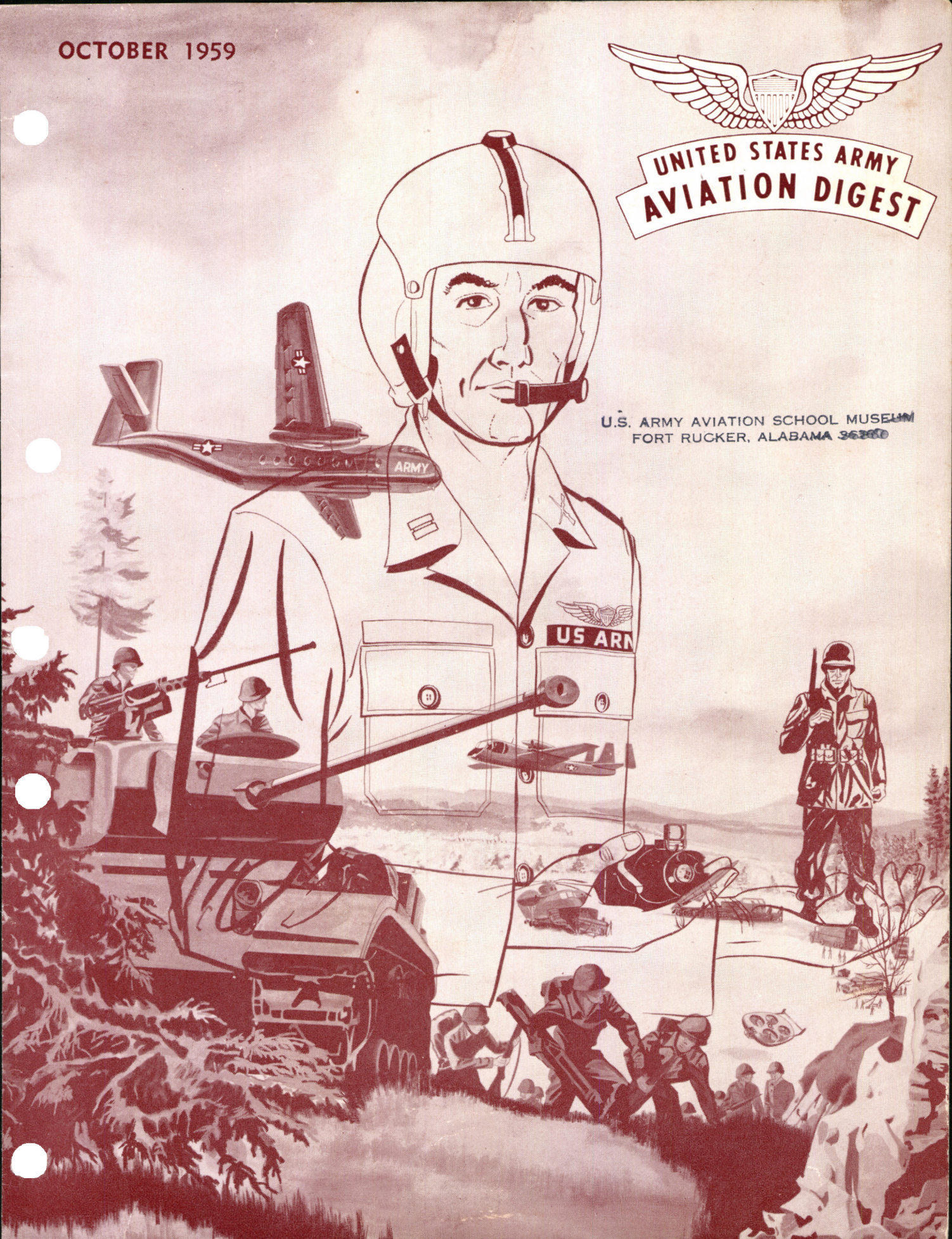
OCTOBER 1959

UNITED STATES ARMY AVIATION DIGEST



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AVIATION DIGEST

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U. S. ARMY AVIATION SCHOOL

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The U. S. ARMY AVIATION DIGEST is an official publication of the Department of the Army published monthly under the supervision of the Commandant, U. S. Army Aviation School.

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.

Manuscripts, photographs, and other illustrations pertaining to the above subjects of interest to personnel concerned with Army Aviation are invited. Direct communication is authorized to: Editor-in-Chief U. S. ARMY AVIATION DIGEST, U. S. Army Aviation School, Fort Rucker, Alabama.

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Army Aviation Philosophy

Brigadier General Ernest F. Easterbrook

ARMY AVIATION exists, mainly, to provide two facilities to Army commanders in combat zones. These are (1) to increase ability to get information which will enable effective application of available weapons and (2) to provide rapid transportation for critically needed personnel and equipment.

The words combat zones are emphasized for a very important reason which bears directly on accident prevention. The use of aviation in the Army is justified on the ability of Army Aviators to operate their aircraft in and out of short un-

prepared landing areas which WILL be found in combat zones, both day and night, under varying weather conditions. This imposes critical training problems. As in any other activity in the Army, aviators must practice in peacetime to accomplish expected missions in wartime. For aviation, this practice is concerned primarily with tactical, short field operations. Aviators recognize that this type of practice, under adverse weather and terrain conditions, is considerably more conducive to accidents than flying to and from long, hard-surfaced runways under the surveillance of air traffic controllers.

GOAL: ZERO

By no stretch of the imagination should the type of operations of Army Aviation and resulting accidents be taken to imply complacency. Nothing can be further from the truth. The goal of Army Aviation is always to reduce accidents to zero. Unfortunately, the only way to guarantee this is to ground all Army aircraft. Obviously, we cannot afford to go to this extreme. Almost as bad would be restriction of flying to airline type operations. While this would allow aircraft to operate, it would not train Army Aviators to accomplish combat missions. The way to reduce accidents in the Army and retain ability to accomplish combat missions clearly calls for UNDERSTANDING, CLOSE SUPERVISION, and STRONG LEADERSHIP.

During fiscal year 1958, accidents involving Army aircraft used up more than 40 percent of the dollar loss due to all accidents in the Army. The cost of Army aircraft accidents was in excess of $9,500,000, as opposed, for example, to a fire loss of approximately $5,000,000. These are startling figures and aviation personnel must work together to reduce them.

USABAAR

One agency involved exclusively in aviation accident reseach is the United States Army Board for Aviation Accident Research, short title: USABAAR. Located at Fort Rucker, USABAAR's mission, as defined in AR 15-76, is to conduct research of aviation accident experience, particularly Army experience, to determine personnel or materiel deficiencies in Army Aviation which result in noncombat loss. Based on analysis of this research, the Director of USABAAR is required to recommend to the Director of Army Aviation appropriate action to enhance the durability, reliability, and efficiency of Army Aviation. The activities of USABAAR do not conflict with those of safety directors at any given echelon of command. The Army Safety Program and USABAAR share common objectives. They are both aimed toward reducing aviation accidents to zero, while allowing the safe, yet aggressive, conduct of aviation flying training.

PROBLEM AREAS

To oversimplify, there are two general problem areas in aviation accident prevention: people problems and hardware problems. Generally, people problems can be divided into about three groups. The first group includes operators (aviators and other crew members); the second group includes technical specialists (crew chief, mechanics, aircraft parts personnel, tower operators, crash rescue personnel and many others); the final group are those who use and ride Army aircraft, the passengers.

HUMAN ERROR

Human error is one of the major cause factors involved in aircraft accidents. However, we are **gilding the lily** and accomplishing negative results when we label accidents as caused by pilot error. The term "pilot error" has no benefit as a source of material for preventing similar accidents in the future. Frequently, it places a detrimental stigma on Army Aviators and reduces the effectiveness of the aviation program. In the people aspect of aircraft accidents, we must bend every effort to attempt an understanding of why the pilot had an accident, and what situation he had to cope with at that particular time, under those particular circumstances. When this analysis is made judiciously and without prejudice, we are well on the way to accomplishing a definite useful purpose.

The finding of pilot error in an accident report without further information is **prima facie** evidence that a full investigation has not been conducted. Further, accident report findings of unexplained pilot error are grossly misleading to commanders in the field by implied indications that punitive or disciplinary actions against pilots are called for. This trend, if allowed to continue, will certainly destroy the initiative and desire of the individual pilot to practice flying in tactical situations.

TECHNICIANS

The second group of people problems, the technical specialists, presents another broad area in which all aviation per-

sonnel can work together for the common good. It does not take an aircraft maintenance expert to look at the maintenance activity of any airfield and determine whether or not certain common basic precepts of good management, good supervision, and job understanding are being followed. Although the skills involved are a little more complicated than those found in vehicle maintenance, the basic philosophy in maintenance is the same. A mechanic who is alert, dressed neatly, keeps a clean tool box, uses his references while performing maintenance, and appears to know his job is a prime indicator of good aircraft maintenance in a particular unit.

The same general thinking follows in the aircraft parts supply setup in any aircraft maintenance organization. The knowledge, ability, and attitude of the aircraft maintenance officer and his assistants are also indicative of good maintenance.

A well organized airfield control tower, without pandemonium, clean, and efficiently laid out, indicates those people who control terminal and en route flying activities probably know their jobs.

These indicators, which in certain circumstances need further investigation, on the surface will give a very definite indication of the efficiency of status of training in various areas. We needn't wait for an accident to occur to look around and see if the operation appears to be a good one under both routine and exceptional circumstances.

