boom, but the entire crew was uninjured and immediately took up defensive positions around the downed ship. The aviator who was flying cover for our ship when it went down spotted a squad of Viet Cong closing in on us from a nearby treeline and took them under fire with rockets and machineguns, killing eight. The crew and I were rescued uninjured by two helicopters that landed under cover of rocket and machinegun fire laid down by the remaining armed helicopters.

1100 hours found my crew and myself back on station with a new UH-1B flying a protective orbit over our downed aircraft. The damaged ship was successfully recovered and sling-loaded back to Soc Trang by a twin-engine CH-37 helicopter. Our armed platoon then returned to the operational area.

1300 hours and the Vietnamese troops had made contact with a large force of Viet Cong who were dug in throughout the length of a banana-shaped treeline which ran parallel to a branch of the Mekong River. The Viet Cong were being harassed from behind by boats of the Vietnamese River Assault Group on the river, while a troop of Vietnamese M113 armored personnel carriers supported by Vietnamese infantrymen attempted a frontal assault.

The armed helicopters delivered suppressive rocket and machinegun fire to the Viet Cong flanks, but the frontal assault was quickly stopped by the Viet Cong gunners who scored direct hits with recoilless rifles on two APCs which burst into flames. The carriers immediately shifted into reverse and backed out of range of the enemy recoilless rifles. They continued to engage the enemy positions with .50 caliber machinegun fire while the River Assault Group hit the enemy from the rear with .50 caliber machinegun and 20 mm cannon fire.

Our armed helicopter platoon received enemy fire from 360° outside the friendly positions and hits were scored on our aircraft on each circuit. As a result, our armed helicopters resorted to overflying the enemy positions at 1,500 feet and firing straight down into the holes and trenches. In this manner, some of the pressure was relieved from the friendly troops who were pinned down by the enemy fire. Constant suppressive fire was kept on the enemy by both the Cobra armed platoon and the Viking armed platoon from Soc Trang.

At 2000 hours the last flight was made from the battle area to Soc Trang to refuel and rearm before being released to return to home station. The remaining Viet Cong had broken off contact with the friendly troops and departed the area under cover of darkness. My crewchief discovered upon close examination back at Soc Trang that our UH-1B was unsafe for further flight as the result of a hit to the synchronized elevator and another hit which destroyed components located in the battery compartment. As a result, I was ordered to fly back to home station as copilot on another ship.

At 2030 hours, with great joy, the remnants of the Cobra armed helicopter platoon departed Soc Trang for home station. But the joy was short-lived as a radio message diverted the flight to the coast southeast of Tra Vinh, where an A1-E Skyraider had been shot down by enemy ground fire. Preliminary information indicated that the Vietnamese observer had parachuted from the disabled craft while the American pilot had ridden the ship into the water.

The mission of the armed helicopters was to provide cover for a medical evacuation helicopter already searching the area at low level with its searchlight in a courageous effort to save the crew. The Viet Cong harassed the operation by firing tracers at any and all aircraft, but the American pilot, who had hidden himself on the beach, signaled the medical evacuation helicopter and was rescued uninjured. The armed ships returned the fire of the enemy and continued the futile search for the Vietnamese observer until officially relieved from the mission.

0115 hours at home station and the end of a long but worthwhile day, as the Cobra armed helicopter platoon was able to say with pride, "Mission accomplished.".

The M113 armored personnel carriers move into the assault

Major Howard J. Stiles

An Army Aviator . . .

With The Infantry

IT ALL HAPPENED on a day in November. I was flying command and control for a fabulous battalion commander. The battalion was having a combat assault to place three companies around a suspected VC town northwest of Tuy Hoa. As soon as the lift ships discharged their troops, the area became a shooting gallery. All we lacked were flashing lights and bells. Charlie started to evacuate the area posthaste.

Gunships were zooming in, shooting up the trails and streambeds. The battalion commander was in the back yelling his head off. As we dived in to drop smoke, he was actually standing on the skid blazing away with his M-16. The artillery LNO was hanging onto him for dear life. Well, this continued for about 20 minutes. I've never seen anything like it. I really got psyched up. My airborne—infantry—ranger blood got to boiling. I wanted to find out what it was all about down there on the ground. After all, I was a recent graduate of the career course from the hallowed halls of the Infantry School.

Later in the day, we returned to the tac CP. Over a nice cup of coffee, I approached the battalion commander on the subject of joining a company for a week in the jungle. The Old Man thought that was an outstanding idea and gave his quick approval.

During the next week, I made arrangements to go with a particular company and to draw my field gear.

The day before my departure for the boonies, I went over to the rear area supply room to acquire my battle paraphernalia. Frankly, upon entering the tent, I felt like the proverbial shady-lady in church. The old supply sergeant put my anxiety to rest as he moved around pulling stuff out of cubby holes and making a mountain of equipment in the middle of the floor. I got straps, packs, belts, suspenders, heat tablets, bug juice, and a sweater. About the time I was drawing my air mattress, the executive officer came bouncing in and convinced me they were no good. He gave me his hammock. I was also told to carry a minimum of four days supply of C-rations. I looked at the pile of equipment and wished I had brought a truck instead of a jeep.

That night I made like a magician as I figured out where to put everything and how to wear it.

Soon I was set, and even sooner morning arrived. My poor back sagged under the weight of all that equipment, and the M-16 in my hands felt singularly unfamiliar. As I climbed aboard the utility helicopter, my helmet came flying off my head, hit my knee, and nearly burst my kneecap. My friends taunted me with a common unfriendly gesture and shook their heads in utter amazement as we lifted off.

What am I doing here? I wondered. My anxiety rose to a fevered pitch during the flight, but soon we landed and it was time to get with the program.

I met the CO and first sergeant. They were very nice and I relaxed. The company was in a rest position. One platoon was out on patrol. I walked around the perimeter and met the platoon leaders and their platoon sergeants. The weather turned worse; it rained on and off all afternoon. Late in the day, a chopper arrived to pick up the CO for a meeting. When he returned, we learned of our mission. We were to make a two days' clandestine march to try to find a large weapons cache. The platoon out on patrol was lost. Through the radio and binoculars, we located them about a mile and a half away on another ridge.

As the sun set, rain came down harder. This did not help cooking and eating C's, but I survived. I was invited to sleep in a lean-to with the CO and first sergeant, but I told them I didn't have an air mattress. It then dawned on me that the bald ridge we were on did not have any trees for my hammock. How stupid can you get? I finally settled on one side of the shelter and wrapped up in my poncho and poncho liner.

In a matter of hours, I was soaked and lying in a pool of water. I got up and found a piece of higher ground. I actually wrung out my poncho liner and tried it again. This was an hourly procedure for the rest of the night. I woke up in the morning with my hands and feet looking like prunes. I was really shriveled up.

We hit the trail about 0700 and planned to link up with the other platoon around noon, which we did. The terrain was terrible. All we did was go up and down. I swear, in spots the slope was at least 70°. People fell all over the place. The wet ground was slick, and of course it was still raining. Vines were a real enemy, and the elephant grass cut you like a razor.

Everytime we stopped, my old joints got stiff and sore. The comfort of the cockpit sure seemed nice, even though it was far away. We waded through some rice paddies, and the worms and leeches were 6 inches long.

That night I did not have any trouble finding a tree. The trou-

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MAJ Stiles, a 1959 graduate of West Point, offers his thought provoking article as a personal observation of what "The Army Team" is as a result of the helicopter. As his article points out, though he is a dual-rated aviator, he spent a week with an infantry unit in Vietnam to see how "the other half" lives.

With The Infantry

ble was in finding a place clear enough to hang my hammock. Everything I owned was soaked. I was really beat, tired, and hungry—but learning. When I tried to get in the hammock, I found out it was made for ARVN, and I stuck out all over the place.

Being so tired helped, because I fell asleep immediately. I awoke several hours later to find rain running down the ropes which supported the hammock. I was lying in a pool of water. But I wrapped up in my drenched poncho liner and fell back into the arms of Morpheus.

It was still raining on the third day. I woke up rather stiff; however, I was proud because my legs and back were doing remarkably well. Shortly after noon, we picked up a trail and signs of life. I clutched the M-16 and really kept my eyes peeled. Finally we came to an abandoned company sized base camp. I expected to get shot at any minute, but it was soon apparent that it had not been used in months. I was really impressed with the complexities of the camp.

Later in the day, we discovered an arms cache on a little stand right next to the trail. The weapons were rusted almost beyond recognition after long exposure to the elements. After calling in about our treasure to battalion, we plodded on. I was still wet. The skin on my hands just peeled off when I grabbed a vine or tree to steady myself. Do believe I had immersion hand!

We plodded on like this for two more days. Our tactical plans had been changed, so we continued to sweep through the dense, mountainous jungle looking for Charlie.

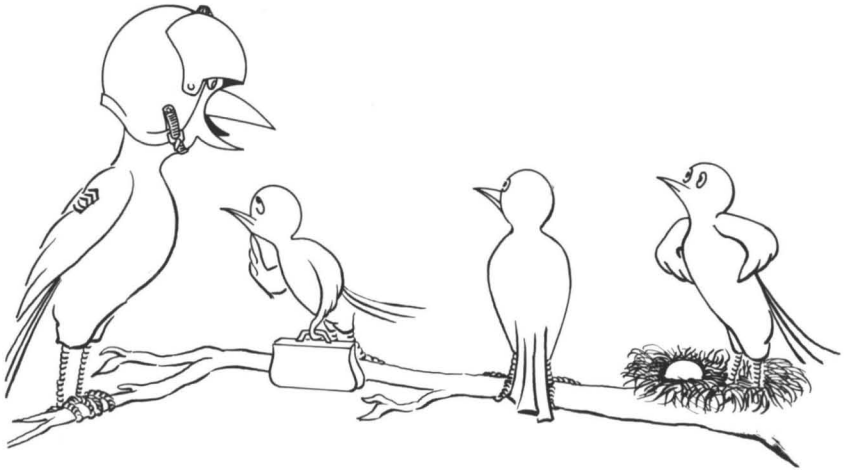
Where was all the glory, the shoot 'em up? It was not there. This was the grim unglorious dirty work of the infantryman. This was humping hills only to have to hump another hill. This was sleeping in mud. This was the groundpounders' way of life.

For two days we had to carry our sick and lame because of a lack of LZs. Finally we found a clearing. Thirteen people had to be evacuated because of twisted ankles, knees, or bleeding feet. The helicopter was our lifeline. It took out the sick; it brought in replacements. Everyone received two pairs of dry socks and a dry sweater. The sundry packs arrived.

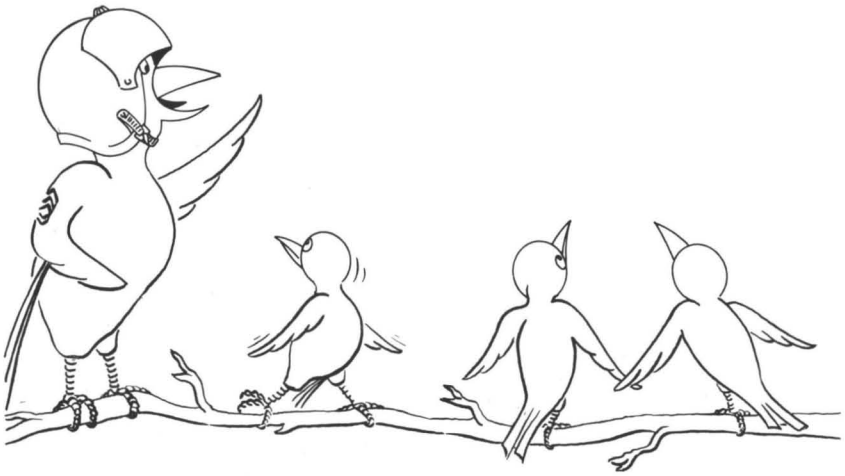
You could see the spirits lift. You could catch GIs looking at the helicopter as if that big whirlybird were his best girl. You could hear the whispers at night. The troops knew that if all hell broke out those gunships would be there in minutes spewing out hot lead. Firefly Ship would be overhead turning night into day.

I learned a lot about the groundpounders' war. I also learned that the people on the ground love the aviator. They need you; they rely on you. I knew I'd appreciate my flying job more after this experience. I realized the helicopter and the pilots who fly them are a very important part of the Army team. I was glad to be a small part of that team.

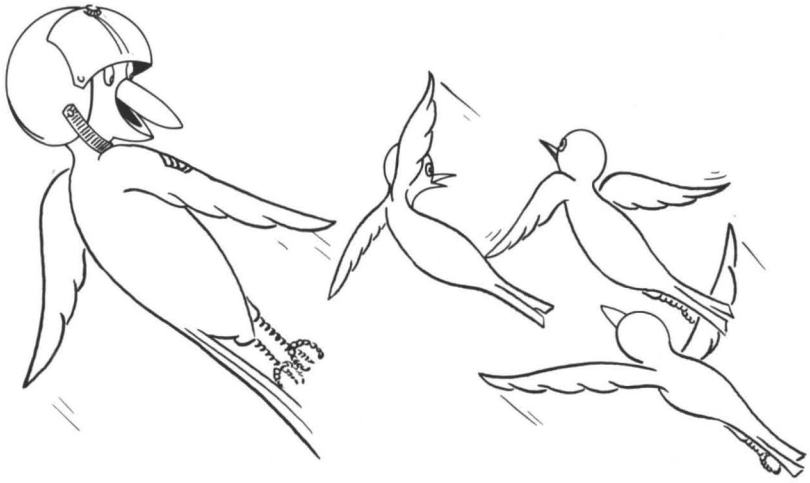
A GI would look at the helicopter as if it were his best girl



I've called you together to talk about aircraft. In the past, when we have been very busy migrating, building nests and chasing insects, we have had to watch out for them.



Now I understand that all pilots have been warned to watch out for us. They have apparently learned that birds and aircraft meeting can be dangerous for both.



Let me warn you not to depend on a pilot to get out of your way. There is the foolish one who will fly through our flocks or chase you down when you are flying alone.

Views From Readers

Sir:

Take heed and listen and you shall hear,
The crunching, ripping of a Seahorse gear,
Thru concertina, then off a gas truck,
Flew into an embankment; what rotten luck!

Luck, some may say. Skill and awareness are really the key words. Many do not wish to discuss their misfortunes of flight, but I honestly believe that more discussion of errors committed, in a personal vein, might prevent another aviator from duplicating the event.

Immediately following graduation from Fort Rucker I joined the 183d Reconnaissance Airplane Co (O-1) in Vietnam. By 1 June I was considered operational. For 25 days, totaling 93 hours, I flew combat missions. Then on 26 June it happened! My mission was scheduled for 1630 hours. After preflighting the aircraft, my observer and I got into the bird and everything checked out fine. The tower advised that winds were variable from 150° to 180°, 10 knots gusting to 22 knots, active runway 25. I looked at the windsock somewhat apprehensive, but not really worried, as I had made several takeoffs previously under similar conditions.

Tower cleared me for takeoff. I checked flaps, gauges in the green and started rolling. The runway was rough and caused some bouncing, while the wind was blowing us to the right. I became airborne and had flying speed. Then I noticed that my gear was entangled in the concertina fence that ran parallel to the runway, some 15 feet to the side. My only thought at the time was to keep the bird in the air until I could put the Bird Dog down in the clear area to my front. I then caught a glimpse of an object to my right front which caused me to automatically lift the right wing, but because of being only about 6 feet in the air I didn't dip the left wing too low for fear of striking the ground. At this point, my right wing struck the object, a 5,000 gallon fuel tanker. I ended up crashing into an embankment at 60 mph. All was quiet except for the sound of trickling fuel from the ruptured fuel cell.

We were extricated from the aircraft and checked for injuries, of which there were none except my injured pride. I know that the locked shoulder harness, gloves and rolled down sleeves played a vital part in preventing injuries.

I personally feel that four factors enter into this case: inexperience, or a lack of awareness of conditions that surrounded me; excessively strong winds for my experience level and runway conditions; a very rough runway which makes a smooth crosswind takeoff difficult; and armor plates on the sides of the seats which restricted me from achieving full aileron control.

At the time of this writing, two of the four conditions have been corrected. The concertina fence has been moved farther from the runway, and the armor plates have been taken off the aircraft. The runway is an occupational hazard that must be tolerated until engineer support can be obtained. My proficiency has increased especially in the area of "awareness." My only hope is that anyone reading this letter will grasp just one small point that will prevent an accident: not to let complacency invade his actions and always be "aware."

LT FRED C. HANKINSON
183d Reconnaissance Airplane Co
223d Combat Support Avn Bn
Dong Ba Thin, Vietnam

Sir:

Let's go back in time to the date you first received orders assigning you to flight school. Now let's assume that flight training was not available in this country and that you had been ordered to the Laotian Military Aviation School, Vientiane, Laos, TDY en route for 15 weeks to the Laotian Language School. Can you imagine how much differently flight training might have been, or the many exasperating moments you might have had because you could not fully understand and your instructor was not able to "get through" to you?

Although the foregoing situation is absurd, the reverse does and is happening at this time. Southeast Asians, particularly Vietnamese, Laotians and Thais, are being sent to our Aviation School to learn the art of helicopter flying. The majority of these students do not know the first word of English when they first set foot on American soil. Couple this with the fact that their entire life's environment has been a country where the latest scientific breakthrough was the discovery of the wheel and you can well imagine what your job would be like as their flight instructor.

Although the English Language Institute at Lackland AFB, San Antonio, Texas, does wonders with our Allied students, it is still a 15-week program and only so much can be gained in that span of time. Then too, there are many aviation oriented terms and phrases that the student must grasp that are not translatable into his native tongue. Often some of the phrases used during instruction are translated by the student to his native language to get the meaning of the words before he understands what his instructor is telling him. A rated helicopter pilot can readily understand some of the situations resulting from this "time lag" in language translation and application of controls to complete a given maneuver—for example, an autorotation.

A unique problem when working with Asian students is understanding their "face saving values," and although they differ slightly from country to country, one aspect of these values seems common to all. An Asian, we have found, will never let on that he does not understand. Consequently, you will never know whether or not your instruction was understood until you allow the student to demonstrate. Hair raising experiences are often encountered during this sequence of training. Just when you think this student has "seen the light" and you begin to relax a little, the curtain falls and he will do something so completely unexpected that it makes you wonder if he will ever earn his wings.

Another unique problem encountered with these students concerns the aircraft they are learning to fly. Let's face it, the CH-34 just wasn't designed for Asians! Humorous situations are forever arising in the cockpit. Because Asians are quite a bit smaller in physique, pillows are often used to adjust their position so they can see outside and still reach the controls. Oftentimes seatbelts and shoulder harnesses are drawn to their smallest extreme before a proper fit is reached. Some of our shorter friends have a choice to make: either sit high enough to see outside or low enough to reach the pedals.

The seats in the CH-34 are spring loaded to the "up" position. On one occasion, the student found that in attempting to lower the seat he did not weigh enough to overcome this spring tension and his instructor had to help him push the seat down.

Whereby an American hand fits the throttle comfortably, the Asian finds he really has a hand full. Also, the CH-34 pedals require much greater pressures to move them than most other helicopters. Because of the awkward seat position he must assume, the Asian usually finds he cannot get the correct leverage and must learn to use brute force for the required movements of these controls.

This has been just a sample of some of the problems that instructors must overcome when working with Asians as compared to training American students. I am proud to say that come graduation day our Asian friends compare favorably in their flying abilities with their American counterparts. The job, however, is challenging, to say the least.

Should you sometime become bored with your present duties, you might consider a transfer and try your hand at training Allied students. I personally recommend it. As exasperative and futile as it may seem at times, the end result is a very gratifying sense of accomplishment.

CW3 LYLE I. MILLER
Flight Standardization Div
Dept of Rotary Wing Tng
Ft Rucker, Ala. 36360

• With all the problems, frustrations, and crowning sense of pride and accomplishment inherent in flight instruction, we seldom think of these added adverse circumstances our Allied students and their instructors face in daily flight training. Both students and instructors warrant special commendation.—The Editors

Sir:

We just received your December issue of the **DIGEST** and read the "Can Do" article by Ken Mertel. We certainly agree that our younger generation of aviators are doing a magnificent job over here. However, some of the oldtimers will be a bit hurt to find they were so unprofessional 10 years ago!

For example, it was a small group of those nonpros who stood off the Air Corps and got the program started to begin with. And the then young regulars who gave up promising artillery careers to enter what was a dead end street — from a career standpoint — were certainly not professionals, and the hundreds of officers who volunteered for the air with its then projected 12 minutes life expectancy. The same ones who flew their Maytag Messerschmidts in every theater of war and established quite a "can do" heritage. And don't forget the pioneers who backed them up with the first maintenance and supply outfits.