PASSENGERS

The final group of people problems includes the passengers. Here again, aviation personnel can work together: in such matters of checking whether or not the passengers are wearing shoulder harnesses, are familiar with common sense safety precautions for walking in the vicinity of aircraft, know how to get into and out of aircraft, and whether pilots and passengers jointly understand individual activities in event of inflight emergencies. These are just a few of the areas in which all can work.

HARDWARE PROBLEMS

Hardware problems are probably a little more exacting for technicians and operators. This is a critical area because, unlike other Army vehicles, aircraft operate in three dimensions. When a materiel failure occurs in flight, we almost always have some damage to aircraft, occupants, or both.

There is an old rule in the aircraft business called Murphy's Law. Murphy says that if an aircraft part can possibly be installed incorrectly, sooner or later somebody will install it that way. This has been translated into a philosophy in Army aircraft construction which is called the "go right or no go" criteria. This means that aircraft hardware must be designed so that it can be installed in only one way—the correct way.

STATISTICS

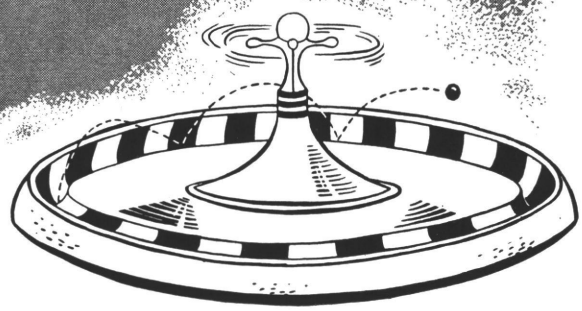
To the uninformed, aircraft accident rates and statistics can be, and often are, very misleading. One of the better examples of this can be found in a comparison of two accidents. A large cargo type helicopter crashes to total destruction, killing six people. The cost of this accident, in hardware alone, can be well over $1,000,000. Statistically, this would be one accident. Almost daily, there are reports of bent propellers and spread landing gear caused by young pilots trying to learn their trade in conformance with the tactical flying mission. These accidents may cause a dollar cost of anywhere from $50 to $250. This demonstrates the tremendous spread which is not shown through accident rates and statistics: one accident for a cost of over a million dollars in hardware; another, **same statistic, $50.**

We, in the aviation field of the Army, are not unaware of the tremendous cost of aircraft accidents, both from hardware and personnel casualty loss. Our training programs, at the U. S. Army Aviation School and in our various units, consider aviation accident prevention to be a primary subject for continual consideration, discussion and implementation. On the other hand, we are faced with a requirement to train young aviators, with limited experience, in the operation of aircraft under tactical conditions, day and night, out of short, unimproved landing areas.

Basically, aviation accident prevention is a management problem. It is incumbent on all of us, working jointly, to give careful, sympathetic and understanding consideration to the peculiar problems of aviation accident prevention, and to the common problem of Army safety. We are all on the same team. By working together, we can further the combat effectiveness of the Army which we all serve.

Brigadier General Ernest F. Easterbrook is Commanding General of the U. S. Army Aviation Center and Commandant of the U. S. Army Aviation School, Fort Rucker, Ala.

An educational adviser believes that there are three quirks of human nature that make the job of education for flying safety difficult. First, there's a tendency to...



GO FOR BROKE

Dr. Thomas F. Staton
Educational Adviser
Air University

THERE ARE THREE quirks of human nature that make the job of education for flying safety difficult. These quirks cause a large portion of flying accidents. To be effective, any program of flying safety must take these quirks into consideration. It must direct its efforts toward counterbalancing their suicidal tendencies, rather than merely putting out adequate information on principles and procedures.

The first of these suicidal quirks of human nature is: Men tend to be prouder of their willingness to take a chance, to "go for broke," than of their caution, conservatism and carefulness.

During my early days as Educational Adviser with Air University I got around. For two or three years I did not keep a room on a permanent basis at all. A closet off my office held my clothes. VOQ's at different bases were my home. My laundry was scattered from Tyndall to Randolph, from Maxwell to Wright-Pat. I picked it up and left more as I made my periodic visits to do any educational advising that was wanted.

This was during the time immediately after WW II when pilots were pouring back from overseas, hot from combat, and, often, impatiently waiting to return to civilian life. Any spare man with wings who happened to be around a base was my pilot on a flight to my next destination.

I had some interesting experiences on some of the several hundred flights I made under those circumstances. I remember these three.

The time we aborted three times with the same A-26 for mechanical failures. The last abort was due to an electrical fire that broke out an instant after we became airborne. We triumphantly made our flight

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This article is reprinted from FLYING SAFETY magazine.

on the fourth trial, all in the same morning.

Another was the time all flyable planes were evacuated on a hurricane warning except one, in which a volunteer pilot slipped me out the next morning, dodging the storm. This enabled me to give two lectures at different bases the same day.

And then that Sunday morning the pilot showed up weak and shaky from what I judged to have been a hard Saturday night. (The flight was long enough for him to be in pretty good shape by the time he would have to land that A-26, I figured.)

I am bound to have had other types of experiences, too; times when I said, "Uh Uh. I'm not going up in THAT weather!" Times I decided to stay over until the next day when I learned that if I flew today my pilot would be making his first flight in a C-45. But those experiences are vague, fuzzy. I can't remember the ones where I played it cautious nearly as vividly as the ones where I took the devil-may-care attitude, "If you think you can fly it, I know I can ride it with you!"

You can confirm the universality of this quirk by examining your own pattern of thinking and feeling. When a bunch of pilots are shooting the bull, how often do you regale the group with stories of the times you cancelled a flight because of weather. Then, about the number of times you tell about flying 'er in when even sparrows were walking?

There is a tendency to glorify the cowboy more than the store clerk, the fullback more than the Phi Beta Kappa, and the man on the flying trapeze more than the man who wrote the music for his act. These are all examples of this same human tendency to romanticize the risk-taker more than the man who figures ways to avoid the risk.

In their hearts, men feel some pride in being so sure of their ability or so casual about death that they will play Russian Roulette with a plane when they really want to get somewhere. Impelled by a sense of duty, a love of life and a regard for their families they will, on occasion, let discretion have the better part of valor. But they do not remember those occasions with the affection they reserve for the times they brought 'er in, with a 100-foot ceiling, 1/16 mile visibility and no GCA!

The consequence: Caution and carefulness have to compete against a subconscious tendency to regard them as a form of timidity unworthy of a military man.

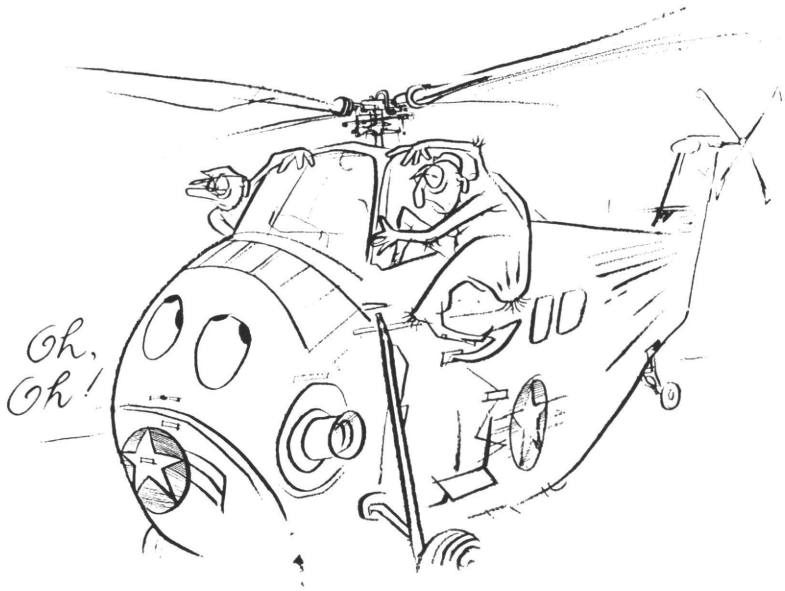
Suicidal quirk number two is: Men tend to use their powers of logic and reasoning to find justification for the things they want to do rather than to determine what is best to do. As a pilot struggles to resolve the conflict between a knowledge of what is the safest thing to do and what he is inclined to do, he may undertake to think the problem through to a best solution. But because of quirk number two, his thinking is not so much to determine which is the most sensible thing to do (he already knows that) but to figure out a way of making what he wants to do, seem sensible.

"Tomorrow is Jimmy's birthday. My job keeps me away from him too much anyway. I'm a pretty poor father if I won't fly when I'm a little tired to get to his party."

"We've got to trust our NCOs if we expect them to assume responsibility. If I trust my crew chief so little that I have to check the plane myself, I'd better get a new crew chief."

Both these instances display irrational self-justifications, but man in the aggregate can be called a rational creature on-

The long-range result of carelessness is tragedy



ly by the most generous interpretations of "rational." Any psychologist will confirm this fact. Basically, man is a creature of emotions, feelings, impulses and unrecognized urges, all kept under precarious control by a flimsy bridle of intelligence, rationality and logic, and the painful whip of authority and social pressure.

Education which goes no deeper than his intellect will assuredly guide him and influence his behavior in matters on which he has no especial feeling one way or the other. But when man's basic nature, his fundamental urges and strong desires, pull him toward one decision and his education inclines him toward another, all too frequently he will go with his feelings. He will tend to go with his natural inclinations unless his education has gone deeper than intellectual awareness of what is right and wrong, and produced in him a profound emotional loyalty to the facts and principles he learned. This is one of the jobs of flying safety education.