Between wars, the ones that kept the program alive, adding newer aircraft and pioneering the helicopter. The same "old nonpros," along with some Johnny-Come-Latelies trained after World War II, who saw the first slash of combat in Korea and manned the first medevac choppers that saved so many lives in that fracas. The term "command and control" wasn't born then, but someone flew the Army corps and division commanders into forward areas for on-the-spot command influence in tight situations. They weren't professionals, just aviators doing another job in a "can do" manner. Then there were the ones who sparked whole new training concepts at Sill and trained the warrants and mechanics to man the initial helicopter companies; the ones that fought for equal career opportunities for aviators and established progressive career patterns for us.

It's a real shame that there weren't any pros available to get CAA instrument and ATR ratings with their own time and money — and fight to establish an instrument program in the Army. The same lack of professionalism was displayed in establishing a separate Center, School and Test Board. It was surely the cautious, over-safety-conscious old aviators who finally sickened from a needless waste of men and machinery and established USABAAR.

A complete lack of vision was displayed at Benning and Leavenworth where they were teaching airmobile operations; at Knox, the Sky Cav concept; and at Sill, aerial artillery. At Rucker they were hanging all sorts of firearms and rockets on flying machinery. Yes, this was all going on when the new graduate was so disillusioned 10 years ago with the nonprofessionals then in aviation. This same type of overage aviator waded through mountains of paper all week, then flew nights and Sundays to maintain minimums, or took leave to get sufficient time free to qualify for an instrument rating. Some of the old nonpros who organized, equipped and trained many of the aviation units now in Vietnam are over here for their third war — in Army aviation! Their "can do" attitude really shouldn't be questioned!

No one is more proud of the place our young guys have carved for aviation in Vietnam than the old hands still around. The terms "professionalism" and "can do" have certainly been coined within the last 10 years, along with "nap of the earth" and "air assault." But really, the whole thing wasn't accomplished in just the last 10 years!

LTC WILLIAM G. BLACK
AAD-ACTIV
APO San Francisco 96384

• It was not the intent of Colonel Mertel's article to minimize the great abilities and foresight of those dedicated men whose loyal contributions built the foundations on which today's airmobile concepts rest. No one wants to minimize the efforts and determination of Army aviation's pioneers. It was this group of true professionals who led the way for today's "can do" aviators to follow.—The Editors

Sir:

Even though I am not in the Aviation branch of the Army, I read your fine magazine whenever possible. This is usually determined if they have enough extras to put in our mail bag.

However, there is one thing, one quality, which I think your magazine lacks. This is some good Vietnam humor. Inclosed you will find the new grenade launcher which I have designed. Many hours of designing and practical experience went into this wonderful launcher. As you can see, [below] it is truly an aviation masterpiece. There are probably some minor stability problems with this launcher, but as I said before, these are minor and easily corrected.

I hope you enjoy this and if you do publish it, which I believe very unlikely, I would appreciate your sending a copy to me.

SP 4 TIMOTHY SULLIVAN
LZ Geronimo
Central Highlands, Vietnam

• Geronimo!

"Kitten" In The Tank

U. S. Army Aviation Laboratories reports a significant breakthrough developing crashproof tanks and safer fuel

Francis P. McCourt

A PHILOSOPHER once said that in spite of the destruction and wastefulness of wars, from each comes something that is helpful to the human race.

His statement may not be exactly true of all wars, particularly those early in mankind's history, but the scientific developments promoted by most of those fought in the last 100 years cannot be questioned. They have stimulated so many new developments and discoveries that to list them all is impracticable.

Back in the Napoleonic war oleomargarine was developed and is today one of the most popular "spreads." The Spanish American War left man the ability to fight mosquito-borne diseases. From World War I we got a 10 or 20 year headstart on the airplane. From World War II came jet aircraft, missiles, and pencillin. In the Korean War, the helicopter proved its potential for both military and civilian use.

It's too early to tell what advancements the Vietnam conflict will bring the world, but it's already evident that there will be many. One that seems to be shaping up is a new aircraft fuel and crash resistant fuel tank that will reduce the chances of postcrash fires and save the lives of many future air travelers.

A study of rotary wing and fixed wing crashes involving fires

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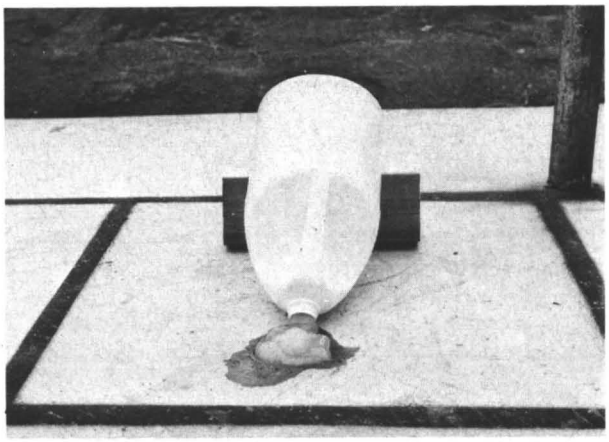
Mr. McCourt is chief of the Safety and Survivability Division of U.S. Army Aviation Materiel Laboratories (AVLABS) and has received several world-renowned awards for his contributions to aviation safety. He is a dual-rated pilot and a retired lieutenant colonel in the Army Reserves. During his military career he served in WW II and the Korean War.



A gallon of JP-4 spreads liberally when spilled (left) unless it is emulsified (above)

shows that about 8 percent of those persons involved survived the initial crash only to be burned to death in the postcrash fire. The Civil Aeronautics Board reports that 343 of a total of 2,161 civilian aircraft crash fatalities which have occurred since 1955 can be attributed to fire.

The problem is not the aircraft itself but the highly flammable fuel used to propel it. Repeated improvements have made the aircraft relatively failsafe mechanically. The fuel, on the other hand, gets more dangerous and harder to handle as it is improved.

Tests by a variety of aviation research agencies show that the behavior of fuel in a crash environment is always the same: an inadequate container permits vaporization of large quantities of highly flammable fuel. All that is needed to set this fuel off is a spark; and in spite of the many improvements, during a crash plenty of these are usually around.

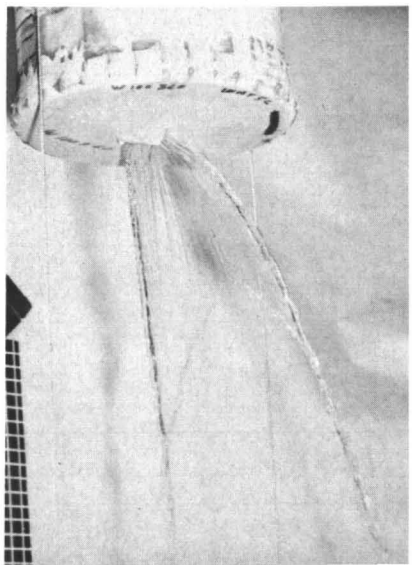
The solution seems obvious: develop a container that won't release vast quantities of fuel at one time and chemically alter the physical state of the fuel so that it is not likely to ignite even if it should be released.

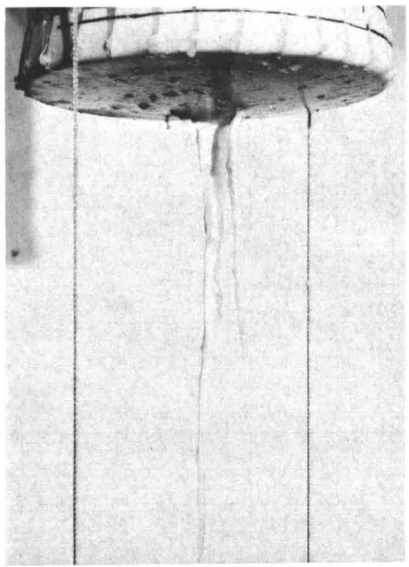
It's a pretty large order to make a fuel that won't vaporize when exposed to the air and that changes itself as it enters the engine to become a powerful volatile fuel. But the U.S. Army Aviation Materiel Laboratories (AVLABS) is trying to do just that. About two years ago their Safety and Survivability Division started working on the project and is now able to report a significant breakthrough, not only in development of a crashproof tank but also in a safe fuel.

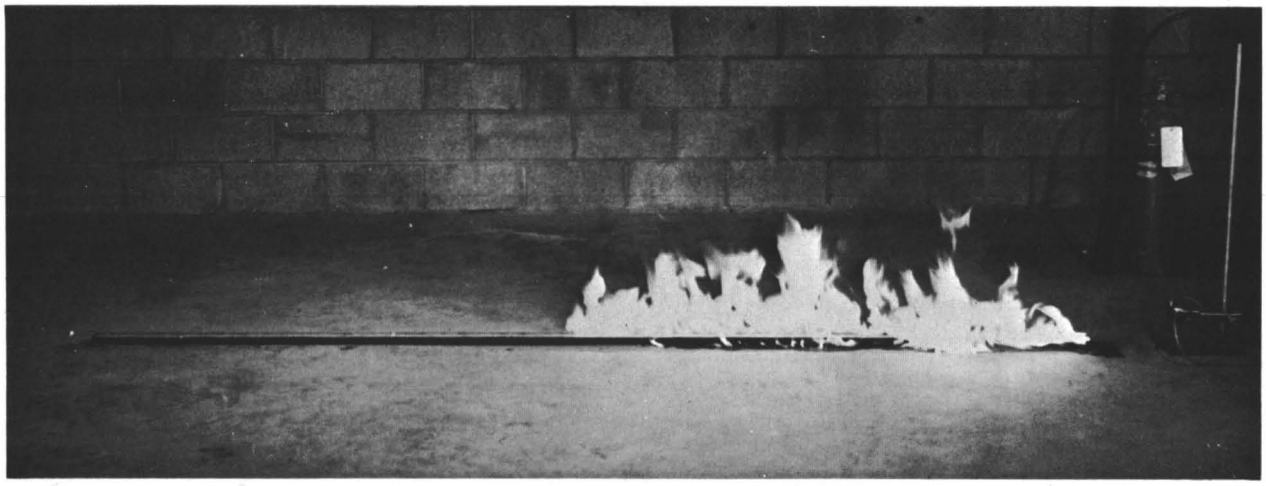
In developing a fuel that is safe in a crash environment, the fundamental properties of a fuel line must be kept in mind. Liquid fuel won't burn, but as it decomposes into a vapor it will burn when mixed with oxygen and exposed to an ignition source. The most practical way to keep this fuel from burning would seem to be to eliminate one of these three elements. Or, if one of the elements is reduced, especially vapor or oxygen, the possibility of accidentally setting off a disastrous fire is also reduced.

Earlier a proposal had been made to emulsify fuel, a process which reduces vaporization. Fuel would then be shipped in this relatively safe form to the airfield

These two photographs show the effect of a sharp anvil making an angular puncture of a self-sealing tank. At left, the raw JP-4 fuel pours from the rupture in the bottom of the tank, the same treatment it could expect in a violent plane crash. Seconds later, however, coagulation starts (right). The puncture is almost sealed and complete coagulation is accomplished, thus preventing the escaping fuel from forming a mist and fumes which cause violent explosion and burning.







This test, designed to demonstrate the low volatility of the emulsified fuel, involved filling two 10-foot metal troughs — one with liquid fuel, the other with thickened fuel. Both were ignited at the same instant, but liquid fuel burned to the end of its trough in 2 seconds and the emulsified fuel, shown here, didn't reach the end of its 10-foot journey until 58 seconds later. Engineers in charge of the test said that the flame could easily have been doused at any given moment

where it was to be used. Just before being placed in the aircraft, it would be reconstituted.

Before tackling the fuel problem AVLABS scientists had a question and answer session with themselves about this emulsified fuel. Why couldn't you inject this fuel into the engines where it would be returned to its original liquid state as it was used? And then just how do you convert the emulsified fuel back to liquid fuel in the engine? Or was it really necessary?

The only way to answer these and many other questions was to see what an emulsified fuel would do in an engine. The first test used a fuel that had been converted into a white clabber-like consistency. This was sprayed through a jet injector nozzle from a helicopter turbine engine. To the great delight of the scientists, the material vaporized about the same as a liquid. But one thing was wrong: the spray pattern was uneven.

The second test was with a fuel that had been converted into a slurry consistency. With this material it was found that pressures required to produce fuel flow and a good spray pattern equivalent to raw jet fuel could be had with a pressure increase of less than 3 percent.

Crash-resistant nylon tanks were tested at AVLABS

But, of course, a proper spray pattern is not everything. The real test of a fuel is in the engine. For this a Continental T-72 engine was run in a test cell with three different percentage gels and two different emulsions. Comparsions were made with the performance of the same engine run on liquid JP-4. Continuous engine runs in execess of 1 hour were made at all engine throttle settings. Cold starts were made on all the modified fuels. The normal fuel control system was used without modification throughout all tests.

It was found that the portion of gelled fuel not burned formed an undesirable residue in the engine, but no significant difference in engine performance was noted otherwise. The emulsified fuel didn't even leave a residue.

At this time, the only necessary aircraft modification that the scientists at AVLABS foresee is in the filtering system. The gels

and emulsions tend to suspend any contaminates in the fuel system and these must be strained out.

Scientists at AVLABS say that by use of an emulsified fuel they may produce a safety bonus for the Army aviator. In addition to reducing postcrash fires, the new type fuel may also help reduce helicopter vulnerability in combat. Helicopters are the prime movers in vertical envelopment tactics and while in this environment are vulnerable to ground fire. Preliminary ballistic testing indicates that emulsified fuels may prove less vulnerable to ball, AP, and incendiary fire than liquid fuel.

Until AVLABS started their study of a fuel tank, most of the effort in preventing postcrash fires had gone into developing crash resistant bladder tanks. These are good in certain circumstances, but not in others.

No matter what the size or configuration, rubberized material tanks tear when penetrated by a sharp object.

AVLABS began by testing some 80 different materials made up for tank application. Then they subjected the best 10 to drop-tower testing for penetration and tear-testing under carefully controlled laboratory conditions.

One of the most promising of these 10 is a polyurethane-bonded multiply nylon tank. In addition to undergoing tests mentioned above, it was control-tested in a C-45 crash, impacting at 95 mph. The right wing of the aircraft was made to hit a telephone pole at the center of the tank. In the impact, the outboard tank was compressed to almost 50 percent of the tank depth; yet it resisted penetration by crash-jagged wing skin and structural members and did not leak.

The same type tank was crash-tested in a CH-34 helicopter. The helicopter was equipped with both the new and conventional tanks. To simulate an extremely rough terrain, boulders were tied to the bottom of the fuselage. In the induced vertical crash, the tanks were subjected to a force in excess of 100 g's. The new tank absorbed the force and localized impact produced by the boulders without leaking. The conventional tank ruptured and burst into flames.

A somewhat similar material with a felt core and a surface of pleated thermoplastic film also worked extremely well. In a C-45 crash test, a full fuel tank made out of this material was actually thrown clear of the wing structure. It came to rest 6 feet in front of the wing, without any leakage or fire.

This tank, like the nylon tank, successfully retained its fuel when positioned between a cargo floor load and large boulders attached to the bottom of a helicopter.

These and other tests have convinced AVLABS that materials are available today which can provide resistance to crash impact, penetration, and tearing.

Although these tests were promising, the use of some type of emulsified fuel and crash resistant tanks is still some distance off. There is both theoretical and practical work to be done before the fuel system becomes a reality. However, the work done by AVLABS and other agencies is a major technological breakthrough, and it is now only a matter of time before Army aircraft will have this increased safety factor.

A puncture-resistant nylon crash fuel tank was torn from this wing, but none of the JP-4 escaped

You Need A Unit Survival Officer

Captain John R. Ulbinski

AIRCRAFT ARE MORE easily replaced than aviators. Besides the humanitarian aspect of saving lives, this is the basic idea behind the drive to do everything possible to see that all survivors of a crash have a fighting chance to get back safely.

As part of the program, many aviation units are appointing unit survival officers. A unit survival officer is not required by regulations, but the appointing of one is encouraged by the U.S. Army Board for Aviation Accident Research at Fort Rucker, Ala. Principal duties of the survival officer is to keep the unit's survival equipment and training at a satisfactory level.

Recent graduates of the U.S. Army Aviation School have had a certain amount of formal survival training. However, this training is necessarily limited in scope due to the time available for the training. Also it is impossible to tailor the instruction to the type of unit or the geographical area to which each individual will be assigned.

In some cases, the older graduates have not had formal survival training unless they had the opportunity to attend an Air Force or Navy survival school. The survival school at Fort Rucker was not established until late 1962. With no formal training the survival readiness of these aviators and crewmembers can be expected to be very low.

Emphasis on survival has reached the point that the Army aviator now has the survival equipment he needs to help him. Besides the SEEK-1 Individual Survival Kit and the three big 25-pound survival kits (hot climate, cold climate, and overwater for fixed and rotary wing) there are four survival kits specially designed for the OV-1 Mohawk, which are equipped with an ejection seat, survival kit lightweight and survival vest SV-2.

The survival kit lightweight, a new survival kit similar to the SEEK-1, is especially designed for use in such places as Vietnam and is being issued in that area first.

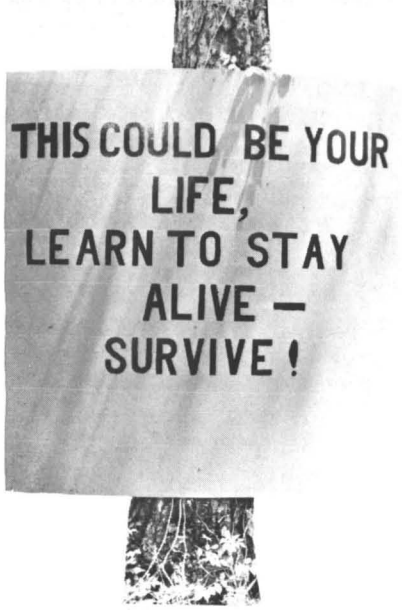
Of course, the unit survival officer should have his appointment as an additional duty. Care should be taken to select an individual who is genuinely interested in the job. Ex-survival instructors or aviators who have had a "walk back" one time are usually militant on the subject.

The survival officer should not let his duties of survival, evasion, and escape training conflict with the duties of the unit training officer, who is responsible for training on a much larger scale. Who will be responsible for survival training in the final analysis is up to the commanding officer, but usually it is best to let the survival officer be responsible as he will be a specialist on the subject.

The survival officer should establish a lesson plan file for presentation to the unit's avia-

USAAVNS survival training (below) is necessarily limited

CPT Ulbinski was assigned to the Army Aviation School's Department of Tactics, Special Subjects Division, at the time he wrote his article on the unit survival officer. During his tenure with DOT he was engaged in survival training and based his story on experience gained there. He currently is serving in Vietnam.



tors and crewmembers. There are a number of places where he can get help. For instance, the Department of Publication and Nonresidence Instruction at Fort Rucker has two plans: lesson plans 6/22-570-26, and 28-547-6, Survival, Evasion, and Escape. These are available on request and may be ordered on DA Form 17 (Requisition Publication and Blank Forms).

Good information on survival may be had from FM 21-76, Survival, various aviation magazines and publications, like the U.S. Army Aviation Digest and Department of the Army pamphlets, the U.S. Army Board for Aviation Accident Research at Fort Rucker, the Aviation School Survival Committee at Fort Rucker, and the U.S. Army Aviation School Library, also at Fort Rucker. The school library will assist in answering questions to the point of contacting such places as the Air University Library and the Public Service Library of Alabama if the information is not available at Fort Rucker.

Training should be directed toward the operational and climatic conditions in which the unit is operating. Besides conducting regularly scheduled classes, a portion of the monthly safety meeting should be devoted to a discussion of survival topics conducted by the survival officer. Recent accounts of aviators who have had to face a survival situation make outstanding discussion topics. If the situation is such that organized classes and briefings are not practical, the survival officer can distribute mimeographed briefing sheets.

Survival equipment should be one of the specialities of the survival officer. Detailed instruction on the proper use of the contents of the kits should be made. He should also aid the unit commander in establishing policies to standardize the survival equipment to be carried on each mission. A standardizing program will correct the practice of flying with too little or too much survival gear.

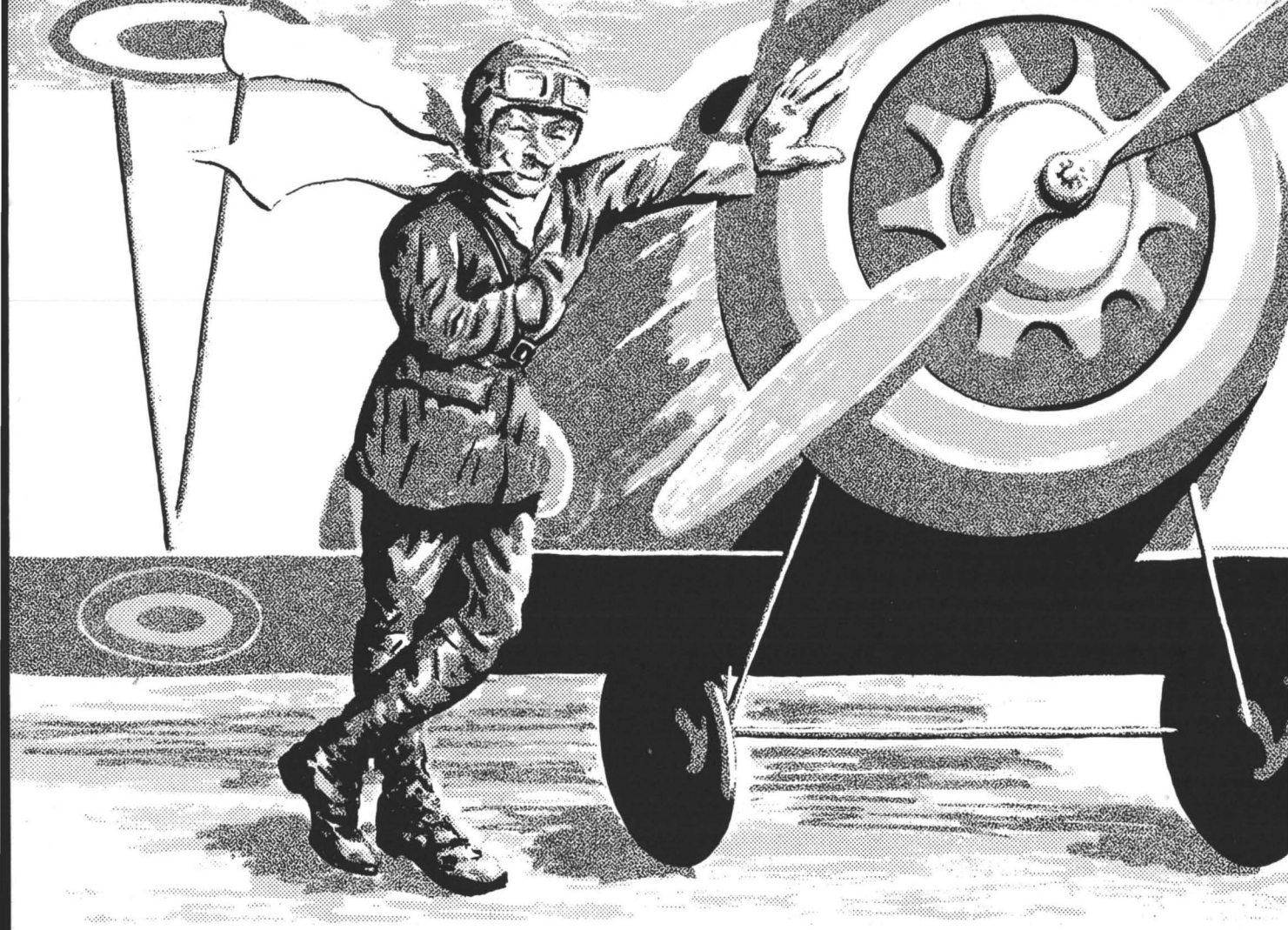
Inspection of the individual survival kits should also be the responsibility of the unit survival officer. Monthly inspections would help keep the aviator from flying with bad or damaged equipment. Some medicines in the kits have a two-year shelf life after which they can be no good or dangerous to use. Of course, in the case of medicines, the flight surgeon should have the final say as to when they should be inspected, by whom, and whether they should be discarded or not.

Immediately upon receipt of new kits they should be checked to make sure all items are included.

Many items, such as the Signal, Smoke & Illumination, Marine Mk-13 flare, Matches and Trioxane Fuel are shipped separately and must be placed in the kit before they are issued. The CO_2 cylinder on the life raft in the overwater kits should also be checked for proper installation.

With the rapid expansion of Army aviation and the hostilities in Vietnam, many Army aviators are being exposed to survival situations. By appointing a unit survival officer, the commander will have gone a long way towards preparing his aviators to face these situations and to live, fly, and fight again.

Units such as this one from Ft Huachuca stress local survival points



The Greatest Aviator

By Ivan Slipshod

I WONDER HOW it all got started? I guess that it was back when I was just a kid and I saw my very first movie about the old biplanes used in WW I and the Lafayette Escadrille. The leather helmets, flying white scarfs, and devil-may-care attitude the pilots had in that era really affected me. I imagine this is what set me on the road to becoming the greatest aviator of all time.

Yes, looking back over my great and illustrious career as an Army aviator I can see that I, Ivan Slipshod, was the best, the greatest of all time. It all comes back to me in a flood of memory . . .

Almost immediately after seeing that movie (I must have been at the ripe old age of 10) I decided that I wanted to be known and remembered as the greatest pilot. I daydreamed constantly about soaring through the clouds like an eagle — foot loose and fancy free. I read everything concerning flying that I could lay my hands on, even *Peter Pan*.

Need is the mother of invention. If this is true then desire must be the brother, sister, or something. I even built my own airplane.

I was reading a magazine when I came across the plans for building a model airplane. I decided that all I would have to do was increase the size of the plan and,

Since there is no mail service between Ivan Slipshod's duty station in the clouds and Ft Rucker, he solicited the assistance of WO1 Basil D. Tisdale in conveying his message. WO1 Tisdale was assigned to the Army Aviation School's Department of Tactics when he helped Ivan. Presently he is serving in Vietnam.

accordingly, I would have an airplane that I could fly myself. I worked on my plane night and day (as I was able) for a whole week. (I did not rationalize that aeronautical engineers take months or even years just in the planning the building of an aircraft . . . I knew that it would work.) I trudged on.

My airplane was to be a glider as I had no motor to put into it. I made it with a body of sticks cut from trees and covered it with cardboard and newspapers. I used the wheels from my wagon so it would roll. Then came the day when my plane was finally finished. I had put glue, wire, tacks, nails, sweat, heart and soul into its building.

There was a hill near our house —not very steep but steep enough. The road that ran down the hill made a left turn, but I planned to go straight ahead and off the steep embankment at the bottom and then sail off into the wild blue yonder.

The big event had to take place early in the morning so nobody would know of my great adventure. It was time. I pushed my airplane out of the yard into the street, started it rolling down the hill and climbed in. I knew it would work.

Well, I need not tell you how it turned out. My beautiful airplane rolled down the hill like I knew it would. It continued straight when the road turned like I knew it would. It went off the steep embankment like I knew it would. However, it did not fly like I thought it would. In fact, it did not even get off the ground. It went down the near vertical slope bouncing, skidding, sliding, and weaving like a drunken albatross at a frightful speed and came to an abrupt halt against a tree. THEN I WENT SAILING off into the wild blue by myself, which is not the way I had planned this thing at all.

I picked myself up and brushed the dirt from my face. Then I took inventory to see that all parts of me were still intact. Battered and bruised, sadder but wiser, I climbed the hill toward the house to dream more of my dream.

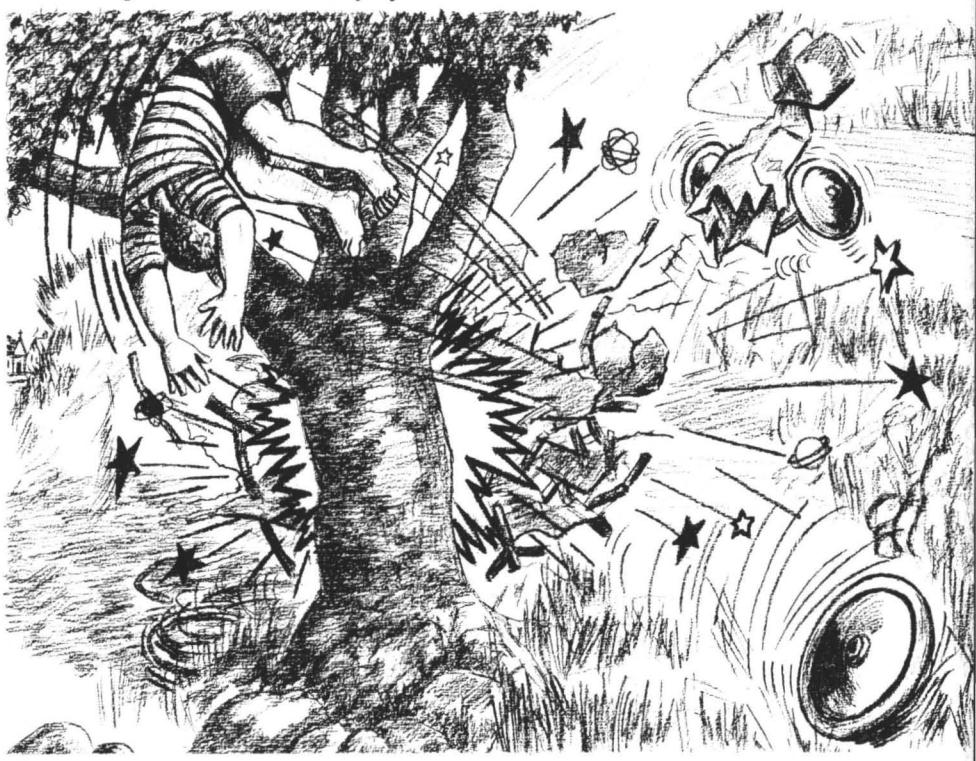
If nothing else (at that time, for I am the greatest now) I at least had the desire to become a pilot and nothing was going to deter me or change my mind. For the next several years I restricted myself to the daydreaming of the danger, romance, excitement and rewards of flying. I dreamed all the time of myself at the controls of an airplane, wind whipping past my face (naturally wearing a white scarf), combat and dogfights, screaming bullets, engine on fire and oil smoke trailing away from the airplane and me laughing and loving every minute of the battle.

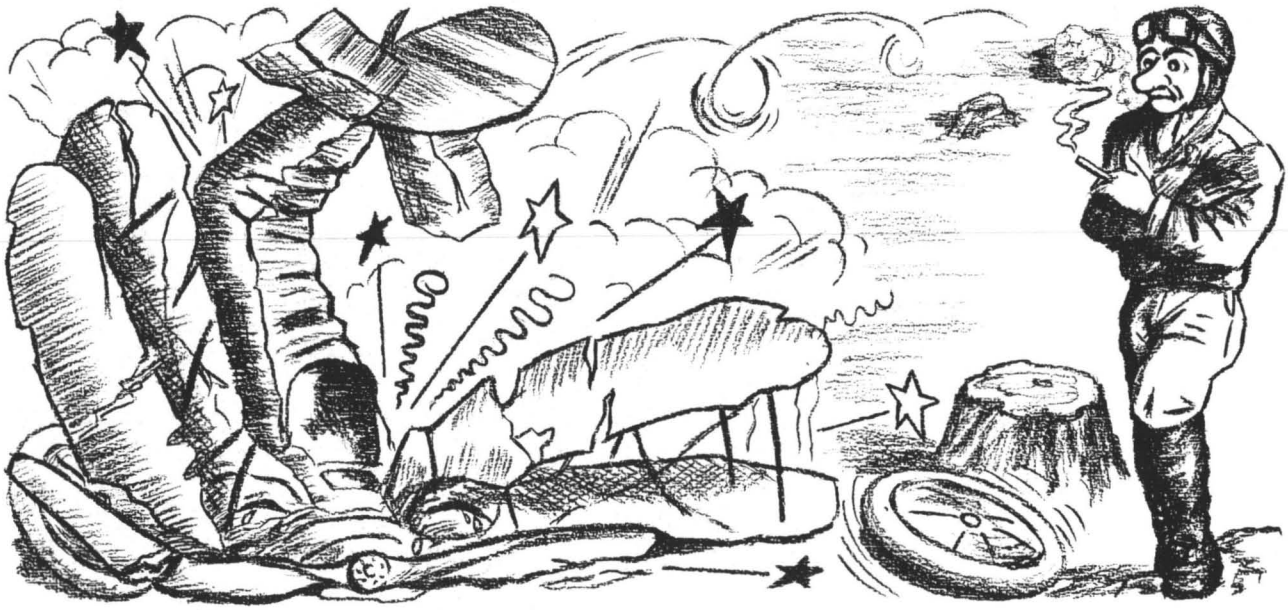
Finally, I was of age. My parents consented for me to get a license to fly (more to get me out of their hair than anything else I think). To me it was my chance to show the world what a great pilot I would be, and I wanted to get started. I went out to the airport and enrolled in a flight course. I was on my way. I won't bother you with the details of my first ride. I guess that everybody gets airsick their first time off the ground. I do remember that I was rather white when I came down.

Then my first solo ride. I rolled the plane out onto the runway and with three or four bounces I was airborne. During that ride I fully realized that I was a born pilot. Everything went smoothly and all too soon it was over.

I was happy just flying basic maneuvers for a while, but quickly the new wore off and this type of flying was boring for a natural born pilot like me. After all, wasn't I born to be great? Born

I went sailing off into the wild blue by myself





My beautiful airplane had cartwheeled a couple of times, but I came out without a scratch

with one foot in the clouds — that's me! I needed and craved action. I started low level flying at high speeds, tight spins, high speed stalls, etc., in short anything that I could do for thrills. The one thing I liked to do more than anything else was buzz houses upside down. After that, I liked to fly under things (that's a lot of fun).

One day I noticed a dilapidated old airplane sitting behind one of the hangars at the airfield, and upon inquiring around I found that it was for sale. Naturally nothing would do me but to buy it. We had a large field out behind our house that I thought would be great to use as my very own private airport.

I flew my "new" airplane over to the house and after making several passes to impress the neighbors I started my approach to the field, not taking into consideration the old sawed-off tree stumps and the (very) large boulders that I knew were there. Needless to say, my landing was less than outstanding. Spectacular, it was. The left landing gear collapsed almost immediately after I hit the first tree stump and the left wing came off. My beautiful airplane cartwheeled a couple of times and came to rest on its nose, but I came out of it without a scratch. I was a very good pilot and I am sure that my handling of that situation is, of course, what saved me.

I salvaged what I could and moved the plane up close to the barn. I haven't been home in some years but I guess that airplane is still where I left it.

I went right back to flying from the airport and, in time, I got a job flying a light plane carrying cargo from one place to another. After a time even this bored me and I started looking for things to do that would add a little excitement to my trips. I started flying low and waving to farmers and pretty girls. I'll bet that I really impressed some of them. The more experience I got the more daring I became. (I even tried crop dusting for thrills for a little while.)

Eventually, as was bound to happen, Uncle Sam called me to Service and, as was bound to happen, I found out about the Army's aviation program. I applied and naturally after they found out about my outstanding qualifications, I was accepted and started flight school. (I should have been given a direct appointment as an aviator, for in my own mind I knew that school would never teach me anything that I did not already know.)

My very first IP was a great disappointment to me. Here I was, the greatest pilot he would ever have the good fortune to meet and he was treating me like a beginner. (He should have taken advantage of the situation and tried to learn a few things.) How could I be expected to get all excited over something as simple as flying? A lot of times I didn't bother to even listen to what he was saying.

I knew that he jumped me for so-called errors just to show the others that he had no favoritism toward me because I was so far ahead of them in flying ability. I knew that I was a well above average student (I called myself a student just to show the others that I didn't look down on them because I was so much better than they) and that I could handle any situation that might come up. Why bother me with all that er-

roneous information? I knew more about flying than did any IP I have ever met.

It was very obvious to me that all my IPs were jealous of my flight ability because I would never have one any too long before I would be transferred to another. I had to straighten out more than one of them. They would argue for awhile . . . then I would have another IP.

It seemed to me that I had quite a few checkrides. I guess that when they wanted a check pilot straightened out on a particular procedure they were sent on a ride with me. A natural born pilot doesn't need to worry about little things like someone checking to see if he knows how to fly. I always fly to perfection although it always irked me to fly by the book. These old "scardy-cats" were just afraid that someone with more ability than they had would graduate and show them up for the sissy they really were. Safety . . . my aching back! They were just plain scared.

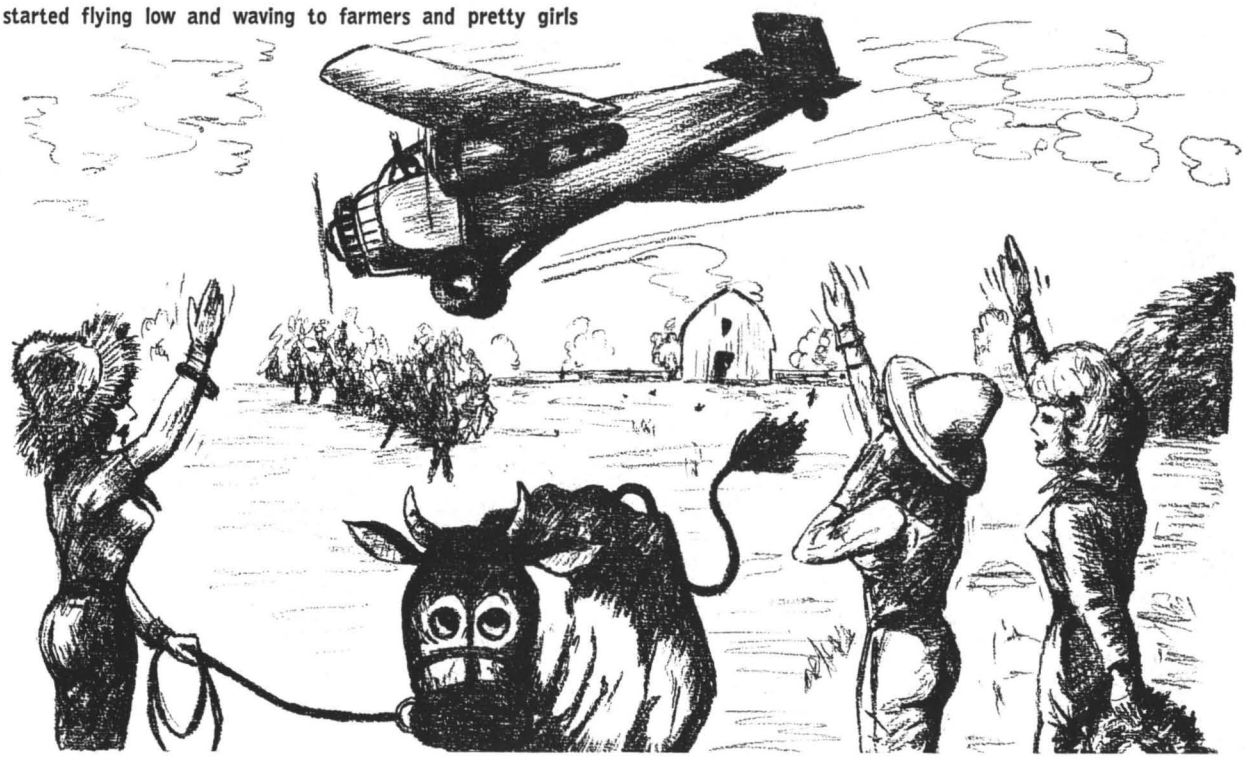
Flying in this manner bored me to tears. A natural born pilot was meant for bigger, better, and greater things than this. After many long and boring hours I finally graduated and pinned on the wings of a fledgling pilot. Fledgling pilot my happy foot! I knew better. I was going to show the whole world what a great pilot I was . . . now was the time.

Now I didn't have to listen like a fool to things like safety, fuel reserve, emergency procedure, take off into the wind, etc., etc., etc., for as everybody knows that if you take off into the wind you are a sissy. Anybody knows that these red lines on all of these instruments have a built-in safety factor and nothing happens if you exceed them at will. Yes sir . . . I was going to show them.

I was always the first aircraft off the flight line and into the air. Preflight? No need; these mechanics know their business. (Just hop in the aircraft and go.) Deficiencies noted during a flight? No need to write them down on the –13 as the next person to fly the aircraft was sure to notice them. Use a checklist? Why? I almost had a photographic memory with almost total recall. No need for a checklist. Study procedures and regulations? Why? With my ability and experience I could handle any situation. Rotor overspeed? Overboost? No need to worry about it. These little babies were meant to fly and fly them I did. They were built to take it and I was just the person to put them through their paces.

During one of my more relaxed times when nothing much was going on, I was sitting in the flight briefing room reading a magazine when I noticed this saying ". . . all an accident is . . . running out of ability, experience and luck all at the same time." Reading this really convinced me that I could never run out of ability, my experience was one of my greatest assets and I was born with a

I started flying low and waving to farmers and pretty girls



From my cloud I could easily see that I was still the best

rabbit's foot in my back pocket.

I was the best pilot in my unit and as far as that goes, I was the best pilot in the Army. I was well on my way to proving it.

Take that time I lost hydraulic pressure. Didn't I continue and successfully complete my mission? They didn't have to send a replacement aircraft. Somebody else would have set down and started yelling.

What about that time we hit a strong headwind on the homeward leg of our trip? Didn't I continue flying until we ran out of gas so that the VIP on board wouldn't have to walk so far to get back to base? Wasn't that a beautiful forced landing? Yes, I was the greatest.

None of the crewchiefs would ride in my aircraft because they were scared to fly. I don't understand how a person could have a job that required them to fly and be scared to go up. Anyway, I never forced anyone to go that didn't want to. If a person didn't want to go up, then stay on the ground—that's my motto.

Of course I got called on the carpet a few times for the way I did things. Every great person throughout history had a rough time of things. I just considered it not worth my time to think about it and continued on my way. (They were just envious, that's all.)