The third widow-producing quirk in human nature is the fact that: Men will risk losses out of all proportion to possible gains if they feel that through their skill and luck they can probably avoid the loss. At a time when any form of theft involving more than a few pennies was a gallows offense in England, pickpockets industriously plied their trade among the crowds which gathered to watch the execution of thieves. They would risk their lives for a few pennies because they figured they were so clever they would not be caught. Silly?

How about the motorist who cuts sharply in front of an oncoming car to save waiting ten seconds to make a left turn? How about the pilot who didn't bother to pick up a bailout bottle because he didn't intend to fly above 30,000 feet? In all honesty, he is highly unlikely to need it, but if he is not afraid of appearing old-womanish or if he doesn't talk himself into believing that precautions are not really necessary, a few seconds' effort may save his life.

Regular flying can minimize accidents

Then there is the pilot who knows his landing approach is a little off, but figures he can make it without going around again. A few minutes of flying time is saved if he succeeds. If he fails—scratch one pilot. No gambler would buck odds like that when he could so easily make them more favorable to him, but people do with their lives.

My observation and study convinces me that the Air Force Flying Safety Program leaves little to be desired in the accuracy and completeness of its information and guidance. Its methods of disseminating information and publicizing safety procedures also impress me as being about all that could be asked for.

And yet accidents resulting from violations of principles of flying safety do happen.

Why?

In light of the extensiveness, intensity and thoroughness of the Air Force's educational program, I do not believe for one minute that half of the violations of flying safety are due to ignorance. My study has led me to the conclusion that the majority of accidents due to pilot error are caused by pilots failing to do what they know they ought to do, not by their ignorance of what they ought to do.

Is there a commander anywhere who has not asked himself despairingly, upon reading the report of investigation on one of his men killed through violation of flying safety measures, "WHY did he do it? He KNEW better. Why? Why? WHY?"

If they know better and still do it, why, indeed? The answer: Human nature's three suicidal quirks. He knew better, but he'd rather take a chance than risk seeming "chicken." He knew better, but he talked himself into doing it that way because he WANTED to do it that way. He knew better but he thought he would be able to get by and wouldn't take the trouble to do it right.

Any program of flying safety education that is to be effective must be designed in light of those three quirks in the nature of man. Just educating people

as to what is the safe, the proper, thing to do is futile if the education does not reach down into the emotional structure of the person. It must create a "safety prejudice" so strong and so ingrained in his nature that it outweighs the three combined quirks which are nature's prime fool-killers.

Here is a psychologist's proposal for deepening flying safety education below the intellectual level. It's a proposal for creating an emotionalized attachment to the principles and procedures of flying safety instead of mere mental awareness of them.

Commanders: Make it obvious to your pilots that flying safety is one of your pet hobbies. There are officers who will knock themselves out trying to read every nuance of the Old Man's mind in preparing a memo for him. They will go to any extreme to avoid giving him reason to criticize or reprimand them. Yet, they'll sometimes disregard flying safety measures as if their lives were of the lightest importance to them.

If pilots know their commander is red hot on the subject of flying safety they become more safety-conscious. For instance, the Old Man posts a pilot roster-flying time calendar on the bulletin board, and has every pilot's distribution of flying time each month regularly recorded thereon. He conspicuously stops every day to check the pattern of flying time of his pilots. This will practically eliminate the end-of-the-month, do-or-die-no-matter-what rush to get in minimums.

If flying systematically and regularly is important enough to the Old Man for him to go to that trouble to keep up with it, it will seem important to his pilots. If he makes it obvious by his own example and his conversation that he observes every feature of flying safety, his pilots will be less self-conscious and more conscientious about taking those precautions.

If he occasionally talks approvingly about someone getting reamed out for a violation of flying safety it will sometimes do more to deter a young hot-shot pilot from the carelessness of youth than the possibility of death would.

Commanders are respected. If they demonstrate respect for flying safety, the men who respect them will acquire a deeper and more powerful respect for flying safety.

Commanders, Operations Officers, Inspectors — everyone having anything to do with the subject: Make adherence to principles and procedures of flying safety an end in itself.

There is a fine point of psychology involved here. Let's say that flying safety is taught only as a means of avoiding accidents. A pilot violates a flying safety procedure and suffers no ill effects from it. So, the whole program of flying safety becomes a little less important in the conscious or subconscious mind of that pilot. When we flout a law and get away with it, we respect that law a little less in the future.

Therefore, I suggest as tight control measures as are practicable to apprehend any violations of flying safety. A pilot climbing into his plane without making the prescribed external check—a violation of specified procedures in bringing a plane down, where unusual pilot skill prevented trouble . . . this time — carelessness in making a weather check, even though nothing ill came of it . . . if such things are done enough times, accidents will result. Therefore, doing any of them one time should be cause for swift, positive, punitive action.

This is not a new idea. Anyone knows that unshined shoes and being out of uniform do not necessarily injure the accuracy with which an air crew puts bombs on the target. But, the long-range, cumulative effect of slack uniform discipline becomes injurious. Therefore, uniform discipline is emphasized as an end in itself, because it is important, even though its importance is hard to pin to a specific result.

The long-range result of violations of flying safety provisions are inevitable and terrible. But the results are so long-range that they are, by themselves, insufficient deterrents. Give flying safety the prestige accorded proper wearing of the uniform. Punish violations because they are violations, irrespective of whether or not any ill results could be pinned to the specific violation.

Commanders: Educate wives in how they can help their husbands live longer. A fine balance has to be maintained here. Wives need to be educated in how they can contribute to their husbands' safety in flying. But, they should not be put into the position of helping their husbands decide how to do their jobs.

Much of their education necessarily has to do with how to make their husbands' flying easier on them. So, care has to be taken to insure that they do not get the idea that the whole program of wife education is a propaganda campaign aimed at making life easier and happier

for the Lord and Master.

Officers' wives generally have too many meetings to attend already. However, I believe that a monthly meeting for pilots' wives, publicized as being for the purpose of explaining how pilots' wives can help their husbands fly more safely, would draw big attendances. Ideally, the wife of a senior officer should prepare herself on some aspect of flying safety for each meeting, make the talk and handle discussions and questions. Properly done, I believe this would be more effective than the best speech a man could make.

This series of orientation meetings, which should be continued indefinitely as personnel rotate, should cover such areas as:

The relation between emotional upset and accidents. Industrial psychologists have found that a worker who has had domestic trouble, or is otherwise under an emotional strain, is several times as likely to have an accident as one who is in a happy, peaceful frame of mind.

The importance of flying regularly, rather than crowding a month's flying into a day, in minimizing the likelihood of accidents.

The importance of unhurried preparation for a flight, and avoidance of feeling pushed for time when making a flight or coming in for a landing.

Basic concepts and procedures in flying safety, to the end that the wife is able to listen intelligently to her husband's talking about the subject, and give him encouragement and support in observing its principles.

Actual examination of aircraft to develop understandings of her husband's tools of his trade, problems and precautions.

Such things as a regular Wives' Page in FLYING SAFETY; a base safety newsletter aimed at wives; and a flight in a military plane with explanation of safety precautions which should be taken are more far-fetched ideas of ways to enlist the active support of wives in flying safety. Commanders should never forget that a wife exercises great influence on a man. They should give the distaff side corresponding recognition in the overall program of flying safety education.

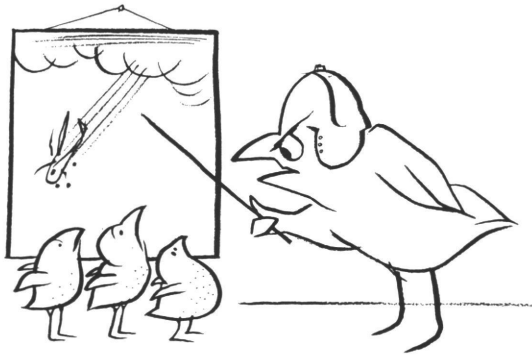
All experienced pilots, especially senior and command pilots: Discipline yourself to glorify taking precautions and idealizing flying safety, both by your own example and in your conversation. This will require re self-discipline, because as was pointed out earlier, the human tendency is to romanticize the risks we took with debonair nonchalance.

Above all else, you prestige pilots, do not tell with dramatic casualness or pseudo-rueful pride of your narrow escapes and brave carelessness. And above all else, don't wind up with an apologetic postscript to the effect that that was very foolish and your listeners should not do such a thing. Take a psychologist's word for it — recounting your own (or som other hero's) wild experience and winding up with an admonition for your audience not to try that, constitutes a dare, not flying safety education!

If you have a sincere interest in flying safety education, talk about the lengths to which you go to achieve flying safety. Leave out the thrilling accounts of how you violated it but got by through your nerve, skill and presence of mind. Just accentuate the positive. Hammer away eternally on the fact that your star or wreath means just one thing: you have acquired sense enough to know how to

Nonchalance can be deadly

Safety education must be practiced to be effective



play it safe and how important it is to do so. Cultivate in the minds of those younger flyers the idea that old hands will measure their flying sense and ability as much by their conscientiousness in observing all rules and procedures of flying safety as by anything else.

All flyers: Use your intelligence and knowledge of what you ought to do to consciously offset the effect of the three suicidal quirks in human nature. When your feelings tell you, "Don't be a worry wart. Are ya' an old woman or a pilot?" Ask your mind, "Disregarding that name-calling, what is the sensible thing to do?"