Looking back I can see it all now. I certainly proved that I was the best. How could I know that someone would drop the ball and not do their job. (It was the mechanic's fault—not mine.)

This is the way that it happened:

It was a rush job, hurry and go. That was my speciality and away I went. This was going to be easy. I had some rugged terrain to cross up ahead—a mountain range but it was no sweat. There was what appeared to be light rain or snow obscuring the tops of the mountains but no problem. I was the best and I knew it. I would just climb on top and continue on my way.

The weather was getting worse by the mile. I didn't have an instrument ticket. No problem. Ground fog was building rapidly and the ceiling was coming down. Pretty soon I had no ground reference and the weather was moving in pretty close, so I started climbing. Still no problem as I knew that I could handle it.

I applied full power and when we reached 9,000 the sick beast refused to go any higher. This is when I decided to turn on my nav radios. You guessed it; they didn't work. On top of that it was about this time that I had complete electrical failure. I reached for the logbook (cussing because I should have checked before leaving the ground) to see what was written up. NOTHING! This was my aircraft—the one that I flew all the time. I had passed the point of no return and couldn't go back now. I had to go on. (I made a mental note to really crawl my crewchief as soon as I got back for not keeping my aircraft in top condition.)

Before long I lost all reference to the horizon. Didn't I have the ability to back me up? Wasn't I experienced? How about all of that luck that had ridden on my shoulder for so long? Me worry? Not on your life. I knew all about those mountains just ahead . . .

I still have wings and I am still a great pilot even though I haven't flown an aircraft in some years. I still look down on the world and frown on all those scardy-cats that fly these days.

You say that you have never heard of me? I will admit that my name isn't as famous as Richenbacker or Lindbergh, or even as famous as any of your astronauts. This is due simply to the publicity the others got that I didn't. But my name will live on long after time has forgotten the others in the slogan: SLIPSHOD PRACTICES. And if you listen carefully you can hear me talk to you everytime you get in a hurry: "don't check that, it's always been right before" . . . "you know that's OK" . . . "no need to get a mechanic, it's within tolerances anyway". . . .

From my perch on this cloud I can easily see that I was the best. Yes, looking back on my great and illustrious career as an Army aviator I can see that I, Ivan Slipshod, was the best, the greatest of all time. It all comes back to me in a flood of memory. . . .

Captain Robert S. Fairweather

THE MISADVENTURE OF BUDDY BUG

BUDDY BUG felt great. This was his first day as an instrument instructor and soon he would be taking his first student out for training. After that year-long tour in Beenam against the soldier ants, this would be an interesting and safe job.

"Okay, Student Bug, let's get with it so I can get all the demonstrations in during this period. I will show you a tactical approach at the Dandelion NDB, and then we will come back to the Milkweed Beacon where I'll show you a standard ADF approach," advised Buddy.

The two walked swiftly out to the parking ramp, dodging the scurrying ants which maintained the aircraft, and quickly located the dragonfly assigned to them for that period. Student Bug climbed aboard and put on his hood. Buddy, meanwhile, made the preflight. He always took care when doing this chore and prided himself on his safety consciousness.

The dragonfly was in good shape. So Buddy climbed aboard, put his helmet and tick skin gloves on, and put the dragonfly into action. The wings quickly gained speed, and Buddy completed the runup while Student Bug checked the instruments.

"Horsefly Ground, this is Dragonfly 6 requesting hover/taxi instructions; IFR Dandelion. Over," reported Student Bug.

Buddy Bug, acting as controller, answered and continued the sequence of reports. He was justifiably proud of his knowledge of controller procedures, for he had spent many hours developing this ability.

Soon the two were winging their way to Dandelion NDB. Student Bug leveled off at 2,000 inches and completed his level-off checks. Buddy explained how to track and make wind corrections and then let his student practice while en route to the beacon.

"OK, I've got it," said Buddy as they arrived at the beacon. He started into the explanation and demonstration of the tactical approach which he learned so well in IMOI (Insect Method of Instruction). With great detail he explained every point of the approach as he skillfully maneuvered the dragonfly so that all gauge readings were perfect.

After the dazzling display, Buddy handed the controls over to Student Bug and asked for questions. Of course, the student had no questions because he was busy studying his feet during the demonstration, as students are inclined to do, and was afraid to show his lack of attention.

The two original aces then guided their craft on to Milkweed NDB for the next demonstration. Buddy made full use of the time by discussing and pointing out on the panel all the little techniques which make for successful tracking and track interception.

Upon arrival at Milkweed Beacon, Buddy again took control and started demonstrating the standard ADF approach with all the flair of an orchestra conductor.

"Now that we have completed our procedure turn, we track inbound to the beacon. See how I have us locked on a track of 185°. Next . . ." Before Buddy could complete the sentence, movement caught the periphery of his vision, and he looked up just in time to watch his dragonfly collide with a large moth. He desperately swept at the controls, but it was too late. The force of the collision drove him and Student Bug into their seats, and the dragonfly dropped into a spiralling descent, shedding its wings on the way.

* * *

Bobby Blatz and his big brother, George, sat on the open patio eating the lunch which their mother had just brought out for them. As Bobby reached for his peanut butter and jelly sandwich, he noticed something drop into his glass of milk.

"Hey, George, a bug fell into my glass. And look—it looks like it's dressed in a flying suit!" shouted Bobby.

"Aw, you little kids have wild imaginations," remarked George as he scooped the bug onto the ground and mashed it with his foot.

MORAL: When the other bug is under the hood, look out or you will get squashed. This is also good advice for Army aviators.

CPT Fairweather was assigned to the U.S. Army Aviation School's Department of Rotary Wing Training, Advanced Instrument Flight Division, when he wrote his article. It was a result of his experience as an "under the hood" IP that prompted "The Misadventure of Buddy Bug." Currently he is serving in Vietnam.

You Holler ...

WHAT STARTED OUT as a routine hunt for Charlie turned out to be quite an experience for Mister Forward Air Controller (FAC), the spotter. He found Charlie all right, but he had to make a forced landing after taking several hits. When the pilot crawled from his aircraft, he was pleasantly surprised to see an Army Huey sitting there waiting for him.

Where did the Huey come from? How did the Huey pilot know the FAC was there? It really is simple. Both aircraft were being flight followed by the 125th Air Traffic Company. The controller diverted the Huey when he heard the FAC's distress call. Another crew was saved through the Army's flight following system in the Republic of Vietnam.

Before August 1965, flight following for United States Army aircraft in RVN was conducted by the 18th Airfield Operation Detachment (AOD). This unit did an outstanding job with limited personnel and equipment, sometimes even using radios from salvaged aircraft.

As Army aviation in Vietnam increased, so did the need for a better flight following system. More and better communications were needed along with more qualified controller personnel.

Located at Fort Benning, Ga., was a unit that could fill the bill. The 72nd Air Traffic Company had just proved itself during testing of the 11th Air Assault Division. Here was an ideal unit with modern equipment and trained personnel, but mission requirements for this unit prevented it from going to Vietnam. So another unit had to be formed.

Out of the 72nd Air Traffic Company came the 125th Air Traffic Company. The tremendous task of organizing, equipping and deploying this unit to Vietnam fell upon the able shoulders of MAJ Jack Anderson, Jr., selected by Department of the Army to be the commanding officer. Major Anderson was an old-timer in the air traffic control business, and he knew the type people and equipment needed in Vietnam.

His personnel were hand-picked and the equipment was manufactured at Blue Grass Army Depot, Lexington, Ky. This all started in late June 1965, and one month later the first packet of personnel and equipment left Fort Benning for Vietnam. By September of the same year the entire unit was in Vietnam, in place and performing its assigned mission.

Just what is the assigned mission of the 125th Air Traffic Company in Vietnam? How does the mission affect Army aviation elements in country? United States Army Vietnam Regulation number 95-7, dated 2 March 1966, gives the answer to these two questions.

This regulation was written to establish standard Army air traffic control (ATC) procedures, to assign responsibilities, and to describe functions of the 125th Air

...We Foller

Major Norman W. Kemp

Traffic Company. The regulation applies to all Army aviation units and aviation support units assigned or attached to Headquarters, United States Army Vietnam, and to all units having Army aircraft operating in the Republic of Vietnam.

The mission of the 125th Air Traffic Company as outlined in USARV 95-7 falls into three categories:

• *Command and control*— The 125th Air Traffic Company provides a service designed to establish a command and control radio communications system that provides Army aircraft and aviation unit commanders an air-ground radio capability. This communications system is responsive to the aviation unit commander in the control of his aircraft, thus the term "command and control" system.

• *Flight following*— The 125th Air Traffic Company provides a flight following system using the same communications system and facilities established for command and control net, thereby relieving the aviation commander of the responsibility for providing this service.

This system provides maximum communications coverage of RVN to ensure safe and continuous flight following for all Army aircraft. Weather and search and rescue is tied into the system. Even though this flight following system was designed primarily for Army aviation in RVN, it is available to any aviator who requests it, as in the case of our FAC friend.

• *Fixed airfield terminal facilities*— The 125th Air Traffic Company provides terminal facilities to include navigational aids (NDB, GCA, tower) in accordance with priorities established by Headquarters, USARV.

Mobile control teams consisting of tower and GCA units may be provided to aviation units involved in large operations. Requests for these teams are coordinated through Headquarters, USARV. Smaller operations are supported by controllers with ground radio sets, and this service is normally obtained through direct coordination with the appropriate platoon commander of the 125th ATC. A platoon commander is located in each corps area.

It should be noted here that the Directorate of Civil Aviation (DCA), which functions as does FAA in the States, maintains clearing authority for all IFR flights in country. The 125th ATC has communications to DCA and can assist aviators in obtaining an IFR clearance. This is accomplished by four flight operation centers (FOC) located in country.

MAJ Kemp was executive officer, 125th Air Traffic Company, during the time he wrote about it. He was an original member of the unit when it was formed at Ft Benning, moving with it to Vietnam. Currently he is in the Command and Staff Division Dept of Tactics, USAAVNS.

Each FOC has one flight coordination center (FCC) to provide extention of the communications system.

The communications system includes UHF, VHF, FM, SSB, RTT and land line telephones. The single sideband is used primarily to pass flight plan information from one FOC to another or to another air traffic control agency. It could be said that the 125th Air Traffic Company is a small FAA operation providing just about everything an Army aviator needs information-wise, to include air warnings.

Back at the 125th ATC headquarters is a flight information section which provides published changes of frequencies for air traffic facilities and navigational facilities in RVN. This section is the collection agency for RVN aviation flight information which is published in the Southeast Asia Airfield Directory.

This directory is published by the U. S. Army Flight Information Detachment (USARPAC) and contains RVN airfield and heliport directory with essential information concerning airfields and heliports and a listing of navigational aids within RVN. Any Army aviator or unit commander may recommend changes, corrections, additions, or deletions to this directory by forwarding pertinent information to Commanding Officer, 125th ATC.

Another function of the 125th ATC is publication and distribution of the air traffic frequency charts for air traffic facilities and navigational facilities in RVN. The 125th ATC is also the Army's representative on the Air Space Coordinating Committee which meets regularly in Saigon. This committee is made up of all allied aviation and irons out airspace problems as they occur.

As stated before, the Directorate of Civil Aviation maintains IFR clearing authority and in essence owns the airspace. The establishment of an Army air traffic regulating system could only come about by good relations and a letter of agreement between the DCA, United States and Vietnamese military forces.

How does the aviator use the system? When he makes initial contact with the FOC or FCC, he gives his call sign, mission number (if appropriate), place of departure, time of departure (if other than time of initial call), estimated time en route, preferred flight route (if used), and place of first intended landing. Place of departure and place of landing may be given by checkpoint code or grid reference system unless they are major secured airfields.

The FOC will log in the aircraft and place his flight strip in the cardinal 1/4-hour block following the one in which his estimate falls. If at the end of this quarter-hour block, the aircraft fails to report, the FOC will attempt to contact him by all available radios, ATC stations, and other aircraft in the vicinity. At the same time, the place of intended landing will be contacted by land line or other means and a ramp check requested. If these efforts fail to locate the overdue aircraft within 30 minutes, a complete search and rescue will be initiated.

Time position reports are required at 30-minute intervals after takeoff if the ETE exceeds 30 minutes. These reports may be made to any element of the Army flight following system handled by the 125th Air Traffic Company, and they will be relayed automatically to the parent FOC of the element contacted unless another FOC is specified. In addition to the time and position reports only changes to the original flight plan need to be included.

Passing from one corps area into another also requires changing the responsibility for flight following from one FOC to another. To ensure continuity, reports are made to each FOC concerned. Normally the aircraft will be given a time or place to contact the other FOC, much like FAA procedures in the States. If no contact is made with the next FOC or allied ATC stations in the corps which the aircraft is entering, the pilot returns to the frequency of the FOC with whom he has been flight following. These FOCs are in constant contact with each other, ensuring complete radio coverage and flight following service.

Landings are reported to FOC or ATC stations simply by calling "destination." If the flight is to be continued, the pilot should give estimated ground time so his flight strip remains on the board at the FOC. If the landing is to be the last of the mission or last landing of the day, the call to the FOC or ATC station should add the word "termination" to the landing call. The flight strip is then removed from the board and placed on file.

When a mission requires more than one landing, the procedures and calls outlined are to be repeated, except that aviators may omit the mission number after the initial call; and for the place of takeoff, the phrase "off last location" may be used.

The Army flight following system in the Republic of Vietnam is being improved every day. It may not measure up to FAA standards, but through the system, several downed crews and aircraft have been recovered unharmed.

This flight following system in the combat zone is another first in Army aviation. The 125th Air Traffic Company offers a service to all aviators in the Republic of Vietnam. Their controllers say, "You holler—we foller."

Continued from page 11

and the student would shy away from this because of the unusual attitude involved.

The case of the simultaneous engine and rotor system overspeed is very real and comes as second nature to the student, since in reciprocating engines the hardest control for him to master is the throttle. It is also very hard for the instructor to guard against since high rpm is not one of the common errors he is associated with, unless in his experiences he has been confronted with the situation.

Three particular examples I have in mind all occur when the engine is under very little load (less than 20″ of manifold pressure). This allows the overspeed to happen so fast the instructor must be on the controls to prevent it. Just being close to the controls is seldom good enough.

Example 1 occurs on final for a normal approach. The student is in his descent and low rotor rpm. The rpm is not so low though that the instructor will not tolerate it with a 6 hour level student. Having been chastised many times because of low rpm, the student finally checks his tachometer and noting the low rpm increases the throttle rapidly.

Example 2 has the student at operating rpm about to reduce the throttle for a low speed mag check. He remembers it takes right pedal for absence of engine torque, so he overcontrols his right pedal while simultaneously increasing the throttles. This accident can be worth more than engine and rotor changes, if the aircraft rotates violently.

The last example happens at the start of an autorotation with pitch full down, the aircraft trimmed with right pedal, but instead of decreasing throttle the student increases rpm.

Speaking of autorotations, it is here that we seem to comprise our greatest number of accidents. From the moment the student reduces collective pitch to initiate the maneuver until the aircraft comes to a complete stop on the lane, the instructor must remain constantly vigilant and prepared to take any necessary action to prevent a simulated emergency maneuver from becoming the real thing. Most of the actions the student will perform are so common we can list them along with the necessary corrective action required by the IP.

The IP should be able to tell as soon as a descent is established whether or not the aircraft will land on the lane. If it is going to be close and is apparent that the student has not recognized this fact, the IP should bring it to the student's attention. Having been briefed on the situation, the student should be allowed to learn for himself as long as there is plenty of altitude; however, low altitude in an autorotation is no place for experiment. If the student is unable to correct the situation, the instructor pilot should either tell him to go around or take over himself. There is no excuse to allow an autorotation to continue when the point of touchdown is doubtful.

Our second major problem in autorotation is the inability of students to determine rate of descent (especially in observation type aircraft without instantaneous vertical speed indicator) and apply necessary corrective action to reduce an excessive rate of descent. The instructor has little time here for trial and error, but if he takes control of the aircraft the student should be allowed to follow through on the recovery in hopes that some training can be salvaged from the maneuver.

One cannot talk about autorotations without mentioning the application of collective pitch. For some reason this seems to be the hardest part of the autorotation to teach, and the part most susceptible to error. Many instructor pilots will sit back during an autorotation until time for initial pitch and then get on all the controls, checking and double-checking to make sure the student does everything as he should. To a certain degree, I have to go along with this procedure. Unless the maneuver becomes unsafe, to take the controls away from the student at this point or to ride the controls so heavily that he is unable to feel what his movements are accomplishing can be the most detrimental thing the instructor can do. Yet the instructor must be capable of taking the controls to abort the maneuver in a split second.

To be able to take control at this point and prevent an accident requires a preplanned course of action with no time allotted for trial and error.

Next let us consider a hovering autorotation. The helicopter is at a 3-foot hover, headed into the wind at operating rpm. The power is reduced and—but wait, now any self-respecting instructor anticipates the student's reducing collective. Yes, you're right. So you pick the aircraft back up to a hover, explain the maneuver once again and again you reduce the throttle, with the same results. Once again you take a raincheck to the smiled crosstube ceremony.

This time instead of instructing verbally, you also demonstrate the hovering autorotation. Once again 3 feet, into wind operating rpm when you reduce the throttle. But after the student reducing collective pitch twice before, you are ready for him—only to feel yourself being pressed into your seat as he makes a violent pitch pull.

Who has the aircraft? Instructors, you have the aircraft.

CRASH SENSE

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

NO GO

UH-1C CREWCHIEF: "At about 1400, we were informed about a mission and proceeded to the ship. The aircraft commander and pilot preflighted. The aircraft commander then started the aircraft and tried to hover backwards out of the revetment to go to the POL. We had approximately 900 pounds of fuel aboard and he was unable to hover without losing rpm, so he told the gunner and me to get out and walk to the POL.

"When the ship got to the POL, we added a little over 100 pounds, bringing the total aboard to more than 1,000 pounds. We then moved to the road beside the runway and waited for the slick to take off. The flight commander called on the radio and said there would be a delay. He told us to return to the parking area. Again, the aircraft commander was unable to hover without losing rpm, and the gunner and I walked back to the parking area.

"After hovering back to the parking pad and shutting down, the aircraft commander asked if we had any extra weight on board and we removed a case of M-79 ammunition.

"In about 10 minutes, we cranked again for takeoff. This time we hovered out of the parking stall with the full crew of four aboard. The aircraft commander called the flight commander and told him we were going to have a little trouble getting off because we were loaded pretty heavy. We started our takeoff at the far end of the parking area on the road normally used for takeoff.

The aircraft commander began the takeoff by sliding along the ground and then rose about 2 feet, but fell through, bounced the skids, then rose again. At the time we bounced, we were about 20 yards from the first obstacle. As we came off the ground, the aircraft commander pulled pitch to clear the wires. As we passed over the wires, the pilot called out the rpm as 5600. After clearing the wires, the aircraft commander reduced pitch to try and regain rpm. Our flight path took us over the open field north of the maintenance area. When we reached the end of the compound, we were below the fence, and the pilot called out the rpm as 6000. The aircraft commander again pulled pitch to clear the fence and continued over a small field, beyond which was a wall of rubber trees.

"At this point, he looked ahead and to the right, then banked the aircraft to the right when we were about halfway across the field. After banking, he continued to try to climb and follow a low draw through the trees. The main rotor hit one tree and changed our course slightly. The aircraft commander seemed to have little control and was unable to avoid a large tree which we hit head-on.

"After hitting the tree, I think I was thrown from the aircraft, but can't be certain. The next thing I was fully conscious of was being on the ground about 25 yards from the aircraft. I jumped up and ran to it and found the aircraft commander trying to climb out of the wreckage. I reached for him and helped pull him free and away from the aircraft. . . ."

Investigation narrative: ". . . They were shut down for approximately 10 minutes before again cranking for takeoff. During this time, the aircraft commander had the crewchief remove a case of M-79 ammunition, which was the only item of weight not normally carried. . . . His actual takeoff

NO GO

weight was 8,360 pounds and his takeoff attempt was made on a road along and beside the parking area. He had 847 feet of clear area before reaching the first obstacle (wires) about 20 feet high.

"He began his takeoff sliding along the ground, then rose about 2 feet and continued to gain groundspeed. The aircraft then dipped down, striking the skids hard, and bounced into the air. Witnesses said it had a high groundspeed and unusually nose-low attitude prior to bouncing. After bouncing, it was about 60 feet from the wires and the aircraft commander began pulling in pitch. As they cleared the wires, the pilot called out the rpm as 5600. At this point, the aircraft commander reduced pitch to try and regain rpm. The aircraft dropped behind some tents and buildings and was out of view of the ground witnesses.

"The flight path took the aircraft over a short open area where the takeoff could have been aborted, but the aircraft commander elected to continue. As they approached the fence at the edge of the compound, the pilot called out the rpm as 6000. The aircraft commander again increased pitch to clear the fence and the flight path took them over another open field. Beyond the field was a plantation of tall rubber trees.

"The aircraft commander again elected not to put the aircraft down and headed for a low point in the trees. He continued to try to climb. As they cleared the first trees, the rpm was bleeding and the aircraft commander began flying through low areas in the treetops. The skids began dragging through the trees, the main rotors hit the trees, and then the aircraft struck a large tree head-on. It came to rest 35 meters from the tree. Before hitting the ground, it turned 115° to the left and rolled inverted.

"The crewchief believes he was thrown from the aircraft. When he came to, the aircraft had started to burn. He went to the wreckage and helped pull the aircraft commander away. A fire truck arrived at the crash and the pilot and gunner were pulled from the wreckage. The gunner was the most seriously injured, with fractures of both upper legs, pelvis, neck, ribs, and jaw. The crewchief had only minor lacerations on his hands. The aircraft commander had a fractured leg and the pilot sustained lacerations and second degree burns on his head, face, and hands. His most serious injuries can be accounted for by the fact that he was not wearing gloves. He said that he had lost his gloves a few days before the accident. . . .

"The engine was removed from the aircraft. Although crash and fire damage was too extensive for it to be run on a test stand, it was examined by an engine specialist who stated that he could find no indication of a malfunction. There was no turbine damage other than from impact. Examination of the fuel control unit indicated the aircraft commander had full throttle, full beep, and full pitch at the time of impact. In the specialist's opinion, the engine was functioning properly. Fuel samples were taken from all bladders and no indication of fuel contamination was found. There was no evidence of mechanical malfunction.

"The takeoff weight was 8,360 pounds; pressure altitude was 1,706 feet; temperature was 90°F; and the wind was calm . . . . The cause of this accident is considered to be the aircraft commander's failure to abort the takeoff on two occasions when he could have landed without damage. If he had elected to put the aircraft on the ground, either before or after the compound fence, this accident would not have happened. The fact that the aircraft was over gross weight limitations for the pressure altitude and temperature accounted for his difficulty taking off and the resultant low rpm. Failure to use the runway is considered a factor. Although he had a long takeoff distance and a low barrier, his safety factor would have been increased if he had taken the time to hover back to the runway."

Reviewing official: ". . . The aircraft commander involved in this accident was well versed in the operation of the UH-1C. In this case, it became obvious, after the crash, that the aircraft would not fly this time. Loss of rpm during takeoff is a common occurrence. This aircraft commander had at least two opportunities to abort his takeoff and make a safe landing. He elected to continue each time. He failed to use the runway for his takeoff. Use of the runway has become SOP in this unit for all gunship takeoffs. . . ."

Headquarters' indorsement: ". . . Assuming the weight data presented in the report is approximately correct, a reduction of load by at least 121 pounds was in order. This fact was readily apparent to the aircraft commander when he had to remove the crewchief and gunner to hover to the POL point. The aircraft commander exercised poor judgment when he failed to reduce the load.

"It is implied that mission accomplishment would not have been possible if the load had been reduced to the point where a normal takeoff could have been made. There is no evidence presented in the report substantiated by performance data that this mission could not have been accomplished by reducing the fuel or ammunition load by 100-300 pounds. . . ."

URC-10 RESCUE

OH-13S PILOT: ". . . We had taken off from an LZ and were making a visual reconnaissance of the mountains. It was partially cloudy and wind at 10 knots from the northeast. At the time I was traveling approximately 50 feet above the trees, and alongside a ridge line. . . . I was in a left bank and was maintaining 40 knots when the engine quit. The aircraft had been running normal all during the half-hour flight and none of the gauges indicated any malfunction.

"When I heard the engine quit, there was no shuddering or shaking. The engine tach and manifold pressure gauges dropped off and I autorotated. I told my wingman over the radio that my engine had failed. I maneuvered to the top of the ridge and zeroed my airspeed. Using rotor rpm, I cushioned the aircraft into the trees, tail low. The tail boom caught in a tree and the aircraft pitched bubble down and we fell head first through the 100-foot trees.

"Due to the thick growth, we were hardly jolted upon contact with the ground, and got out uninjured. The M-60 hanging in the right door and my survival gear in the front right side were torn from the aircraft, and my crewchief and I began a search for them. We popped white and red smoke to let my wingman know we were at least alive. We never located the M-60, but the survival gear was down the side of the ridge and I immediately called my wingman. I told him we were OK and he stated help was on the way. I rogered him and said I would call him back in a few minutes as I wanted to look over the aircraft and see what could be salvaged and if we could determine the cause of engine failure.

"All we found was oil in the turbocharger, but it was damaged during the fall which could have caused this condition. We gathered everything we could together and piled it in front of the aircraft and I called my wingman. He asked me to pop smoke so the rescue ship could locate me, which we did. I began talking to the pilot of the rescue ship and he directed us to an opening about 500 meters northwest of us. As we could not carry the equipment, seat cushions, radios, skidmounted M-60, and chest plates through the thick undergrowth, we left them with the aircraft, only carrying an M-16, smoke grenades, and radio. We were hoisted out by a Chinook and returned to the LZ.

"A crew of three men were sent in to see if the aircraft could be salvaged. They determined it was not, hoisted what equipment they could back out, and were ordered to burn the aircraft."

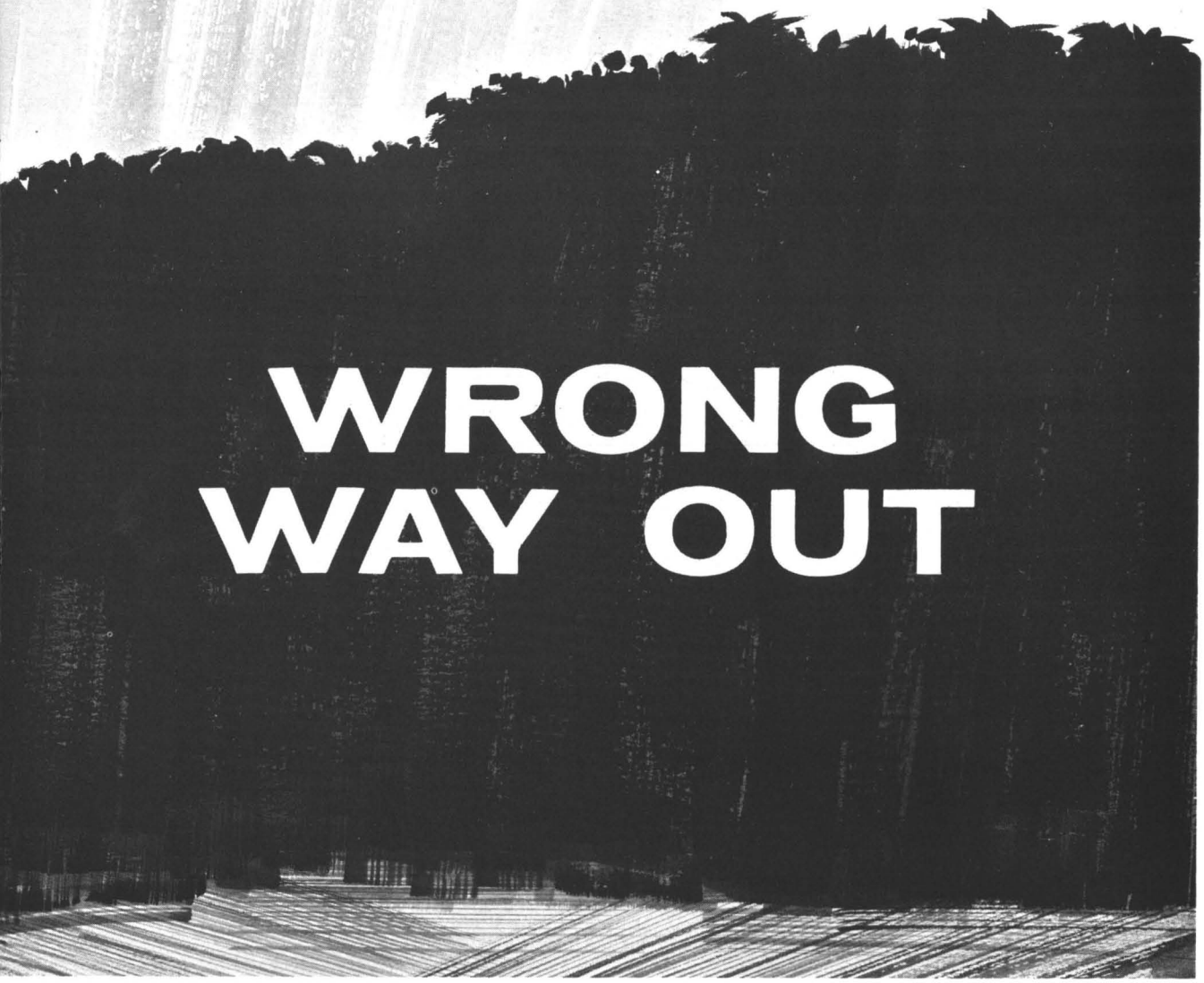
Wingman: ". . . We were flying generally north up a slight draw. The pilot in the other aircraft turned south and a few seconds later I heard a distress call. I saw him flare and settle into the trees slightly tail low. The wind was from the south approximately 5 knots and he was at an altitude of 30-50 feet. Weather was clear with light turbulence. The trees were extremely thick and approximately 100 feet tall in the area of the forced landing. The only contact I had with the pilot after the accident was through the use of the URC-10 emergency radio."

Aircraft accident investigation board: ". . . The pilot and gunner were extracted from the area within the hour. The short period between crash and rescue can be directly contributed to use of URC-10 survival radio which enabled aircraft circling above the area to direct the pilot and gunner to a suitable pickup point."

INVESTIGATION BOARD NARRATIVE: "At approximately 1100, a UH-1D, with a crew of four and four passengers, left for an LZ. When he arrived, the aircraft commander circled the LZ several times and, observing smoke, made a circling descent, landing to the east. The wind on the valley floor was estimated at 2-3 knots, light and variable from the southeast. The aircraft commander had no difficulty during the landing and, after discharging one passenger, prepared to take off.

"From the takeoff point, after making a hover check, the aircraft commander departed to the southeast, circling to the north. The takeoff was made nose low in an attempt to gain airspeed. As the aircraft neared the steep, wooded hillsides to the east, it continued to turn to the north, gaining altitude slightly and steepening the bank. The aircraft commander continued the turn through a heading of north in order to avoid the trees. While doing so, he crossed the valley opening to the north. Just after crossing the opening to the north, while in a 60° bank, the aircraft started to lose rpm and settled.

"In order to avoid the steep, heavily wooded slopes to the northwest, the aircraft commander continued to turn and increased collective pitch to avoid striking the trees. In doing so, the angle of bank was further increased and the engine and



rotor rpm continued to drop. The turn was completed at extremely low rotor rpm and a final flare was made just prior to impact. The aircraft struck with the skids nearly level, and with considerable forward motion. It slid forward a short distance, struck a dike, shearing the left skid from the fuselage, and started to bounce and roll. After two bounces, it rolled to the left, the main rotor and rotor head separated, and the aircraft came to rest on its left side.

"The gunner jumped from the aircraft before it came to rest. One passenger remembers sliding from the aircraft and landing on his chest in the paddy. After the helicopter came to rest, the aircraft commander, pilot, crewchief, and one passenger exited and a count of personnel was made. One passenger was missing. He was found pinned beneath the wreckage. He was removed and life-saving measures were started immediately. The engine was still running and, at this time, another pilot arrived in an OH-13. He and the UH-1 pilot attempted to shut down the engine. During this attempt, the spilled fuel caught fire. No firefighting attempt was made due to the lack of equipment and size of the fire. The aircraft burned."

Analysis: "The board concluded that there was no evidence of materiel failure, improper maintenance, or inspections, although the aircraft was flown 10 minutes past an intermediate inspection. Pending the results of the engine analysis, the board has proceeded with the assumption that there was no engine or fuel system malfunction. Possible malfunction in the other systems could not be investigated due to the almost complete destruction of the aircraft.

"Examination of the aircraft records and available 2408-13's and 2408-14's offered no evidence of discrepancies which could have contributed to the accident. The 2408-13 dated 20 days before the accident indicated a momentary power loss, but an inspection by maintenance proved negative.

"There was no subsequent power loss in the period leading up to the accident, except on the day of the accident, when a 100 engine rpm loss was noticed by the pilots, at 91% to 93% increase N_1. The board concluded that this was due to a takeoff from a pinnacle and the consequent and immediate loss of ground effect.

"The board considered the possibility that the aircraft was out of weight and balance limitations, but investigation proved that the aircraft, with its fuel and cargo loads for weather conditions existing at the time and place of the accident, was well within weight and balance limitations. The next and final consideration after expending all other possibilities was pilot judgment and technique.

"The aircraft commander stated that he circled the landing zone several times to determine the best approach route with existing wind conditions indicated by the smoke provided by the ground unit. These orbits gave him an opportunity to select not only the best approach route, but also the best departure route.

"The aircraft commander, who remained at the controls prior to the accident, executed a circling approach with a final leg to the southeast. After discharging one passenger, the aircraft load was three passengers, 100 pounds of cargo, and four crewmembers. The aircraft commander pulled a hover check which indicated 93% N_1, affording a 2% power margin for takeoff, as the topping had been previously determined during the morning as 95%.

"The aircraft commander, from his takeoff point, could not see the open valley to the north, which afforded the safest departure route. It was blocked from his vision by the rapidly rising terrain. His only knowledge of this exit route could have come from a terrain analysis while performing his high reconnaissance. The aircraft commander, with a predetermined decision for a circling departure, departed to the southeast into the light and variable wind, reached translational lift at an estimated distance of 50 feet, and performed a left turn to the north, at the same time increasing his takeoff power to 95%. This maneuver brought the aircraft in direct confrontation with the rapidly rising valley walls and the 100-foot trees.

"The aircraft continued on its flight path over this terrain, gaining up to 60 knots of airspeed and 150 feet altitude, the maximum altitude prior to the crash. He sacrificed altitude for airspeed, necessitating a continued power application of 95% N_1. After continuing his flight path to the north for approximately 300 meters, the aircraft commander banked sharply to the left, in accord with his plan for a circling departure. Here again, the aircraft commander, sitting in the left seat, failed to see the open valley to the north, due to the left

side low attitude of the aircraft in a left bank.

"He continued in a left turn, sharply increasing the bank to 60° plus. He saw that his engine rpm was 6200 and decreasing, then rolled out of his turn momentarily, at the same time pulling more power to remain above the trees. Realizing his hazardous flight conditions, the aircraft commander continued a sharp left bank, possibly increasing the angle to 80°-90°, intending to land in one of the open rice paddies on the valley floor. Continuous application of collective pitch was employed to prevent the aircraft from settling in the trees.

"After the aircraft cleared the trees, the aircraft commander, in an attempt to regain lost rpm, bottomed collective pitch, flared, then pulled pitch to cushion his landing. The force of impact, although the soft ground of the rice paddy provided a partial cushion, indicated the lack of enough rotor rpm to properly cushion the rapidly settling aircraft. The partially intact main rotor blade gave an indication of the slow rotor rpm. The tail low attitude at the point of impact indicated that the aircraft commander failed to level the skids prior to the touchdown, or that there was insufficient rotor rpm to allow control response."

Cause factors: "Failure to operate within operating limitations. The combined factors of weight, airspeed, angle of blade attack, degree of bank, and radius of turn resulted in a loss of lift and rotor rpm, causing the aircraft to settle. The combined factors added up to a flight condition from which the aircraft commander was unable to recover because of his selected flight path.

"Failure to properly evaluate the landing zone for approach and departure routes.

"Failure to execute a normal or maximum performance takeoff to clear the obstacles.

"Lack of communication between aircraft commander and pilot. The pilot had no knowledge of the takeoff route."

Recommendations: "Review of the effects of unusual flight attitudes carried out in close proximity to the ground.

"Review of techniques necessary to evaluate terrain during high recons.

"Review of the proper use of the GO-NO-GO chart.

"Bring to the attention of all aviators the facts and circumstances surrounding this accident."

WRONG WAY IN

OLD PILOT: ". . . . After 30-45 minutes of visual reconnaissance, we flew around a basin . . . . then began working our way eastward. The terrain rises fairly fast in that area, so I added climb power. I noticed that the aircraft was not climbing. The terrain was rising rapidly, so I went to takeoff power. Still the aircraft failed to climb. We were heading for a very large, high tree, so I started to lower a little flap and began to make a turn to the right to avoid the tree and head for lower terrain. I don't remember anything else until about 45 minutes later when I regained consciousness and the observer told me we had crashed. . . ."

The aircraft accident investigation board listed the following cause factors:

". . . Failure to recognize the rate of terrain rise and start a climb in sufficient time.

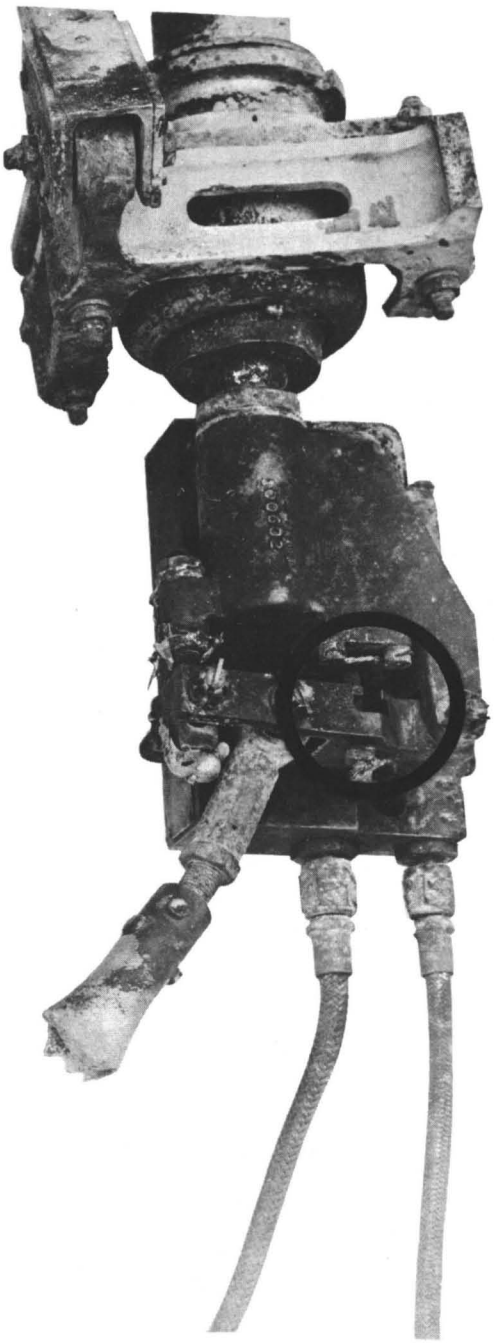
"Flying at an altitude (300-500 feet) below that approved for routine visual reconnaissance missions.

"Exceeding aircraft capabilities by lowering flaps and banking at low airspeed.

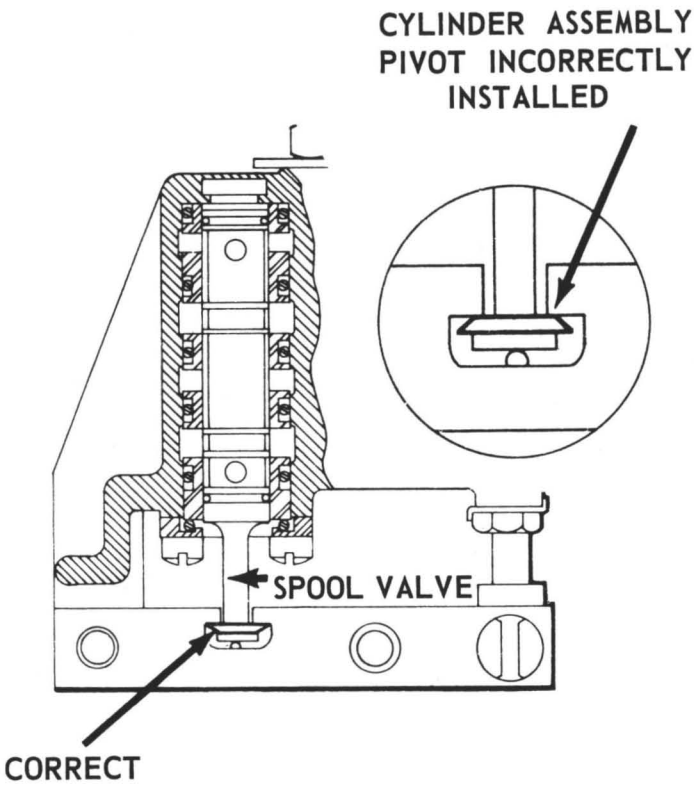
"Operating over allowable gross weight and out of c.g.

"High density altitude."

Pivot, installed in accordance with Murphy's Law (upside down), came out, causing servo to fully extend and forcing cyclic to left rear position. Tail rotor hit ground and UH-1 rolled to left and crashed.



MURPHY'S LAW?