When you have an inclination to do something that is not exactly according to the rules, consciously try to think of all the reasons you shouldn't do it instead of kidding yourself into thinking it is really sensible. Then honestly weigh each side of the issue. When it is a question of saving a little time or effort balanced against the possibility of losing your life, ask yourself if it makes sense to go into the situation without doing all you can to better the odds in your favor.

In the last analysis, everything else in this article is only a gimmick to get you, each individual flyer, to personally accept the principles and procedures of flying safety in your life. You won't become a safer flyer just because the Old Man watches the flying roster; because you are punished for flying safety violations; because your wife is safety-conscious or because other flyers idealize flying safety.

You will become a safer flyer only by permitting your attitudes and practices to be changed by the things they do. If you consciously try to change yourself into a safer flyer you will have a lot better chance of being around to watch your kids grow up.

There is no such thing as flying without risk. It is just a matter of how little danger with which it can be done. (Ed. note: For that matter, statistics show that more people die in bed than anyplace else.) When you take off, your life is in your hands, not the hands of flying safety officers. It depends on you. And the same is true of flying safety education; you are in command of your own education. You can't be educated as a result of what someone else does, but only as a result of what YOU do.

Safety makes sense. Risk makes widows. It is as simple as that. If you take a chance and get by, no one has gained much. If you take the chance and DON'T get by, your wife loses, your children lose, the country loses. Come to think of it, you lose, too.

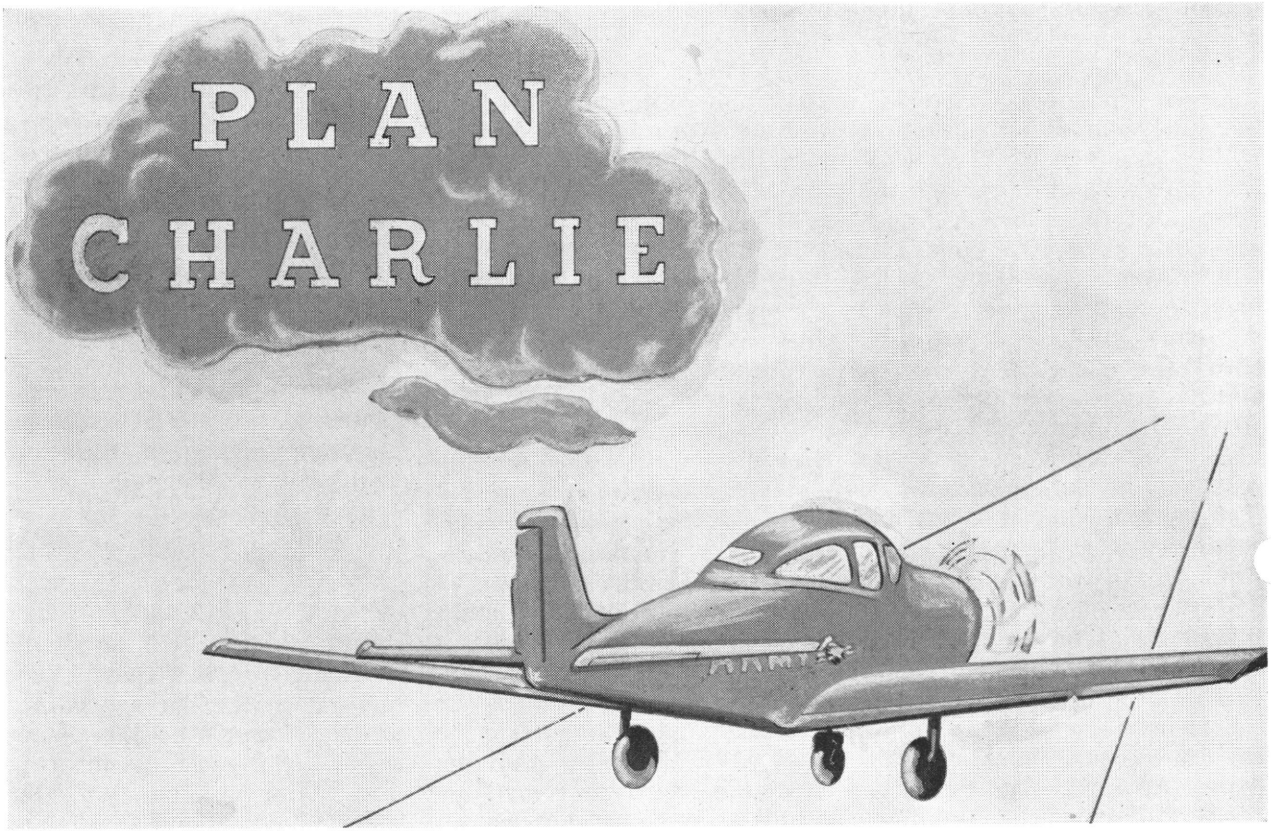
YOU ARE THE PILOT of an L-20 on an administrative flight into Atlanta Municipal Airport from Fort Rucker. Upon landing, the right brake fails and the aircraft groundloops, causing damage to the landing gear, propeller, and right wingtip. No injuries are sustained.

Indicate by a √ which of the following actions you would select to be most appropriate.

As the pilot in charge your responsibilities are:

- ☐ Close flight plan and notify Flight Service or FAA immediately and give them details.
- ☐ Close flight plan. Notify Fort Rucker base operations by the most expeditious means and give them details for preliminary report.
- ☐ Call accident investigation board at nearest military installation and ask them to investigate the accident so the aircraft may be moved.
- ☐ Arrange for repair of the aircraft.
- ☐ Coordinate with airport officials regarding disposition of the wreckage. If at all possible, leave it as it stopped until investigating officials arrive.
- ☐ Get names of witnesses and move the aircraft as soon as possible.
- ☐ Arrange for guards or otherwise safeguard the aircraft.
- ☐ Refuse to let photographs be taken until proper authority is obtained.
- ☐ Do not refuse to let photos be made unless classified material is involved, but withhold your consent and try to delay photographers until permission is obtained from PIO or other proper authority.

The recommended solution to the PUZZLER may be found on page 21.



Captain Carl H. Sawls, Jr., Inf

THE CAR DOOR made a loud noise as it slammed shut. Hogan and I thanked the driver, then walked toward my car as he was driving away.

Fog was hanging heavy in the night air; the sound of it dripping from the hangar buildings indicated it was the next thing to rain. It was a late hour and the few lights that were on glowed faintly in the distance.

I started my car and drove toward home. Automobile tires on a wet pavement make a rhythmic tune; this was a beautiful sound, I thought, as we drove along, stopping occasionally for the traffic lights that were still on at this late hour.

Turning to look at Sgt Hogan, I said, "This is a beautiful night!"

Without returning my glance, he looked outside at the weather, grinned and said, "Yeah, it is!"

Earlier in the day SFC Hogan and I had decided, over a cup of coffee, to fly to Birmingham. I needed night cross-country time for my annual minimums; besides, it was the first football game of the year in Vulcan Stadium. So, the flight was agreed upon, with coffee mugs raised in a salute to the "two-fold mission."

A thorough preflight was pulled on our National Guard L-17A aircraft, and other necessary details were made ready for the anticipated flight. With the approved flight plan from Maxwell Flight Service, we were ready for takeoff.

A good start and a ground runup that checked out perfectly, found us airborne at 1700 hours. Gear was upped, flaps milked into the up position, and we turned out of traffic, picking up our heading to Birmingham as we climbed to altitude. Upon reaching our altitude, the aircraft was trimmed up and cruise rpm and manifold pressure were set.

Captain Sawls is Flight Commander of the Shawnee Branch in the Department of Rotary Wing Training. He is fixed and rotary wing qualified and has approximately 3400 flight hours.

Everything was checking out smoothly and in the "green"; this was to be a good flight.

The weather en route was clear and mild, indicating a good return flight later that night.

Some 30 minutes later, from 15 miles out, Birmingham tower was contacted for landing instructions.

After touchdown, we refueled and tied down. A quick check with the tower made sure our flight plan had been closed. We called a cab for the last leg of the journey to the stadium. Everything was as planned, running on schedule.

It was 2230 hours when we returned to the airport. A quick hamburger and a cup of coffee would taste good — giving us plenty of time for checking the aircraft, filing a flight plan, and being airborne within the hour.

An hour later this "3-3" had become airborne with a VFR flight plan in his hip pocket. A left crosswind leg put us east of downtown Birmingham and on our return course to Montgomery.

The night was black and the dimly shining stars, blending with the scattered lights south of the mountains, left no visible horizon for pilotage.

Fifteen minutes after takeoff put us well south of Birmingham and the mountains, into fairly level terrain.

It wasn't much later when I became horror stricken; the ghastly glow of wingtip lights meant but one thing — FOG! The dimly shining stars above and faintly glowing lights on the ground had disappeared completely.

My first thought (after checking airspeed, altitude, heading, needle and ball) was to do the famous 180° turn back to Birmingham. I soon gave up plan "A" when Birmingham went IFR, with commercial traffic "stacking up" at various holding points; also, the mountains were to be given some thought.

Gears were turning in a semi-frantic effort to set up and put into operation plan "B." The thought ran through my mind, an old saying of the coach, "When in doubt — punt!" I wanted to laugh out loud, but was afraid Hogan might think I had flipped my lid; so I returned my thoughts to the problem at hand.