UH-1B AIRCRAFT COMMANDER: ". . . I preflighted and everything checked out well. . . . The pilot got in and started the engine. After we completed our checks, we started hovering out to take off. He was a little rusty on the controls. Since he hadn't flown for a while, I took over. I started hovering out, got halfway, and the cyclic came back to the left corner of the cockpit. I used both hands and tried to shove it back. That didn't work. I should've gone down on pitch, rather than trying to shove it back. I thought the hydraulics had gone out. It wouldn't go back so I pushed as hard as I could with both hands and it just wouldn't go. The aircraft was shaking and vibrating and it rolled on its left side."

The helicopter burst into flames and burned. The gunner was killed. The aircraft commander, crewchief, and only passenger sustained critical burn injuries to their faces and extremities. The pilot escaped with minor contusions and abrasions on his hip and legs.

Investigation board narrative: "There were several witnesses to the accident, some only a few yards away. After evaluating witness statements and interviewing the pilot, the board directed its attention to loss of control, either by materiel failure or pilot technique. Considerable time was spent going through what was left of the wreckage. Nothing of importance was found.

"A request was made for technical assistance. The following morning, technical representatives arrived to assist the investigation. Three members of the board interviewed the aircraft commander before he was evacuated for further treatment. After possible cause factors were discussed with the representatives, a complete re-examination of the wreckage was started. All push-pull rods and tubes had been melted by fire, but bellcranks and hard points were distinguishable. The aircraft commander stated that the cyclic had moved to the left rear and he was unable to return it to the center position using both hands. The board concentrated on determining what would cause a cyclic input of this nature.

"Detailed examination of the cyclic servos revealed that the pivot (horseshoe washer) was missing from the right lateral servo. . . . The board concluded that the pivot came out of the servo cylinder while the aircraft was at a hover, causing the servo to fully extend and forcing the cyclic to left rear position. As a result, the tail rotor struck the ground, and the aircraft rolled to the left and crashed.

"The aircraft had flown 1 hour since the completion of the 17th periodic inspection. The unit received the aircraft 2 weeks prior to the accident. It had been grounded since the acceptance and periodic inspections. The PE was pulled 3 hours early in conjunction with the acceptance check.

"The aircraft commander had worked closely with the crewchief, conducting the PE and getting necessary parts. One of the parts which required replacement was the lever assembly cylinder. The part was obtained through the general support maintenance unit and installed by the crewchief. The technical manuals indicated that replacement of the lever assembly cylinder would be done by general support maintenance. To replace the lever assembly cylinder, the pivot (horseshoe washer) must be removed along with several other small parts. According to the statement of the technical inspector, the crewchief did this work and he inspected it and found it to be correct.

"The aircraft crashed as a result of loss of control caused by the pivot coming out of the servo cylinder. The replacement of parts on the servo cylinder was done by organizational maintenance and inspected by direct support maintenance personnel. The work should have been done by a general support maintenance unit.

"There are two critical points when assembling the lever assembly servo, which, if not done properly, will result in the pivot falling out the assembly. If the pivot is installed upside down, and it *will* fit that way, the pivot will break and fall out. When the fine adjustment is made, with limits of 0.001 to 0.004, any dirt, sand, or foreign matter in the system will result in improper tolerance, thus permitting the pivot to work free. If the pivot is installed properly and the correct adjustments are made, the pivot cannot be pulled out of position by any reasonable force."

Flight surgeon: "The civilian was not wearing a helmet and consequently had severe burns about the head and face. He was not wearing gloves and was wearing nylon stockings, resulting in severe burns of his hands and feet. None of the members of this flight were wearing fire retardant clothing. . . . Stronger emphasis should be placed on the use of helmets, gloves, and the proper clothing by all members and passengers of aircraft. Fire retardant clothing could have prevented much suffering in this accident and may have saved a life."

TOO MUCH TOO LATE

U-1A AIRCRAFT COMMANDER: ". . . When we first landed, the tower did not inform us about the ditch that had been cut across the runway at approximately the halfway point. The dirt had been piled next to the ditch on the north side. We landed to the south on the north end of the runway and neither of us saw the pile of dirt until we were already on the ground in our landing roll. We were able to stop before hitting the dirt or the ditch. I called the tower operator on FM and asked him why he had not informed us of the hazard on the runway. He 'hemmed and hawed' around and finally said that he 'thought all fixed wing traffic had been notified.' I told him to inform all fixed wing traffic by radio as each approached for landing. We then took off.

"When we returned, the tower operator said 'be advised, we have only 1,500 feet of usable runway.' We landed and picked up our passenger. This gave us three passengers and approximately 250 pounds of cargo. . . .

"As we taxied out for takeoff, I saw an O-1 on the active waiting for takeoff. We held on the first taxiway and performed an abbreviated runup and complete pre-takeoff check. I called out the checklist to the pilot. When the Bird Dog departed, I requested takeoff clearance. We were cleared into position and told to call when ready for departure. We taxied into position and I checked to see if the passengers were secure, as we had left our crewchief at another airfield.

"The pilot lined up, rolled forward a short way, switched the tail wheel into the lock position, and rolled forward a little farther, 10-20 feet. He then locked his brakes and advanced the throttle to 30 inches as I received takeoff clearance. As he reached 30 inches, he released his brakes and advanced the power to approximately 35-36 inches and approximately 2225-2250 rpm. We started rolling straight down the runway. After a short distance, we started to swerve toward the left. The pilot brought the aircraft back toward the center of the runway. It did not want to leave the ground and made a fairly violent swerve to the left again, toward a long double row of landing mat pallets that were lined up near the side of the runway. We were dangerously close to the pallets, so I assisted on the controls. We attempted to clear the pile of dirt next to the ditch across the runway.

"We were too close to the pallets and the ditch to cut the power and abort the takeoff safely, and I felt that with a little more back pressure we could clear the dirt. We both pulled back on the yoke, but the aircraft did not leave the ground fast enough and we struck the dirt with our gear. We both thought that we had only hit the right gear, so when I called the tower I told them that I thought we had damaged our right main gear and requested permission to do a 180° turn and fly by the tower to check for damage.

"As we were climbing and turning for our pass, I tried to check the gear myself. The tower informed us that our gear appeared to be intact but the rear (drag) strut seemed to be bent. We climbed out toward the southeast and I turned around in my seat, put my feet through the cabin door, told one of our passengers to hold on to my feet, leaned out the cockpit door, and examined the right gear as best I could. I could see no damage to the compression strut or the axle strut, except for a scrape mark on the compression strut from the upper fairing. The drag strut had been bent and was cracked. It had the same appearance as a piece of copper tubing that had been bent almost double and straightened out again. I knew that without a proper drag strut, the gear would no doubt collapse on landing. I took control and told the pilot to try to see if we had any damage to the left gear. He could not see any damage. . . .

"We came to an airfield and decided to land. I requested a landing on taxiway 27. With the wind generally out of the south at 6-8 knots, we would be able to keep the right gear off the ground much longer and possibly delay its collapse. The tower suggested that we try to land south on the number one taxiway that runs between the runway and the parallel taxiway. It was 1,200 feet long and wide enough. I took a pass at the taxiway and decided it would be sufficient. I told the pilot that I would make the landing from the right seat, but for him to be ready to help.

"We made a wider than normal approach and touched down left gear and tail wheel first with the right gear still in the air. It didn't stay up very long because the left gear started to collapse immediately, causing a left turn and bringing the right gear down abruptly. They both collapsed and we headed off the taxiway to the left. I pulled the emergency fuel and oil shutoff valve and started to shut off

switches. When we came to rest, we had turned about 120° from our landing direction.

"I yelled for the passengers to get out, finished throwing switches and pulling circuit breakers, checked to see if the passengers were out OK, and got out.

"Crash rescue personnel were already standing by the aircraft when I got out. There was no fire so I returned and checked that all of the switches were off and disconnected the battery.

"I have been in and out of the airfield many times in the past 9 months and I have experienced very similar actions on takeoff from that strip. It has, at times, very unusual wind currents that do unusual things with an aircraft. Many of the pilots I have flown with have expressed the feeling that the aircraft either would not come off the ground when it should, or it seemed to be pushed back down to the runway.

"UH-1s were parked fairly close to the side of the runway on the left side. Due to the high trees and the proximity to the runway, if a Huey is turning up, or even at flight idle, it produces an exaggerated effect on any fixed wing aircraft landing or taking off on the strip, especially an Otter. . . .

"One UH-1 had just landed prior to our takeoff. It landed near the beginning of the row of helipads and, even though I did not actually see it, I think it caused our first swerve. I think our second swerve was caused by a UH-1C picking up to a hover for takeoff. I have felt swerves like that before in the same area and two other facts make me believe that the swerve was caused by rotorwash. First, the second swerve occurred even with the helipads. Second, an aircraft was cleared for takeoff very shortly after we cleared the runway. If we had not used up so much runway counteracting the two swerves and avoiding the pallets on the side of the runway, we would have been able to gain sufficient airspeed and altitude to clear the pile of dirt at the ditch. I felt that we could not have cut power and safely gotten away from the pallets on the side of the runway."

Accident investigation board narrative: ". . . Investigation and analysis of the statements received from the aircraft commander and pilot revealed that the control techniques used by the pilot to counteract the crosswind could very likely have caused the abnormally long groundroll. The board believed that the application of excessive left aileron and right rudder at or near flying speed would have caused the aircraft to slip to the left and not become airborne. There was evidence that the pilot used right brake on the second swerve. The possibility exists that this was also done during the first swerve and contributed to the increased takeoff distance.

"The board felt that the crown of the runway was a contributing factor. After the first swerve, the aircraft was proceeding down the left side of the runway in a left wing low attitude. At the time of the second swerve, the aircraft commander applied full right aileron, picking the left wing and wheel up to clear the boxes. The right wheel stayed on the slope of the runway, creating friction and hindering the attainment of enough speed to clear the mound of dirt. However, the runway crown was not enough to cause the accident.

"Weather was considered a contributing factor because crosswind correction had to be applied to compensate for variable wind conditions 40°-70° from the direction of takeoff. Both tower operators said there was light rain when the aircraft attempted to take off and rainshowers were forecast. This would contribute to directional control problems. . . .

"The aircraft commander was fatigued. This created the possibility of impaired judgment, coordination, and prolonged reflex time at the time of the accident. He was on duty as staff duty officer the 22 hours immediately preceding the flight and had gotten only 3 hours and 20 minutes of sleep in the preceding 24-hour period. This is the only evidence of crew fatigue determined by the medical officer's report.

"Both the aircraft commander and pilot stated that they felt the swerves could have been caused by helicopter rotorwash. The board believed this condition could have existed due to the intense volume of helicopter operations normally conducted immediately adjacent to the runway. However, investigation failed to substantiate helicopter operations in the immediate vicinity of the runway at the time of the accident.

"In conclusion, it appears that the pilot failed to take corrective action soon enough to regain directional control, necessitating excessive use of controls and brakes. This did not allow flying speed in time to clear the barrier.

"He evidenced poor judgment in not using the entire length of the runway for takeoff, knowing that the runway was relatively short and a barrier existed.

"The aircraft commander failed to take immediate corrective action to avoid a dangerous situation.

"Supervision was also a factor because the aircraft commander was scheduled for a flight immediately after performing as staff duty officer with very little rest."

IFR IN OIL

U-6A INSTRUCTOR PILOT: ". . . Prior to takeoff a complete runup was made and no discrepancies were noted. Approximately 1½ hours after takeoff, we saw a small amount of oil coming from the top of the engine cowling. The engine instruments showed normal readings. They remained the same for the rest of the flight.

"Approximately 3 hours after takeoff, oil suddenly covered the windshield and we saw oil coming from the area of the air intake on the top right side of the cowling. We made a call to control and told them about our problem, and reported we were returning to base. Our altitude was 2,200 feet.

"Just prior to reaching an en route airfield, I queried control about status of the airfield. I had monitored a radio transmission a few days before advising that it was closed to fixed wing traffic. Control advised me to stand by and I continued flying south. There were no indications of any problem other than the oil leak at this time. By the time control confirmed the airfield was open to fixed wing traffic, we were well past the field and elected to continue towards our home field. We knew that another airfield lay between us and our home field, if circumstances necessitated a landing before we reached home base.

"Approximately 15 minutes after we saw the second oil leak, the engine coughed and sputtered

When tappet nut came loose, adjustment screw hit rocket box cover and oil covered windshield, completely blanking forward visibility

a few times. We changed to the center tank and increased the mixture to full rich. The engine ran smooth for 3 or 4 minutes and then began to run rough again.

"We called 'MAYDAY' to control. The engine ran rougher and rougher until it failed. The windshield was completely covered by this time.

"We located a section of highway without traffic and made an approach. . . . Since the pilot was relatively inexperienced, I made the approach. . . . Since it was impossible to see ahead, I turned slightly to the left by kicking left rudder. I did this in an unsuccessful attempt to see what was ahead. Since I couldn't see, I turned back to align approximately with the road. At approximately 10 feet, the aircraft struck and sheared the top off a 20-foot tree. The airspeed was approximately 60 knots and we had full flaps. We touched down on the road, but I was unable to see if we were lined up with it.

"Apparently we were at a slight angle, because we went off the left side into an open grassy field. The road was elevated approximately 5 feet above the field, so the aircraft was momentarily airborne as it left the road. By this time I had lost directional control. We came to a stop in an upright position. . . ."

There was major damage to the wings, both main landing gear, and engine section.

Accident investigation board findings: "The cover of the exhaust rocker box to no. 9 cylinder was broken through. Failure was due to the tappet lock nut coming loose, resulting in the adjustment screw striking the cover of the rocker box. This allowed the oil to escape through the rocker box cover. The lock nut was approximately nine turns from the proper adjustment. Although this in itself will not cause a complete engine failure, oil on the windscreen and the rough running engine are attributed to the broken rocker box. . . . It is felt by this investigating officer that, through a period of time, the lock nut had started to back off. On this particular flight, it lost all torque, backed off enough to affect the setting of the adjustment screw, and ultimately caused it to break through the rocker box cover. . . ."

FROZEN THROTTLE

OH-23D PILOT: On preflight I had a frozen throttle and maintenance freed it twice. On the third try, it was OK, so I completed my cockpit check and left the heliport at 0750. I discovered a frozen throttle at 1,800 feet. I turned north into the wind and made a forced landing. This happened 10 minutes after takeoff.

"The forced landing was begun at 1,800 feet at 60-65 knots. I cut off fuel selector valve and then the mag switch. On completion of the flare, the aircraft ballooned. I leveled and made a second flare. The tail rotor hit the ground and I lost directional control. After the accident, I shut off the auxiliary fuel pump, then the master switch. I exited the aircraft and took along the fire extinguisher. . . ."

The accident caused major damage to the main rotor blades, tail rotor blades, yokes, 1-inch drive, tail boom, and tail skid.

The aircraft accident investigation board checked with maintenance to see why they had let the pilot fly the aircraft after twice having a frozen throttle. Maintenance replied that the frozen throttle had been thawed out by two personnel and that if they had known it was the second frozen throttle in such a short time, they would have grounded the aircraft. The frozen throttle had not been written up on DA Form 2408-13.

Cause factors: "1. Pilot elected to autorotate to a sod area instead of going to heliport or stagefield.

"2. Pilot flared too high and made improper correction.

"3. Throttle was inoperative because of frozen moisture located in throttle cable housing."

Temperature at the time of the accident was 21°F.

WHITEOUT

UH-1D PILOT: ". . . The flight was an attempt to pick up a crew of two from a peak approximately 10 miles northwest of the base camp. I had dropped them on the peak at approximately 0930 that morning. Weather conditions deteriorated shortly afterwards, preventing a pickup as scheduled. We attempted to return and make the pickup, but the weather prevented it. Base camp monitored a radio transmission from the crew at 1300, stating they were OK at that time. No other positive contact was made. A garbled transmission was monitored at 1730.

"Winds had been high, with blowing snow throughout the day. At about 2030, there was a break in the weather. Based on available information concerning the crew, and the improving weather, I decided to attempt a pickup.

"I took off at 2045 with a copilot, crewchief, medic, and passenger aboard. Weather at takeoff was high overcast, 3-5 miles visibility, and winds 15-18 knots from the northwest. The pickup point weather was broken, visibility 1/2-1 mile in the northeast quadrant and 3 miles plus in all other quadrants. The crew was spotted on the peak, but we encountered severe turbulence. Winds were in excess of 60 knots at the pickup site.

"Since both men indicated they were OK, I did not consider it necessary or safe to attempt a landing. The copilot and I decided to return to camp and wait for better weather. He contacted base camp and was advised that weather was also deteriorating at the camp site. As we passed abeam of camp at approximately 800 feet above the terrain, I started a letdown and a 180° turn to approach camp into the wind and from the quadrant of best visibility and surface definition. We had the camp in sight as I started the turn to final. Shortly after the turn was started, we again experienced severe turbulence and a partial whiteout condition. Within seconds, the aircraft struck the snow and came to a stop in an upright position, after sliding approximately 300 feet. My first thought was that structural failure had occurred because of the severe turbulence.

"The passengers got out through the right cargo door. My door was jammed, so I also left through the cargo door. The copilot was able to leave through his door. There was no panic. Within 5 minutes from the time of impact, we had secured survival clothing and removed the survival sled from the aircraft. At this time we were experiencing a complete whiteout, with the wind estimated at 35 knots.

"The copilot transmitted in the blind on all available radios, advising that we were on the ground and all personnel were OK. We then put the small tent up for protection and settled down to wait out the weather. There were improvements from time to time in the visibility, but only for short periods. At about 0030, two polaris sleds arrived, picked us up, and returned us to camp."

Cause factors: "Weather—Aircraft encountered unexpected and unforecasted severe turbulence and whiteout conditions. There was no possible alternate.

"Inattention to altimeter.

"Lack of coordination between pilots."

Recommendations: "1. Improved capability for forecasting local weather. A fixed approach facility and IFR approach procedures be established at base camps where no alternates are available.

"2. Installation of a radar type altimeter in the aircraft with a low altitude warning device.

"3. Positive steps to assure that one or both pilots are continually monitoring flight instruments

NO SWEAT?

CH-47A PILOT: "We released our sling load and hovered forward to a clear area, then set the aircraft down. I set the brakes and the ramp was lowered to load a 1/4-ton jeep trailer. After arrangements were made over the radio for ground movement of the trailer, I removed my helmet to wipe the perspiration from my head. I turned to place my helmet on the map case at the rear of the center console. I did not see what took place at this time.

"I felt the bump and dropped my helmet on the floor behind the console. Looking down the cargo compartment, I saw fuel escaping from the line on the left side in the ramp area. At this time, the aircraft commander moved both condition levers to stop and the aircraft was shut down."

With no possible alternate, UH-1 entered unforecast turbulence and whiteout and crashed in snow

during flight in adverse weather conditions."

Statement of reviewing official: "This headquarters concurs in the findings and recommendations of the board, with the exception of finding number 2 and recommendation number 3. This finding has not been substantiated either in the pilots' statements or the narrative by the board. As stated by the board, weather forecasting capabilities are extremely limited. Accordingly, altimeter settings are not available. Additionally, this detachment operates in uncharted areas and the altitude above the terrain has to be estimated. These factors, coupled with no approach facility, left the pilots no choice but to attempt a VFR approach. . . ."

Accident investigation board narrative: ". . . The pilot executed a normal landing and set the parking brakes. However, a final check of the flight controls was not made by either pilot. The cyclic stick control indicator was not checked to see if it was centered and the thrust lever was not checked to see if it was in the 3° detent position. At this time, the flight engineer had lowered the ramp by the ramp control lever to accept the internal load. The lever was not checked to ensure it was in the stop position.

"The pilot then removed his helmet to wipe the perspiration from his face. In placing his helmet to the rear of the console, he accidentally pushed forward the cyclic stick. The combination of the cyclic stick not being in the neutral position and the thrust lever not fully seated in the 3° detent position, coupled with the accidental forward movement of the cyclic by the pilot, resulted in the aft wheels coming off the ground. As the wheels came off the ground, the ramp continued to lower because the ramp control lever was not in the stop position.

"The aircraft commander immediately saw the nose low condition of the aircraft and rapidly applied aft cyclic to return it to the ground. At this time the ramp was extended below the aft wheels. With the sudden application of aft cyclic, the ramp, rather than the landing gear, absorbed the impact. Impact caused the bulkhead at station 502.4, attaching point of the ramp actuators, to buckle. This severed the left fuel line and the right utility hydraulic line to the ramp valve. . . ."

OUT OF FUEL, ALTITUDE, AND A PLACE TO LAND

ACCIDENT INVESTIGATION BOARD NARRATIVE: "The OH-23G took off for a 25-mile flight on a southerly heading. Before departure, it was estimated the aircraft had been flown 2 hours and 5 minutes since refueling. This was a postcrash computation based on an examination of the flight routes and locations where the aircraft had been. Not included in this estimation is any ground time.

"At the time of departure, the pilot informed his section commander by radio that his fuel state was 8 gallons or approximately 30 minutes flying time. The investigator computed the flight time required to accomplish the intended flight as 25 minutes.

"After takeoff, the pilot climbed to approximately 100 feet, then descended to treetop level for the rest of the flight. Weather at the time was clear and visibility was at least 15 miles along the flight route.

"After 10-15 minutes, the engine stopped. The aircraft entered 15-20 foot scrub trees on the downslope of a hill. The tail rotor, attached to a 2-foot section of the tail boom, was located approximately 30 meters back along the flight path from the main wreckage. It was at about this point that the aircraft entered the trees. This was evidenced by tree strikes and is indicative of an abrupt flare in an attempt to slow the aircraft for impact. The main rotor blades most probably severed the tail boom at this time.

"Final impact occurred at the bottom of a ravine in a small stream. The aircraft came to rest on its nose after turning 90° from the direction of flight. It was supported by the main rotor and mast, with the front of the aircraft resting on the stream bed and the tail boom upright. The right side was against one bank of the stream, blocking that side. The pilot and one passenger were pinned in place by the pedestal and firewall and could not escape. The other passenger had no trouble getting free of the wreckage through the left side. . . .

"No fuel was found in the carburetor or fuel lines and there was no evidence the engine was developing power at the time of impact.

"The cause of the engine failure was established as fuel exhaustion, probably the result of faulty flight planning and fuel management. Possibly the fuel tank had not been 'topped-off' at the time of last refueling. This was brought out as a possibility by the pilot's section commander. OH-23s of the unit are routinely refueled while the engine is running and the pilot, as the only crewmember, is not able to personally check the fuel level. The pilot may not have accurately accounted for the time flown and his time on the ground at idle, considering his repeated stops.

"Other errors contributing to this accident were: (1) Flying at treetop level when there was no necessity to do so, particularly during a low fuel state, allowing no possibility for successful autorotation. (2) Attempting a flight of approximately 25 minutes duration over wilderness in a low fuel state when a road could have been followed, providing areas for autorotation and a better chance for rescue.

"Other factors to be considered in this accident pertain to the element of survival. . . . The location of the crash was in an area over which aircraft were flying at the same general time. On board were several items of survival gear, including a URC-10 radio, signal mirrors, and smoke grenades, all of which would have attracted the attention of aircraft in the vicinity. Although the pilot was incapable of reaching these items or using them, he failed to call them to the attention of the one survivor who was free of the aircraft. This survivor did not know that these items were available to him. . . ."

The wreckage was located more than 40 hours after the crash and the trapped pilot and passenger did not survive.

"Pearl couldn't be with us this month, so I've come out of retirement to tell you young whippersnappers a thing or two about survival and rescue gear for her. There may be some of you who prefer my looks. If you do, stay on the ground and see your flight surgeon right away! Meanwhile, I'll see if I can round up a young filly for next month. But remember—I didn't reach this age without learning everything I could about my personal equipment and survival gear. If you intend to enjoy a long and healthy life, I recommend you do likewise."

Pearl's

personal equipment and rescue/survival lowdown

Dear Pearl:

I would like to have some information on the Combat Boot, Tropical, DMS, in use in Southeast Asia. Some of the questions which have arisen in my mind are:

1. Will the boot provide sufficient foot and ankle protection in a crash?
2. Will the boot, with its cotton canvas and nylon uppers provide adequate protection in the event of fire?
3. Will the boot provide sufficient ankle support in the event a parachute exit is required during the landing for individuals not jump qualified?
4. Which boot, leather or tropical, does the

Board recommend for personnel flying in Southeast Asia?

CPT Calvin B. Chandler
Aviation Safety Officer
1st Radio Research Company

Dear Captain Chandler:

To answer all your questions in one statement, USABAAR recommends only the leather combat boot for flying in Southeast Asia. It provides more protection to the foot and ankle in a crash and/or in the event of postcrash fire (the nylon in the tropical boot will melt). It also provides more protection during landing following parachute egress or ejection. As you probably know, the jungle boot was developed primarily for the soldier, with no thought given the aviator. Attempts are being made to provide you fellows with your own boots which will have safety toes and quick donning or doffing characteristics.

PEARL

Dear Pearl:

The OV-1 survival vest, FSN 4220-300-0006, is equipped with the distress marker light, FSN 6230-015-7216. What is the FSN on the battery and the ordering authority?

CPT John J. Spisak
Flight Line Maint Officer
244th Aviation Company (AS)

Dear Captain Spisak:

The federal stock number for the distress marker light battery is 6135-073-8939. You use the same ordering authority for the battery as you did for the light. This information came from MIL-L-38217 and was supplied by USAAVCOM.

PEARL

Dear Pearl:

Recently a U-21 airplane was assigned to Fort Hood with the oxygen system installed in the aircraft. However, no oxygen mask came with the aircraft for the pilot and copilot. There were six disposable masks with the aircraft for the passengers.

The mask for the pilot is the demand type and for the passengers the constant flow type.

What is the correct FSN and authority for the demand type mask as it is not listed in TM 55-1510-209-24P-1 dated April 1967?

What is the FSN for the nondisposal constant flow oxygen mask and are they authorized in lieu of the disposable mask listed in the TM?

SFC Samuel T. Freeman
Supply Sergeant
Fort Hood, Texas

Dear Sergeant Freeman:

To equip your pilots and copilots with oxygen masks for the U-21, each pilot/copilot will need a mask, a tube assembly to adapt the mask to the oxygen outlet in the aircraft, and a modification kit to install the mask on the APH-5 helmet. Nomenclature and FSN of required equipment follow:

NOMENCLATURE	FSN
Mask, Oxygen, Small	1660-516-6607
Mask, Oxygen, Medium	1660-516-6620
Mask, Oxygen, Large	1660-516-6621
Tube, Assembly, Oxygen	1660-692-3939
Modification Kit, Small	1660-872-7794
Modification Kit, Medium	1660-872-7795
Modification Kit, Large	1660-872-7796

The basis of issue for this equipment is one per crewmember in aircraft with a demand oxygen system. Until such time as a new supply bulletin for expendable supplies is published in early 1968, AVCOM will honor requisitions without a quoted authorization.

The FSN for the disposable constant flow mask (P/N 28301-12) is 1660-902-5308. All masks are considered expendable since they cannot be decontaminated for reuse by another individual. Therefore, it is considered desirable to provide passengers with a disposable mask.

PEARL

Dear Pearl:

Reference your comments about NOMEX flight suits in the December issue, although NOMEX suits are available through commercial outlets, their use would be prohibited by cost and by the fact that they would not be regulation. However, there is a solution for those who desire fire protection.

NOMEX underwear, which looks like a light, insulated, two-piece underwear, is available for approximately $15.00 from at least two mailorder

If you have a question about personal equipment or rescue and survival gear, write to Pearl, U. S. Army Board for Aviation Accident Research, Fort Rucker, Alabama 36360

houses. Since underwear is not subject to military regulation, this can be worn under the uniform of the day and give a high degree of protection.

The fireproofing method that you detailed does give some protection, but the material becomes so coarse as to require something worn under it. With the fireproofed flight suit and NOMEX underwear, a person would be doubly protected and stand a good chance of being around when the Army can supply everyone flying with NOMEX clothing.

As far as I know, no dye has been developed that will adhere to NOMEX and since the natural color is an off-white, do pilots look anything like doctors?

Cadet James F. Dugan III
North Carolina State University

Dear Cadet Dugan:

Your suggestion certainly has merit and is being considered by the military. However, the prime consideration at this time is to provide protection for aircrews in Southeast Asia, since the additional hazards of enemy fire and adverse terrain increase the possibility of crash fires. The absorbent qualities and comfort of NOMEX underwear limits its use in the hot and humid climate found in that area.

NOMEX will take some dyes. Olive green (OG) probably has been the most successful dye to be used up until now.

The NOMEX flight clothing that will shortly be available in Southeast Asia is two-piece and similar in appearance to the fatigue uniform. It also has covered zipper pockets placed approximately as they are on the legs of one-piece flight suits, as well as pockets on both sleeves. Hopefully, this flight uniform will be available to all aviation personnel in the near future.

PEARL

Dear Pearl:

(Reference your December column)

FSN 8465-082-2512 is a component of the Survival Kit, Individual (Cold Climate). This component is Case Outer, Individual Survival Kit. The FSN of the end item Survival Kit, Individual, Cold Climate is 8465-973-1862.

No technical manual has been published for Survival Kit, Individual (Cold Climate), FSN 8465-973-1862. However, a technical manual is in the process of development at U.S. Army Aviation Material Command, St. Louis, Mo.

TM 55-8465-206-13, dated 19 December 1966, applied to:

1. The Army OV-1 aircraft individual kit (also known as Pararaft Kit or RVN Composite Kit), FSN 8465-j22-0033.
2. Leg Holster Kit (Army lightweight individual survival kit), FSN 8465-935-4728.
3. Vest Kit (Army aircraft escape and evade kit), FSN 4220-B00-0006.

Robert C. Mauck
U.S. Army Support Center
Philadelphia, Pa.

Dear Pearl:

I wish to advise that your answer in the December issue of the AVIATION DIGEST to SP6 Robert M. Smith, 42d Transportation Company, for a publication to cover survival kits, cold climate, FSN 8465-082-2512, is not accurate. TM 55-8465-206-13 was published by this command to cover survival kits in SEA which consist of a Survival Kit Composite Pararaft, SV2 Survival Vest, and Survival Kit Leg Holster Individual for U.S. Army aircrews.

Publications to include Survival Kit, FSN 8465-082-2512, and all other survival kits used in Army aircraft will be published by this command in the last half of fiscal year 1968.

John Molinar
Equipment Specialist
USAAVCOM

Gentlemen:

Thank you for your correction.

PEARL

tales from the trojan

The following stories were written by members of a recent Communications skill class of COL Daniel M. Lewis (USAF, Ret.) of the Institute of Aerospace Safety and Management at the University of Southern California. Each contains an important safety message.

LEARN FROM MY MISTAKES

I ARRIVED at the main airfield about 0700 and met the instructor who was to give me an in-country IFR checkout in operations. We talked briefly and he told me to file an IFR flight plan. I completed the flight plan and received the following weather: minimum en route ceiling, zero; freezing level on the surface; and light rime icing in the clouds. I discussed the weather with the instructor and he told me it was all right, that he flew in light icing conditions all the time. He also told me that a local regulation authorized flight in light icing, even with no deicing equipment. Since I had no experience in flying in icing conditions, I relied on his judgment.

The crewchief was wiping the windshield of the U-6 when we arrived and told us the aircraft was in top shape. I checked the log book and found only a few minor discrepancies. We completed the preflight and climbed aboard.

I taxied to the approach end of the runway and completed the runup and pretakeoff check. I received takeoff clearance from the tower and started to roll. I was instructed to climb to 1,500 feet via flight plan route and contact control for my clearance.

The takeoff and climb to 1,500 feet were uneventful. I called control, received my clearance, and was directed to climb and maintain FL 60. I applied climb power and started the climb. As we passed 3,000 feet, I saw that my rate of climb was only 100 feet per minute and decided to apply METO power. I still had trouble climbing. I began to wonder if I had forgotten to raise the flaps. I checked the flap handle and found the flaps were up. As I passed 4,000 feet, the airspeed was about 90 mph and rate of climb 100 feet per minute. I thought maybe something was wrong with the airspeed indicator and remembered I should turn on the pitot heater. I knew I was in the clouds because the ceiling had been about 2,000 feet. I still had the hood on and made no attempt to look outside. I was desperately trying to determine why I couldn't climb more than 100 feet per minute. I decided to maintain 90 mph and accept the rate of climb.

I finally reached FL 60 and leveled off. I left the power at METO and waited for the airspeed to increase to cruise. It did not increase, but remained at about 90 mph. I decided something must definitely be wrong with the airspeed indicator and started to reduce the power to cruise.

The instructor had not spoken since takeoff, but when I started to reduce the power he told me to leave it in, that we would need it. He also told me to take off my hood. I removed my hood and looked around. The clouds were thick and wet. I saw ice forming around the windshield and checked to see that the heater was full open. I looked out at the left wing and saw about 2 or 3 inches of ice had formed along the leading edge and was continuing to build. When I looked back at my instruments, I saw that I had lost 200 feet.

The instructor said, "I've got the radio." He called control, advised them we were picking up ice, and requested a lower altitude. Control replied they were unable to approve a lower altitude and instructed us to maintain FL 60. He then called and requested the weather at the closest airfield to our position. It was 100 feet, obscured, in heavy snow.

I was having trouble maintaining airspeed and altitude. The windshield was almost completely iced over. The wings, struts, wheels, and everything in sight had about 3 or 4 inches of ice formed on the forward side. When I lost altitude, I was un-

able to regain it. The airspeed varied from 75 to 80 mph.

For the first time I realized we might have to jump. It was then that I became aware that we did not have our chutes on. The instructor must have been thinking the same thing because he took the controls and told me to put my chute on. I struggled with the straps, which had not been adjusted. I was cold, yet I could feel the perspiration running down my ears and forehead. My palms were wet and my hands shook. My breathing was rapid and I felt sick at my stomach. After what seemed forever I had the chute on. I took the controls and the instructor struggled into his. I wondered who would jump first.

The MEA was 4,000 feet and control called and cleared us to descend and maintain 4,000 feet. I relaxed the back pressure and the Beaver seemed to fall to 4,000 feet. We were still in the clouds and the temperature was -10° C. We were still picking up ice and I knew we couldn't fly much longer. The instructor increased and decreased the propeller pitch. I could hear the ice hitting the aircraft as it was torn from the propeller.

The instructor increased the power to maximum allowable when we saw the hole. I saw trees and heavy snow directly below us. The instructor yelled, "I've got it!" and went into a steep descending left turn. He leveled off about 100 feet above the trees, heading in the general direction of the airfield. It was snowing very hard and our visibility was practically zero. I flew just above the treetops by looking out the left window and crosschecking the instruments. The airspeed was approximately 75 mph with maximum power. Luckily, we spotted a large powerline which he recognized. It would take us to the airfield. The instructor canceled our IFR clearance and we flew along the powerline back to the field.

After several calls, we contacted the control tower and were advised the airfield was closed due to weather. We told the tower about our situation and stated that we would be landing.

The instructor was very familiar with the area and told me when to turn in order to get us on final. After turning final, I picked up the lights of the snow-covered runway. Everything was looking good until we suddenly pitched forward. Charts and pencils slid from my lap to the floor under the rudder pedals. We were both startled and struggled to regain control. The aircraft responded and we landed without incident.

I taxied up on the ramp in front of operations and we were met by 8 or 10 pilots. They walked around and looked at the ice. After saying a little prayer, I climbed out and planted my feet solidly on the ground.

I had learned many things the hard way. I will not attempt to explain why the instructor allowed himself to get into this situation, but I do want to point out how ignorance can kill you and how we can learn from our mistakes and the mistakes of others.

Here are some of the things I learned from this experience:

Never fly into forecast icing conditions without deicing equipment unless you can stay below the freezing level or clear of clouds.

Always check and adjust your parachute before flight and wear it at all times when instrument conditions are anticipated.

When ice is first encountered, take immediate action to prevent accumulation.

If you have ice on your aircraft during landing approach, be prepared for pitching moments as a result of changing c.g. due to ice breaking off.

tales from the trojan

As we approached the radio relay site, the snow fell even heavier . . . the ceiling was down to about 200 feet and visibility was less than half a mile . . .

The Last Five Feet

SNOW AND LOW CEILINGS seemed to follow us like a plague. Several times the visibility dropped to nil. This presented no large problem as there were many open fields to land in when the snow got too heavy. We did just that several times. We knew our VIP passenger was an avid bridge fan and we had tactfully seen to it that playing cards were aboard. I wondered what the farmers thought when they saw a card game going on in the helicopters that landed in their fields.

The second night out provided a break in the routine. We dropped our passengers with instructions to pick them up again in the morning. As for us, we were to spend the night in town. And what a time for it! The holiday season was in full swing and parties were as common as snowflakes. Those people really knew how to spend the last few days before Lent. I won't list our evening's activities here. Suffice it to say that flying the next morning was not foremost in our minds.

Dawn came all too soon and we were back in the air again. Somehow, we managed to arrive at the pickup point at the appointed time. If we showed the aftereffects of the night before, our passengers didn't seem to notice. We hadn't rid ourselves of the snow and low visibility during the night. It looked like it was going to be a carbon copy of the previous days.

It was at the third stop that it happened. As we approached the radio relay site on a hilltop, the snow fell even heavier. The ceiling was down to about 200 feet at the hilltop and visibility was less than half a mile. The landing area wasn't the largest I had seen, but it would accommodate both UH-1s. We were still flying trail so we had to orbit while the lead pilot made his approach. Fred was at the controls and I was handling the radios. No sense in making too much chatter, I thought. One of our passengers might be listening in and I didn't want to darken his picture of our professional manner. As we orbited, the snowfall became more intense. It was no time to be circling. We needed to get on the ground before the weather forced us there.

After what seemed like an eternity, the lead ship was on the ground. Fred swung into the wind and we were on our approach. I saw that the crewchief of the lead ship had dismounted and was ready to help guide us down. At about 50 feet, a lightning rod loomed up from nowhere, forcing Fred to veer left and steepen his approach. It would put us pretty close to the other aircraft, but we still had room.

As we approached a hover it hit us—we were engulfed by snow that was thrown up and stirred by our rotorwash. To try and pull up and go around could have been fatal. True, we had a full panel of instruments in front of us, but to

attempt a quick transition to using them would have been folly. Fred did the only thing he could do and planted it. When we lost the horizon we had been at an altitude of only about 5 feet. With any luck, the skids should have been level when we touched down. Our touchdown was far from VIP quality, but at least we were on the ground.

For a moment, I almost relaxed. Then, through the chin bubble on my side of the aircraft, I could see snow moving past us—packed snow. We were sliding forward! Worse, before the snow swallowed us, we were pointed directly at the other ship and its crewchief. My reflexes took over. There wasn't time to key the interphone and tell Fred. I grabbed the cyclic stick and pulled back sharply. I might have damaged the aircraft, but better one than two. Although we jolted slightly, there were no crunching sounds.

When the snow settled, we could see how close to disaster we had come. There was a scant 3 feet between the turning main rotors of the two Hueys. We had to do some explaining about the rough landing to our passengers, but that was easy compared to explaining a collision.

We shut down, got out, and looked for damages. The snow that had been our enemy for three days had made amends. When the tail boom rocked back, the thick blanket of snow acted as a cushion. A close inspection revealed that the only damage was a bent tail rotor guard.

We had been extremely lucky. To this day I don't know what made me glance down through the chin bubble when I did. It was the one thing that saved us from the errors that we had compounded. *We had flown in marginal weather when good judgment told us to stay on the ground. We had socialized when we should have been resting. And, to impress our passengers, I stayed off the radio when I should have been finding out about that lightning rod.*

I learned a lesson that day I have never forgotten. The book may tell you what to do if you inadvertently encounter whiteout, *but only good judgment will keep you out of it in the first place.*

tales from the trojan

One Strike And Out

A RESTFUL SLEEP, a wholesome breakfast, VFR weather, and a good helicopter under him—what else could a man ask? I was flying as copilot in a UH-1D, taking a team of officers to a desert site. I was an IP in the UH-1 with more than 3,000 helicopter hours. The pilot was an officer I had previously checked out in the aircraft. He did not have a great deal of helicopter time, but he handled the aircraft well. The crewchief had flown in Hueys in Vietnam and was very conscientious. With the four passengers aboard, we had a total of seven people.

After making contact with the helicopter that had sighted our destination, we landed. The early morning sun felt good on my back as we waited for the experts to be experts. They decided it wasn't the right location, and the other helicopter made us eat dust as it departed for another search. One of the passengers was the hospital commander. He requested that we make a stop at a road junction so that he could give instructions to one of his ambulances parked there.

The junction was a crossroad with the inevitable restaurant and service station. Because it was the only habitation for miles, it was a logical place for the ambulance crew to wait. During the few minutes flying time I was busy on the radio talking to the local control and relaying a message from one of the passengers. I called the pilot of the other helicopter to advise him of our intention, then attempted to contact a ground vehicle. I saw that we had approached and were circling the junction at 300 feet while the pilot performed a high recon. He turned from base to final in a generally east heading as I continued my radio conversation. On the approach, I saw we were paralleling a powerline to my left and a road to my right. The ambulance was parked in front of the cafe, alongside the road ahead and to our right.

We were just coming to a hover, with a little forward speed and slight descent, when it began. I saw the cables ahead and above, near the end of the tip path plane. In most stories, the hero freezes with horror at this point. Not me. I moved for those controls like lightning, shouting, "Wires" at the top of my lungs. Jim must have seen them about the same instant I did. As I felt for the cyclic, I felt it come aft. The nose pitched up and the aircraft shuddered. It immediately started a turn to the right with the left side low. I know because I was looking down at the dirt, expecting to turn over at any second. The metal made a sickening sound as it was wrenched and torn and I thought in surprise, "We're crashing!" The aircraft struck on the skids in a tilt to the left and the blades hit the ground. I recall thinking of fire and, during the turn, got the switches off. Jim had his hands full with the controls as the helicopter continued a 270° turn to the right and hit twice more before coming to rest upright. The glass between us shattered when the main transmission tore out and flew forward.