Checking the map, plus the 15 minutes flown, gave me a good idea where we were on our out-bound course. Fairly level terrain and the knowledge that our flight path would cross highway 31 south to Montgomery gave me courage (false). I explained to Hogan what was to take place, plan "B."

His job, since we had only needle and ball and a magnetic compass, was to count down in hundreds of feet as we started letting down from 2,000 feet. My job was already cut out for me: I was going to concentrate on the compass heading and try to keep the aircraft level with needle and ball until we broke out beneath, while descending about 200 fpm. Picking up highway 31 south and flying to Montgomery would be no sweat —yet!

As Hogan called out 700 feet, I leveled off and steadied the aircraft. Looking out ahead and down, I could see only fog. It was then I envisaged an L-17A aircraft scattered over the countryside, along with the remains of two people whom I liked very much. With this in mind, along with passing thoughts of an accident investigation board, another "3-3" pilot hit the panic button when encountering IFR conditions and set up the next plan, "C."

Climbing back for altitude and leveling off at 2,000 feet, I picked up my heading for Montgomery. This seemed to be the first sensible thing I had done up to now; plan "C" was being put into effect. Tuning in the low frequency radio to MXF, I rechecked VHF radio on Baker Channel, glanced at the time, and rechecked the instrument and engine panel.

Plan "C" was (act like an Army Aviator) to fly my planned flight course at 2,000 feet for 30 minutes from takeoff time (this altitude should keep us below instrument traffic and well above the terrain). The 0 + 30 time of a 0 + 45 ETE would put us 0 + 15 out of Dannelly Field, Montgomery and in the NW quadrant of MXF low frequency. I'd planned to stay in the NW quadrant until I had made contact with (MXF) GCA in the event someone was making a low fre-

Plan Charlie saw him through

quency approach into Maxwell Air Force Base. At this point and time, I would contact MXF for a GCA. I was feeling much better, more like a man.

First call to Maxwell tower brought nothing; I called again and asked for a long count for tuning on Baker Channel. Rotating the "coffee grinder" handle on the VHF radio brought in a loud, clear count down from Maxwell tower. I informed MXF tower that I was on a VFR plan, Birmingham to Dannelly, when I encountered IFR conditions, and requested assistance with a GCA to Maxwell Air Force Base. Maxwell tower asked how much fuel I had left. To this I replied, "Two hours."

I was given several frequencies to contact GCA, but only had Baker Channel and the emergency frequency; tower said he'd work me on "Baker." I requested that they run in the "first string team" as I had no instrumentation in the aircraft for making precision turns to a given heading, and, too, I was only a "3-3." Maxwell said he'd work me on a "no gyro" system — the key word being NOW. GCA gave me several identification turns and had me located 12 miles NW of MXF at 2,000 feet.

Everything was working great at this point, and I was unaware of Hogan sitting beside me.

Several more turns had me on downwind for a north landing — base leg and then a 10-mile final approach, with instructions to complete my landing check. A call back gave Maxwell GCA, "Landing check completed, gear down and in the 'green'."

My final instructions were, "Do not acknowledge any further instructions, and if you do not hear the voice of GCA Operator at any 5-second period of time, pull up and use missed-approach procedure until contact is made."

I thought to myself, "I want this landing more than anything."

All corrections were made, with light pressures on the rudder pedals to keep from overcontrolling on final approach. At each mile GCA informed me of my position, as to distance from touchdown, alignment with runway 36, and glide path.

"This is Maxwell GCA. You are 1 mile from touchdown, high on glide path, alignment looks good. You are on glide path; hold that rate of descent. You are ¼ mile from touchdown, 600 feet altitude, glide path good, aligned with runway 36."

As I broke out I saw two parallel strings of runway lights directly in front of the aircraft and traffic passing along beneath on highway 31 into Montgomery. I stayed with the gauges, wondering how low GCA would continue to work me.

"This is Maxwell GCA. We have you visually in sight. Continue to make your instrument letdown. (These fellows were good and I was not about to argue with them; they had brought me this far, and I was going all the way with them.) You are over runway boundary; alignment good, with fifty feet altitude. Raise your nose to landing attitude—hold it—cut your power."

Just as throttle was retarded, the wheels gave out with a soft screech. We were on the ground!

"This is Maxwell GCA. Take over and taxi to intersection; a "follow me" jeep will park you. Thank you and goodnight, Sir."

Yes, it was a good night! Thirty minutes later the field was closed, below IFR minimums.

Later in flight operations, I thanked the fellows who had worked me on GCA. They were just young boys, but were doing a man-size job!

The operations officer arranged transportation to Dannelly Field where my car was parked.

Thinking back over the 1-hour flight from Birmingham to Maxwell, I turned what could have been a disastrous flight into a successful GCA landing by realizing the foolish mistake I had made in trying to stay VFR in IFR weather. I had made my plan "C" (Charlie) to fit the situation and stuck to it. It was that simple.

Editor's Note:

We all applaud when an Army Aviator (or any aviator for that matter) gets through an experience in one piece. Especially do we applaud if that experience is passed on for others to use. With 20-20 hindsight, we cannot resist a little preaching, to wit: lack of preflight planning—a little procedure that can make pros "old."

The pilot should have immediately contacted an Air Route Traffic Control Center and explained his predicament. This would have made the Center aware of any possible conflicting traffic and enabled them to remove possible danger through rerouting of other traffic. There's must more to flying than pushing the "go" button. From the tone of Capt Sawl's article we believe a thoughtful aviator has gained a great deal. We hope you have, too.

HURRY! SEND A CHOPPER!

Proved on Korea's battlefields

Captain Curtis O. Greer, Jr.
MSC

AIRPLANE CRASH! These electrifying words came over the loudspeaker in the Eighth Army Aviation Detachment ready room. "They need all the helicopters that can fly to evacuate casualties."

Within minutes all the flyable choppers were manned and on the way.

Army Aviation wrote a brief history that dark night on the Han River, one that lives on. And since then many pages have been added to the dramatic story of Army helicopter rescue and evacuation.

In France a young girl dependent suffered critical burns over 40 percent of her body. After first aid, a Medical Service Corps demonstration team was hastily called in. Minutes later the girl was en route to an advance hospital while plasma was being administered.

Near an airborne center a truckload of paratroopers returning from town were pinned under the truck as it plunged through the guardrail and overturned in a creekbed. In minutes an H-34 hovered over the wreckage, the fanning blades only inches from the bridge abutment while a line was secured on the truck. A quick lift and the Sioux pilots who accompanied the Choctaw extricated the dying and dead; moments later the race to the hospital began.

A motorist ran off the road and overturned. An Army Aviator passing in a helicopter quickly landed, rendered first aid, and then delivered the injured man to the hospital.

"Hurry! Send a Chopper!" For years this request has sent helicopter pilots scurrying off on mercy medical missions. Countless lives have been saved by both military and civilian pilots, utilizing many different types of rotary wing aircraft. Medical evacuation is one of the primary functions of Army Aviation today.

This life-saving method of transport was proved on the battlefields of Korea, under the most difficult weather, terrain, and flight conditions. Accomplished while helicopters were still in their infancy, pilots of all three of the Armed Forces air evacuated thousands of United Nations soldiers. Physicians were amazed at aeromedical evacuation's contribution to

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The helicopter reduced the mortality rate in Korea

the reduction of the mortality rate among wounded. A mortality rate of only 2.4 percent was attained during the Korean conflict—the lowest of any major war yet!

Without a doubt, the air ambulance is here to stay — not only in our Armed Forces, but in civil use as well. Every major hospital will ultimately have its own heliport; outlying highway networks will have designated patient pickup points for both day and night operations. Seriously ill or injured patients will be air lifted over congested city traffic, just as soldiers were evacuated from combat areas above heavily traveled main supply routes.

Vital inflight emergency medical treatment can be rendered before the killer, shock, gets a foothold. Precious moments will be saved, and the patient treated while there's still a good chance of survival. Many problems must be solved before this can become a reality, but these solutions are possible.

As far back as 1936 the Army Medical Service experimented with the autogyro in the air ambulance role. Today, our Army Medical Service has organized its ambulance helicopter units based on the experience and knowledge gained in Korea and elsewhere. Their principal mission is the evacuation of the most critical cases; however, they are also used to transport high priority medical supplies and key medical personnel between field installations.

Only the physician has the professional knowledge and training to properly diagnose and sort casualties for this type of evacuation. Only he can designate the particular medical facility where the patient must go to receive definitive emergency treatment. For these reasons, this service must remain under medical control.

Our surgeons are becoming increasingly aware of the great potential of the helicopter as an evacuation vehicle. They are more efficient in their use of this relatively new machine, and have been very cooperative and understanding of the pilot's many problems. These are some of the problem areas: marginal weather and night operations, safety precautions, load limitations, pilot capabilities, and basic information required in planning the mission.

When the external litter carrier is utilized, no inflight treatment can be rendered, with the exception of whole blood, or blood substitutes, which freeze in cold weather. During extremely cold weather operations, the heating system of the external litter carrier is inadequate for the patient in critical condition. When using this method of evacuation, all patients should be thoroughly briefed regarding strange noises and vibrations to which they are unaccustomed. The possibility of acrophobia or claustrophobia occurring cannot be underestimated. The unconscious patient must be observed during the flight. If the internal litter is used, a medical attendant is assigned to render treatment during flight. Oxygen therapy has been administered with excellent results. Adequate heat is available when the larger transport type helicopter is used.

The helicopter does not replace the other methods of evacuation; the hand-carried litter, jeep ambulance, and field ambulance are merely augmented by this new means. When speed in evacuation is vital, when isolated areas require support, the helicopter stands ready at all levels of command to do the job. Backup support for the Medical Service air ambulance units is obtained by the surgeon, through command channels, from the other branches and arms of the service authorized Army Aviation.

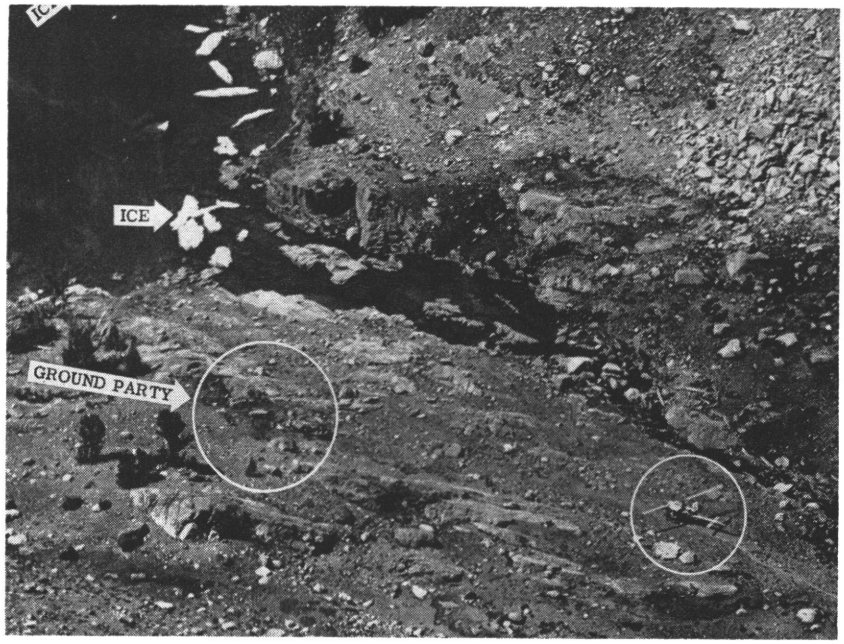
A recent evacuation mission was flown by an aviator sta-

tioned in Korea. A soldier had fallen and suffered a painful hip injury on a mountain pinnacle at an elevation of 3,980 feet. Evacuation by hand-carried litter and field ambulance to the nearest hospital, 30 miles away, would have required approximately 6 hours. The request for evacuation was passed back to the air ambulance unit, and a helicopter was dispatched immediately. Fifty-five minutes later the soldier was undergoing excellent medical treatment in a well-equipped hospital.

This procedure is simple in ature but can get very inolved and confusing if certain prerequisites are not met. The contents of Chapter Eight, Field Manual 8-35, "Transportation of the Sick and Wounded," should be read and studied by all concerned. A great deal of training and prior planning goes into a mission of this type.

The requesting agency (normally the doctor) ensures that "this trip is necessary." He must know and understand the capabilities and limitations of the pilot and aircraft. The exact location of the pickup site, by grid coordinates and prominent land features, is passed back with the request. Other valuable information is the number of patients to be evacuated, diagnosis of each, disposition of patients, and method to be used to mark the pickup site. The pilot is informed of any property exchange or special supplies and equipment he is required to bring forward.

The ground party's job is also important for the safe accomplishment of the mission. A great deal depends upon them. The site selected must be large enough to accommodate the type of aircraft utilized. It should be free of all obstructions to flight. Level, dust-free sites are desirable. Cloth panels used to identify the site must be secured. If smoke is used, it is placed on the downwind side of the intended pickup site.



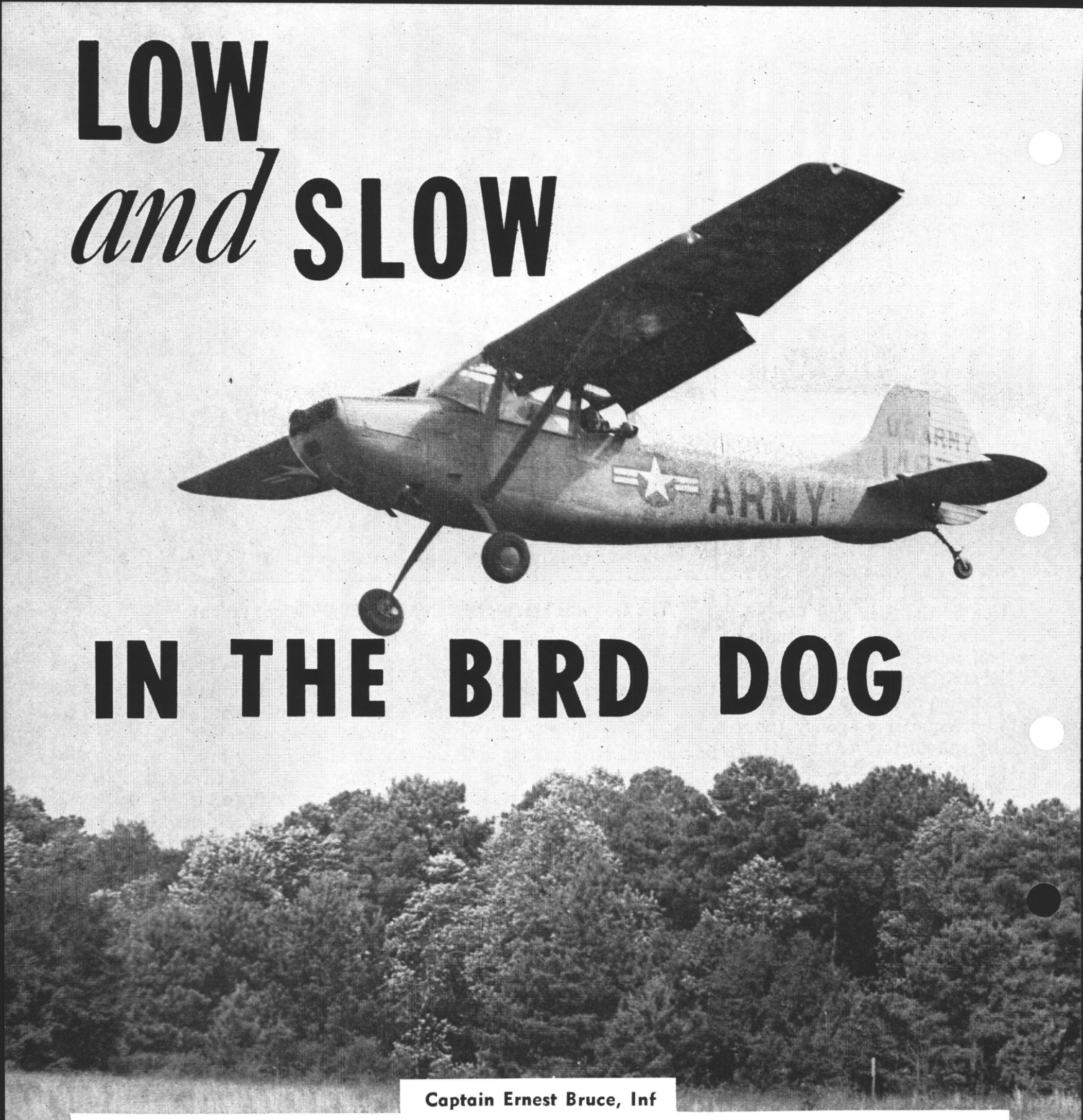
The Iroquois made pickup on this 10,000-foot mountain

Only necessary personnel should be used for loading and unloading operations. Personnel approach the helicopter from the front so the pilot has them in view. Other rules are these: avoid the danger area of the tail rotor, bend down when passing under the main rotor blades, and keep the litters in a horizontal position. In general, exercise good safety practices. For night operations a larger area is needed. Smudge pots and vehicle lights have been used successfully many times for this type of operation. Vehicle lights are directed into the wind because this is the direction in which the pilot will land the aircraft. Lights should not be placed in such a position as to blind the pilot.

The pilot must know and never exceed the limitations of himself or the aircraft. He is the final authority in any matter concerning the safe operation of the craft for which he is responsible. Pitch-dark night operations and marginal weather conditions often face our helicopter pilots in the field. Sound judgment and compliance with current policies and regulations are valuable aids in rendering a final decision as to whether or not the mission will be flown. A high degree of pilot proficiency must be attained, and retained, if missions are to be conducted without danger to the lives of the crew and passengers and damage, or destruction, of the aircraft.

Sound judgment and coordination are absolutely necessary among the three personnel elements involved in an evacuation mission: the physician, the ground party, and the pilot.