Suddenly, everything was still, and the crewchief was shouting to the passengers to get out. We evacuated and I heard someone cry a warning to be careful of the hot wires. Through the settling dust, I saw that, although the cabin area was intact, the blades were smashed, the transmission gone, skids bent, tail boom twisted, and the tail rotor missing. One word summed it up—total. It was almost impossible to believe that less than a minute had passed since we saw the wires. I don't know when I've felt sicker. No one was hurt, except Jim, who complained about a sprained wrist.

What had happened wasn't hard to reconstruct. The blades, striking the wires about the time the cyclic was moved aft, resulted in a nose high attitude and caused the tail rotor to dig into the ground. The resultant torque spun the helicopter to the right, and the left side low attitude allowed the blades to strike the ground. It just beat itself to death. The most amazing thing was the speed with which it happened. One moment everything was fine and a few seconds later—disaster.

Why didn't we see the wires? A high recon was performed and low recon was made on final. There were at least five pairs of eyes looking forward during the approach, although my attention was di-

vided by radio transmissions. Yet no one saw the wires until they were silhouetted against the sky. It is true that there was a powerline along the left side, about 50 yards from the road, and any good Monday morning quarterback will tell you that we therefore shouldn't have landed in that spot. But there were no wires visible in the flight path and no poles could be seen on the right. We were trying to put the hospital commander as near the ambulance as possible so he wouldn't have to walk too far. Again, we could be faulted for that. But the real question was, Why hadn't any of us seen the wires?

From the time we turned on final, we were on a collision course for them. This question so intrigued the president of the accident board that two days later, after the wires had been repaired, he flew as a passenger in another helicopter and duplicated our approach. Although both he and the pilot were looking for the wires and knew they were there, they did not see them until they were almost on top of them. A more perfect job of camouflage of wires could hardly have been made. Pictures to prove the point were taken from the helicopter on approach and submitted with the accident report.

What can be done about this type of accident? Well, wire strikes could probably be eliminated:

If we never landed near anything resembling a pole and a wire.

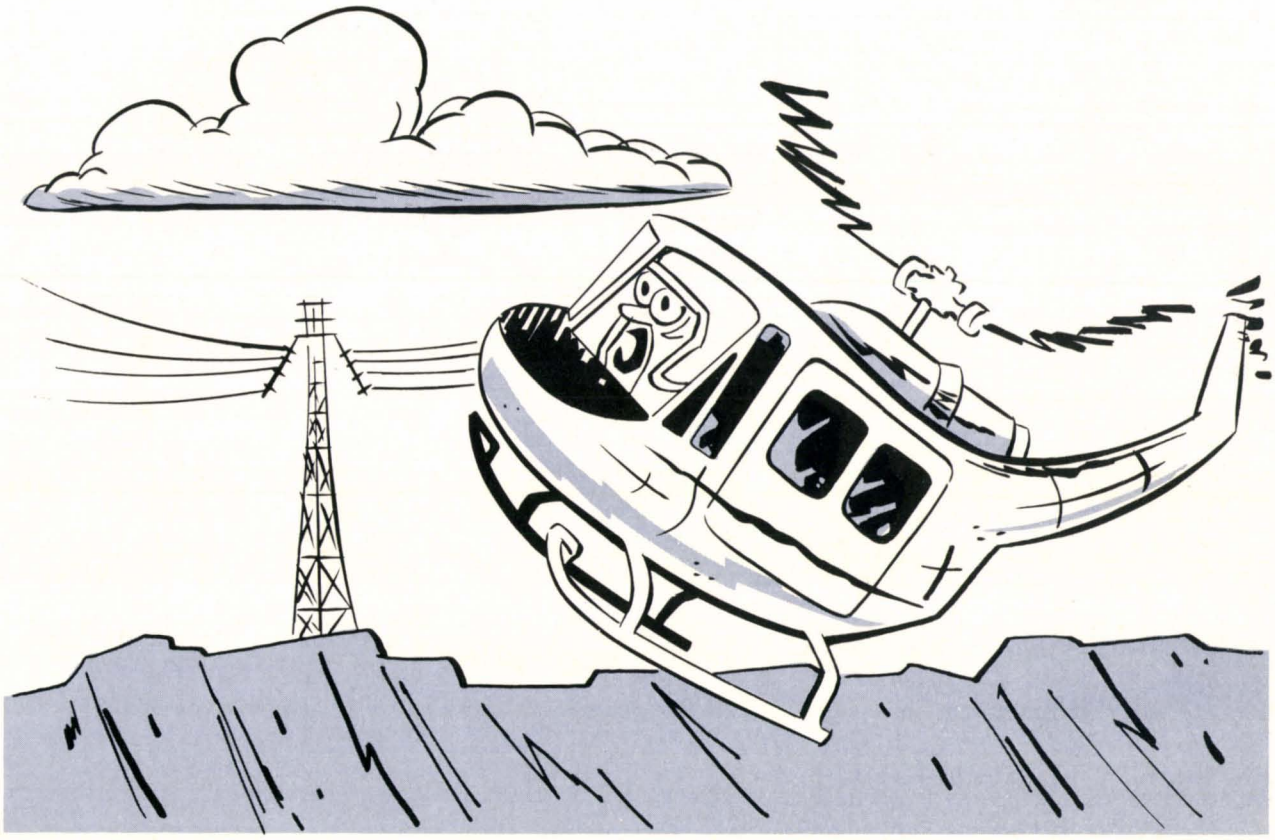
If we landed only at designated spots that had been examined from the ground by someone qualified to judge the area.

Since these two alternatives are not always possible, the exposure rate could be reduced by:

Marking all wires in a standard way just as we mark danger areas on our roads.

Dragging every strange landing spot at low altitude and speed to make sure it is free of obstructions.

The latter two are only ways to reduce exposure, and I'm afraid we'll still be reading about wire strikes in the *Weekly Summary* until someone comes up with a solution. Be sure you're not the one they're writing about.



tales from the trojan

Wild Dream

WHAT A WILD DREAM—I wish I'd wake up! The irritation of cockpit and passenger noises did not let up. Suddenly, I realized I was awake. The sound of pain from my passengers was real: the wreckage of my helicopter was not dreamsville. It was here and now.

Realization forced me out of limbo into action and I cut the switches. The odor of fuel was heavy and fire was an immediate hazard. I moved to trip my seat belt and a sudden pain told me I had smashed my chest on the cyclic. Luckily, my shoulder harness was fastened or the injury would have been worse. I left what remained of the cockpit, wondering how I had gotten here.

I moved around the front of the helicopter and snapped the safety belt off the right-hand passenger. One leg and both his arms were broken. Lifting at him to assist his exit, I slumped unconscious again. After several attempts to remove him, spurred on by the fear of fire, I had him on the ground. I made a quick check of both passengers and found no cuts or bleeding. The center passenger, still in the aircraft, had a broken leg and possible stomach injuries and was unable to move. I returned to the first passenger, splinted his broken limbs, and made him as comfortable as possible. I again failed to remove the second passenger. I resolved, with the coming of darkness, not to waste daylight and splinted his leg, making him as comfortable as possible in the aircraft.

I removed blankets and tarpaulins and covered the injured to prevent further shock. My survival kit was scattered in the jungle growth and I found only one can of water. The passengers' equipment provided water, blankets, and protection for the night. As I finished securing the injured, I heard an O-1 overhead. Knowing a search had been launched, I grabbed for my survival radio and punched the buttons, with no results. It was inoperative. Noting the concern of my passengers, I told them I had made contact, and that a rescue party was being organized and should arrive by the middle of the next day. I buried my disappointment in my efforts to make them more comfortable.

As darkness fell, the jungle became quite. I gave water and words of encouragement to the injured. No one wanted food. Conversation was needed to bolster our spirits and we talked about what had happened to the helicopter.

The mission was supporting topographic survey parties, with transportation of personnel and equipment from survey station to survey station. The weather was typical of the rain forest, low clouds and rain, mixed with intermittent breaks of clearing and good visibility. The speed of moving survey parties, when possible, could result in weeks saved in weather waiting time. All moves were made by helicopter, and most survey work (actual angle shots and elevations) was done at night. When a weather break came, an all-out "go-move-survey parties" was launched.

I had been into this particular station several times before. This morning, I moved one-half the party of four in two loads, carrying personnel and equipment to a new location 45 minutes away. After two trips, I took on a full fuel load so I could make

the jungle was only a few feet below the skids . . . the engine surged, coughed, and surged again . . .

two more trips for the remaining personnel and equipment. As I approached the pickup area, I saw the weather was closing in again, and that I could probably take only one more load. I landed on a sandbar and dumped most of my fuel, keeping only enough to pick up the gear, plus a reserve, and enough to return to base camp.

Arriving on station, I hurried the loading of two people and their equipment. I knew I'd be overgross and would need all the skill I could muster for a safe takeoff. The wind was approximately 10-15 knots toward the nose of the helicopter, and the clouds were covering the hill, with intermittent clearing. I had carried as much weight out of worse spots during the preceding 30 days. I revved up to operating rpm, pulled pitch, and took off. Not more than 10 feet from the pad, the engine lost power, the needles split, and I wished we were back on solid mountain. The jungle was only a few feet below the skids. The engine surged, coughed, and surged again. I realized we were going into the jungle canopy. I yelled to tell my passengers and decelerated to get zero airspeed and a tail low attitude for entry. Milking rpm and trying to clear the hill mass, I ran out of speed and lift at the same time. The next thing was "What a wild dream—I wish I'd wake up!"

The passengers were in pain and we established a 1-hour cycle of water and conversation to help them through the night.

At dawn, I prepared a signal for the search aircraft I knew would soon be overhead. There were no openings in the jungle canopy near us, but I thought I could use the fuel from the ruptured tanks to make enough smoke to clear the trees. At 0600 I heard the O-1 overhead. I tried to light the fuel and tried the radio again, but both failed. Our spirits dropped.

I realized by the sound of the search aircraft that our penetration had left little or no mark on the jungle canopy. I decided to make my passengers as comfortable as possible and return to the helipad on the mountaintop. After 2½ hours of climb, slips, cuts, and falls, I arrived at the mountaintop clearing. Later, I could hardly believe that the wreckage was only 295 feet below the takeoff point. Looking down the flight path, I could see no indication where we had entered the treetops. No marks or scars were evident and I realized how lucky we were that one of us was able to climb to the helipad.

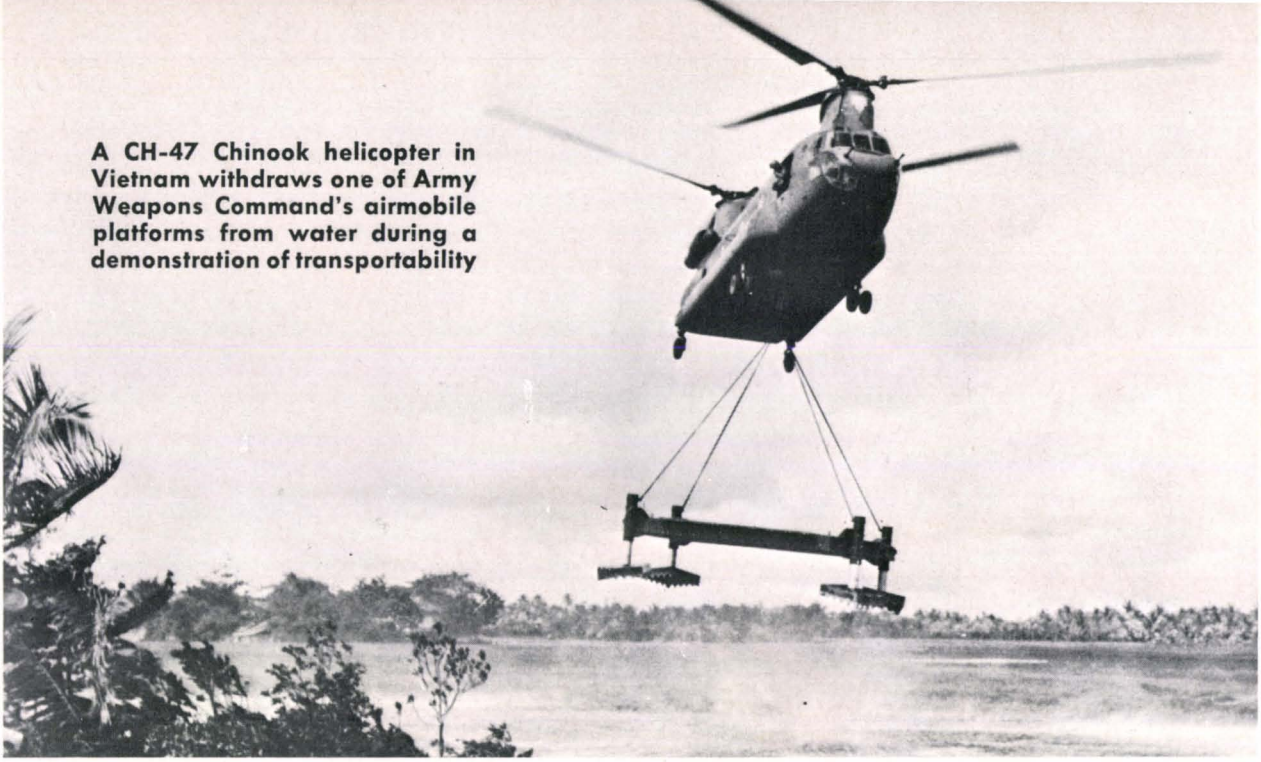
I built a fire at the campsite and prepared green leaves to make a smoke signal when the aircraft came near. As the morning progressed, I swore at the pilot for searching on down the survey line, as it was quite evident to me that I was not where he was looking. The sight of that beautiful aircraft coming back changed my curses to blessings. Its low pass of recognition was the most beautiful sight I've ever seen! I made hand signals to indicate where the helicopter was and the extent of injuries to the passengers. The pilot dropped a message pack, saying the rescue team was en route by helicopter and should arrive around noon. I shouted this information down the mountainside to my passengers. They replied that they were not in need of water or relief, and asked me to wait for the rescue party and help them locate the wreckage.

At noon the UH-19 landed with a flight surgeon and party. We hurried to the wreckage. The recovery of the injured required two trips by litter, taking 4 hours each.

The accident and eventual recovery made several items apparent to those flying over the jungle. The lack of radio communication hampered the search, as no exact flight path had been filed. Failure of the survival radio resulted in a second failure to pinpoint the wreckage. Serious effort must be made to record every leg of flight paths. A reliable radio backup became a necessity on every flight after that and the failed radio was the subject of an equipment improvement report.

The failure of the survival kit pointed out shortcomings in that area. To have carried supplies for an emergency only to have them disappear in the accident was ridiculous. Packaging and securing the container to the aircraft is equally important. The most important factor became readily apparent to me as the survival situation developed. The removal of the injured, particularly when all are incapacitated, is extremely difficult. The immediate treatment of the injured can prevent further shock and save energy and effort for survival. Even a short 24-hour period can end in tragedy if all participating are not properly motivated. One person must assume the leadership role at the accident site. A logical sequence must be established and followed to prevent wasted effort and time.

Prior planning by every crewmember can produce a plan of action that can be adapted to any survival situation.



A CH-47 Chinook helicopter in Vietnam withdraws one of Army Weapons Command's airmobile platforms from water during a demonstration of transportability

Airmobile Artillery Platforms

THE U. S. ARMY Weapons Command recently brought to its Rock Island Arsenal in Illinois, a touch of Vietnam, in the form of a simulated rice paddy—without rice—for testing the new U. S. Army portable firing platform.

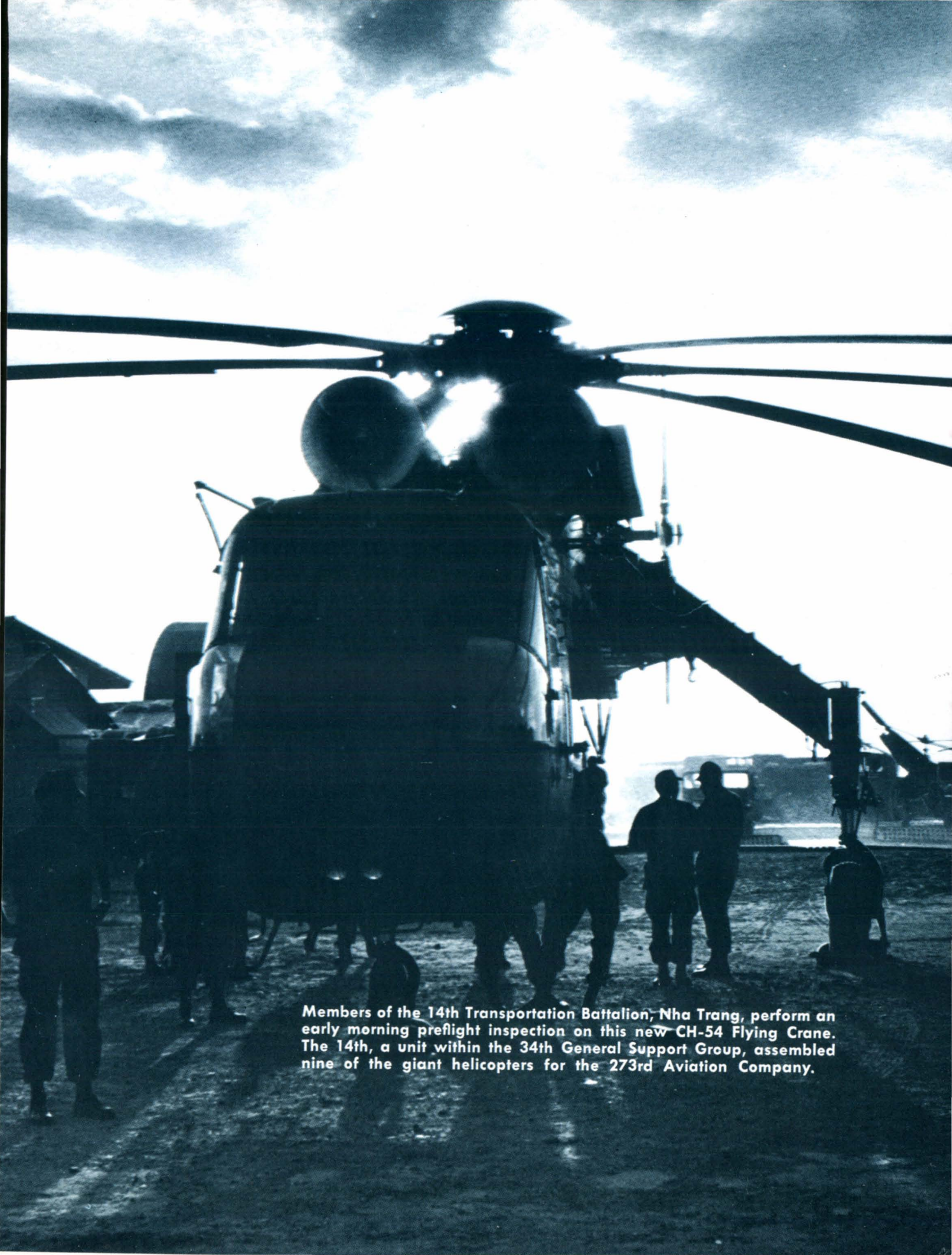
Need for such a platform, for firing artillery, arose from the fact that much of the terrain in the delta region of southeast Vietnam is covered by 6 inches to 2 feet of water over from 6 to 18 inches of mud. To simulate this condition, a large hole was excavated near the combat vehicle testing range on Arsenal Island.

Howitzer crew in Vietnam tests airmobile platform

Mud of the consistency found in Vietnam was hauled from a local swampy region and dumped into the hole. Enough was used to cover the bottom to a depth of 2 feet, on top of which water was pumped from a nearby pond. Constant water level of 2 feet is maintained in the test swamp.

The platform, designed for firing the M-102, 105 mm howitzer, is air transportable by helicopter as an external load. It consists of a 22-foot square aluminum structure with a plywood deck and adjustable legs at the corners. At the tips of these legs, in contact with the mud, are 4-foot square, perforated metal bases that sink into the mud and reach the hardpan. These bases give the platform stability.

The original request for the platform was made by General Westmoreland's headquarters in Vietnam, to the Office of Chief of Research and Development in the Pentagon.



Members of the 14th Transportation Battalion, Nha Trang, perform an early morning preflight inspection on this new CH-54 Flying Crane. The 14th, a unit within the 34th General Support Group, assembled nine of the giant helicopters for the 273rd Aviation Company.

during one month...

FAILURE TO COMPLY WITH TECHNICAL BULLETIN-

FAILURE TO PERFORM REQUIRED INSPECTIONS

COST

12 lives - 2 aircraft