LOW *and* SLOW IN THE BIRD DOG



Captain Ernest Bruce, Inf

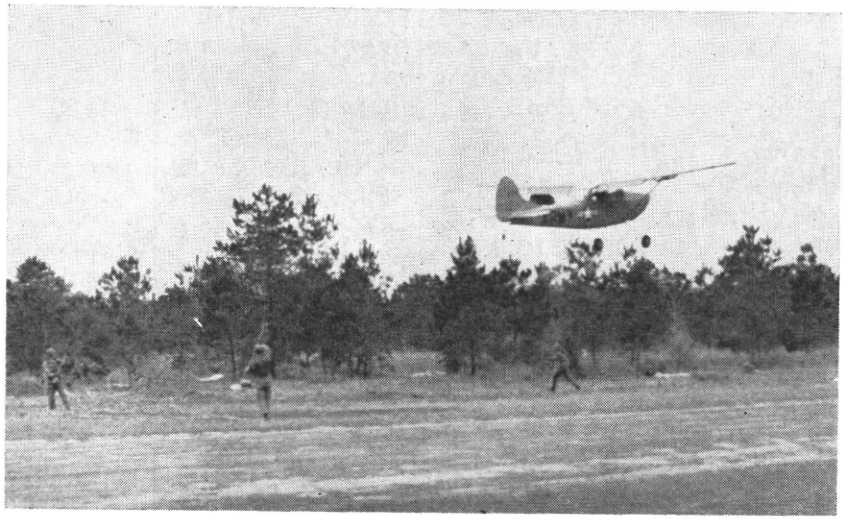
TO THE ARMY AVIATOR assigned to the aviation company of a tactical ground unit, low-level missions are a regular part of his duty. These missions are somewhat hazardous at best, but errors in judgment and technique can increase this danger enormously.

Little goofs that mean nothing at higher altitudes are sometimes fatal at low altitudes. Have you ever run a gas tank dry? Lost 100 feet in a turn? Inadvertently stalled? Gotten carburetor ice? If any of these has happened to you on a low-level run, you are lucky to be alive.

The large number of aircraft involved in low-level mission accidents has caused concern among Army safety officials. They ask: Why did the deceased pilot attempt to make a steep turn at 150 feet when there was nothing to prevent his climbing to 400 or 500 feet before turning? Why did the pilot on a flour-bombing mission look down to watch the floursacks hit—and fly into the ground at 120 mph? Why?

The age and experience level of most of the pilots pulling duty with tactical units may be a factor. The young pilots straight out of flight school are usually assigned to the Combat Division Aviation Companies. As they gain experience they migrate to other aviation jobs and are replaced by more pilots straight from flight school. All too often when a low-level mission comes up, the more experienced pilots consider themselves "too old for that sort of thing" and leave the mission to the young pilots who are least qualified, experience - wise, to handle it. The young fellows, whether they realize it or not, need the guiding hand of an experienced Army Aviator in these matters.

Were you ever practicing autorotations in a Sioux when several dozen civilians gathered at the airport fence to watch? It brings out the "ham" in most of us—that almost irresistible urge to put on a little airshow for the people. The same atmosphere sometimes prevails with low-level missions. There may be several hundred troops watching you make your run. They are expecting something spectacular, and you don't want to disappoint them. Maybe they will have something to write home about—at the expense of your life.



The pullup can be hazardous

All too often pilots use the term "tactical" as an excuse for violating safe flying practice and common sense. Often so-called "tactical flying" proves to be just immature buzzing. Most low-level missions in support of tactical ground units actually require the aircraft to be at treetop level for only a short period of time. The pilot can fly to the unit's area at a safe altitude, make his low-level passes, return to his home field at a safe altitude and be just as "tactical" as the Hot Pilot who contour flew from the time he left the home field until the time he returned.

Let's go through a typical low-level mission, a freefall supply drop. This mission is typified by low airspeed flight conducted as close to the terrain as safety permits so the supplies can be dropped without undue damage. The points to be considered will apply in most cases to other low-level missions, such as a message drop or pickup, a low-level photo run, or low reconnaissance.

If the mission is laid on in advance the pilot has an opportunity to make a reconnaissance of the mission area if he is unfamiliar with it. In the example of a freefall supply drop, time spent on a thorough high reconnaissance, if possible, is time well spent.

Usually, under field conditions, the unit will furnish an observer who is familiar with the ground situation and the terrain. In such event, don't neglect to brief your passenger, who will usually arrive prepared for the worst in full battle gear. A steel pot and the torque tube make a deadly combination. Nothing will jam the aileron controls more effectively than a steel helmet between the L-19 torque tube and side of the cabin.

Your observer must be thoroughly briefed prior to takeoff. Explain to him what you will do and what you expect him to do. Caution him against inad-

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vertently interfering with the throttle quadrant or pushing against the torque tube while in the throwing position.

Always, **without exception,** remove the rear stick from its socket and stow the rear rudder pedals in the down position. Your observer could, while groping for support, place his foot against the stick or rudder pedal and cause you to crash instantly. If you have a fellow pilot for an observer be certain that he doesn't put the rear stick in the socket out of habit.

After taking off there are several things to do before starting the mission. Be certain that you switch to the fullest fuel tank. Determine the proper direction to make your low-level run. You must take into consideration wind direction and velocity, terrain, forced landing areas, direction of the sun (if it is early in the morning or late in the afternoon), and the target pattern on the ground.

THE LOW LEVEL RUN

The actual low level is the most dangerous part of the mission. A properly executed run should consist of a more or less straight descent from a safe altitude to the low-level altitude, a straight low-level run, and a straight pullup. Of course small turns might be necessary because of terrain, but steep banks near the ground must be avoided. Every pilot knows how easy it is to lose 100 feet in a turn, but what if your aircraft is only 75 feet above the ground?

During the low-level run there is an almost irresistible urge for the pilot to watch the supplies fall. Naturally there is a feeling of satisfaction when watching your bull's-eye but this is a luxury that you cannot afford. Diversion of attention at low altitudes is one of two big killers in low-level missions. If you must know the results of your run, have your observer give you a "strike report." On low-level runs the pilot **must** devote his complete attention to flying the airplane.

The other big killer is excessive bank at low altitudes. A perfectly normal bank at 1,000 feet could be excessive at 30 feet. Remember, the steeper the bank the more difficult that altitude control becomes; and, of course, the lower the altitude becomes the less you can afford to lose. Use nothing in excess of a shallow bank during the low-level run. If the target cannot be covered without turning, then make more than one run.

After completing the low-level run, it is only common sense to pull up to a safe altitude. The pullup can be as hazardous as the low run if not executed properly. A sharp, steep pullup will prove to be fatal if the engine should fail. To appreciate the danger of a steep pullup try this the next time you are flying a Bird Dog: Place the aircraft on a certain altitude several thousand feet above the ground; make a steep pullup after gaining about 150 feet of altitude, and cut the throttle. Attempt to keep the plane from stalling and attempt to get it into a gliding attitude before passing through the altitude that you started from. You can't do it can you? And you couldn't do it if your engine should quit on a steep pullup from ground level.

Most other low-level missions may require more than one pass. It is important for the pilot to pull up to a safe altitude before attempting to place himself in position for another run. Recently a pilot pulled up to 150 feet after dropping a message and began a steep turn, apparently with the intention of flying back over the drop area. He stalled in the turn and was killed on impact. Making steep turns at low altitudes is like playing with matches in a dynamite factory.

A pilot must guard against surprises at low altitude. Surprises such as control interference and fuel starvation have already been mentioned, but what about terrain surprises? A Bird Dog made a supply drop to a unit in a small valley. After dropping the supplies the pilot found that he was unable to clear the ridge lines forming the valley. He crashed about 50 feet from the crest of the ridge. He wasn't injured, but he was somewhat surprised. A low recon and a dry run prior to the low-level pass are good insurance against "surprises."

Low-level missions require skillful flying as well as proper planning and good judgment. A professional attitude towards low-level missions is an excellent way for the Army Aviator to increase his life expectancy.

Memo from Flight Surgeon

FUNDAMENTALLY, the Army flight surgeon's role is to provide the services of a physician to the pilots and supporting personnel of Army Aviation. His patients are a breed apart, requiring that he augment his professional training and medical background with a knowledge of flight and aeromedical techniques.

In the more or less routine peacetime operations of the present, our younger pilots have little cognizance of times past in which the "flying doctors" performed feats of derring-do. Instead, they are familiar with FS who functions in a clean, often air-conditioned office. They associate his functions with bright shining tools, polished desks, and crisp, efficient clerks or secretaries. It was not always thus.

The circumstances of aviation medicine today are different from those of the chaotic days when we struggled to wrest air supremacy from the flying hordes of Göring & Co. Then, it was the flying doctor, the flight surgeon, more than any one individual, who taught man to keep apace with his incredible machine. For each engineering advance that further stressed the human body the flight surgeons initiated medical adjustments that modified the man and aided him in some way to meet the machine's challenge.

THE FS RECORD

The flight surgeons lived and flew with their men, came to know them intimately, to appreciate their problems. They "jumped" into the field to administer first aid, and into oceans to prove that fliers could release themselves from the regulation parachute while immersed in water. They made parachute descents from as high as 40,200 feet to test bail-out oxygen equipment. They allowed their bodies to be instantaneously projected from 10,000- to 35,000-foot altitudes in low-pressure chambers to prove that explosive decompression would not kill.

In the face of a destructive war, the flying doctors were motivated by a spirit of experiment to defy nature and thus ensure man's safe place in the skies. Without them, modern military flying would have been impossible and the aviation feats of World War II would have gone unaccomplished.

There are no longer the opportunities or causes, inherent in war, for today's flight surgeons to be applauded and decorated as were their earlier confreres. However, when occasions arise which interrupt the day-to-day routine of our present flight surgeons, they have responded in exemplary manner. A recent emergency in the Carribean illustrates that aviation medicine is not necessarily restricted to routine functions, that the flight surgeon is not just an operating individual in standard procedure patterns. The story bears telling in aviation circles.

RECEIVES EMERGENCY CALL

A tuna boat, some 500 miles at sea south of Panama, sent out an emergency radio call stating that their captain was having an attack of appendicitis. The call was picked up by a military aircraft rescue unit operating in an area of deserts, open seas, mountains, and jungles, providing emergency medical service where it might otherwise be unattainable.

In hurried response, a rescue flight arrived on the scene at dawn. While circling over the area, the flight surgeon aboard radioed to the ship. The vessel's radio operator advised that his captain was vomiting blood and appeared to be very critical, perhaps dying.

In turn, the flight surgeon impressed his pilot of the emergency. He instructed that, if at all possible, an immediate landing to evacuate the patient must be made. The pilot flew several low passes over the sea to determine surface conditions.

The eventual landing was very rough. The rescue aircraft planed off a gigantic swell and skimmed into the air, its props in full reverse. She fell back into the angry sea at a slightly nose-first angle. Upon contact with the water it tore twistingly to the left. Much of the equipment aboard was torn free upon impact, and minor bruises and lacerations were inflicted on some of the crew. Water entering the compartment added to the confusion as the flight surgeon administered first aid, instructing those who could tend their injuries and assisting those who could not.

ROUGH PASSAGE

The aircraft was able to taxi, and the pilot headed her over the rough water toward the waiting trawler. The distance was considerable and passage was extremely rough. Before the aircraft had come alongside the tuna boat, several members of the rescue crew were stricken with seasickness and required further attention from the flight surgeon.

The boat crew sent a dingy over the water to pick up the doctor. He was brought aboard the fishing vessel safely, examined the ship's captain and found that he had an obvious peritonitis, high fever and was severely dehydrated. He instructed several of the fishing crew to bundle the patient in blankets and a few of their waterproof "sou'westers" and set about bringing his patient to the rescue aircraft.

SEASICK AIRCREW

The gunwales of the little dingy were nearly awash as the flight surgeon, his patient, and one of the tuna crew oared their way from the tuna boat to the floating aircraft. There the patient was made as comfortable as possible. Some of the crash debris had been restored to order, but the entire crew was now violently seasick. Once again the FS had more than one patient requiring medical assistance. The aircraft's seasick complement was practically useless to the FS. The problem became even more complex as all efforts to assist the patient resulted in causing him greater nausea and consequent vomiting.

As the pilot made several unsuccessful attempts to taxi into a takeoff position, the FS kept up his medication and was finally able to introduce some demerol, terramycin, and fluids intravenously. These drugs had an immediate effect, and the patient became more comfortable and quiet.

The FS then turned his attentions to the aircraft's crew. At that moment, it was as important for them to "pull through" as it was for the fisherman. As their seasickness continued, fewer of them were able to get about their duties, and the aircraft was fast losing its struggle with the rough seas. The flight surgeon made the crewmen get to their feet and walk past him as he doled out dramamine tablets. He advised them to breathe regularly and deeply, and urged them to think of things other than their predicament. He ordered several to assist in setting his kit near the patient's hammock. Gradually, order was restored in the compartment.

SITUATION GRIM

The patient continued to rest comfortably and the FS went forward to discuss the situation with the pilot. They both agreed that it appeared very grim. The aircraft could not be gotten into a takeoff position and was further hampered by a lack of "jato" equipment. Even if the pilot were able to maneuver the aircraft into position, it was doubtful there would be enough power to lift both the damaged aircraft and the additional weight of water that had been shipped upon impact. The pilot suggested that a tow rope be thrown out by the fishing boat and the plane be towed until the seas were calmer. The fishing crew complied with the request, the line was made fast and the pilot cut his engines, relying on the tiny boat ahead to see them safely through the high seas.

Meanwhile, the crew, some of whom were not much improved, inspected the aircraft and reported some, perhaps disabling damage, had been sustained through either the crash or the buffeting of the water. The chief damages among the aircraft's vital parts were the flaps, wheel fairing, and the horizontal stabilizer.

As darkness approached, the flight surgeon decided that the patient should be re-transferred to the tuna boat. The towline had broken twice during the long afternoon and he worrie that it might break again during the night, leaving the plane stranded at sea.

STORM WORSENS

The fishing vessel sent out its dingy for the second time so that the patient could be transferred to his own ship. The seas were higher than at the time of the previous transfer. Passage from the aircraft to the boat was made with considerable difficulty and caused great discomfort to the tuna captain. Progress was slow as the oarsman alternately rowed and bailed in a dual effort to keep the skiff on course and afloat. The flight surgeon struggled in vain to keep his patient dry and relatively calm.

The patient was placed in his bunk aboard ship. His condition had hardly improved, although he was responding somewhat favorably to treatment.

During the night the supply of demerol and intravenous fluids ran out. As the drugs' affects wore off, the sick man evidenced greater discomfort, fever, and pain. The ship's radio operator called for assistance, stating the problem and

the flight surgeon's urgent need of drug supplies. As the patient's condition became increasingly critical, the second day of storm tossed waters began. The flight surgeon waited helplessly for supplies.

SUPPLIES DROPPED

Shortly after dawn a second aircraft from the rescue unit flew over. The pilot radioed that he would not chance a landing, dropped the needed supplies, wished them luck and flew off. Once again the patient responded to the drugs, but by mid-afternoon his condition had again degenerated and as the hours passed, his breathing became extremely labored. If the patient were to survive, it was imperative that some measure be taken to provide relief. However, the necessary equipment was not at hand. The flight surgeon took a length of intravenous feeding tubing and fashioned it to serve as a Levine Tube. He inserted it with some difficulty through the ship captain's nasal passage and attached a 10 cc. syringe to the exterior end. The suction induced by the syringe afforded some relief.

The man's breathing was still very labored, however, and by evening this little relief had ceased to be sufficient. Some instrument providing greater suction had to be employed. But what? The flight surgeon knew he had no professional equipment with him that would serve his purpose.

IMPROVISE

He asked the tuna crew if any such equipment or instrument were aboard. The ship's engineer mentioned timidly that a grease gun might do the job. The flight surgeon thought it could be used and instructed several crew members to clean the gun thoroughly with gasoline. Under his direction, it was then sterilized in the galley by the ship's cook. When this was done the flight surgeon modified the clumsy tool with tape, plastic tubing and a syringe barrel. The captain's men watched wonderingly as the surgeon advanced upon his patient with the homemade aspirator. Grouped around the circle of light from the single bulkhead lamp, they waited.

Minute by minute, the sound of breathing became less harsh, more evenly paced. Although a violation of "professionalism," the grease gun had worked. As the flight surgeon attended to its use, he watched the patient fall into a fitful sleep. The suction provided by crude improvisation had saved a life. The medical officer assigned a watch for the night and instructed each man in how to manipulate the life-saving instrument. He requested that he be awakened immediately if the patient's condition became worse and sought his first sleep in over 40 hours.

Throughout the night the tuna vessel towed the rescue aircraft; the weary flight surgeon managed a few much needed naps; the patient continued his fitful sleep; and the seas became calm. On the following morning a third aircraft from the rescue unit appeared on the scene, circled overhead and landed. The calmed waters offered no problem as the patient was transferred aboard the aircraft. A successful open-sea jato takeoff was made and the tuna captain was flown to Gorgas Hospital in Canal Zone, Panama. Following an emergency appendectomy there, he was hospitalized for a long period of time.

This inspiring account of a flight surgeon who managed to succeed in his mission in the face of overpowering odds might well be some hero of fiction. Might be—except for a tuna boat's captain somewhere in the Carribean who can vouch for every word.

Solution to This Month's Puzzler

On the basis of the factual information contained in the PUZZLER on page 9, the recommended solutions are as follows:

Close flight plan. Notify Fort Rucker base operations by the most expeditious means and give them details for preliminary report. They will make arrangements for investigation.

Coordinate with airport officials regarding disposition of the aircraft. If at all possible, leave it as it stopped until investigating officials arrive. If traffic is heavy and a delay in investigation is expected, the aircraft may have to be moved.

Arrange for guards or otherwise safeguard the aircraft. In this case Fort McPherson could be called on to furnish guards.

Do not refuse to let photos be taken unless classified material is involved, but withhold consent and try to delay photographers until permission is obtained from PIO or other proper authority.

THE AVIATION MECHANIC

Griffin Williams

THE INCREASING technological advances of today demand that a competent aviation mechanic possess much more talent than his predecessors. There was a time when the mechanic was a fellow who wasn't very good at "books" but whose hands could handle a wrench with all the skill of a sculptor manipulating a chisel. Today's aviation mechanic not only handles his tools with great facility, but he also must have a vast amount of specialized knowledge. He is a skilled technician. Only a step away from the engineer, he is a professional, too.

All this has come about through the spectacular growth in aviation in these postwar years. The research and development ball started rolling during World War II, and it has gained momentum each year. Our scientists and engineers are placing marvels of scientific development in the hands of our military leaders. These intricate products from the minds and hands of our nation's foremost researchers are funneling into Army Aviation.

We have come a long way from the light observation planes of WW II. The L-4 and L-5 gave way to the L-19, Otter, Beaver, the versatile helicopter — each serving an important place in operational missions of the Army. Now these are making way for the new developments in VTOL and STOL aircraft.

With each new step in growth of equipment, the demands on the human side of the man-machine combination have increased. Increased knowledge, responsibility, and integrity are demanded of both the pilot and the mechanic.

There is no room for second-class ability on the Army Aviation maintenance team — only first class men working to become masters. Although the mechanic is a recent graduate of an excellent training school, he is still a fledgling in aviation maintenance. His skills will progress with him through all the days of his career. Every day will be an exciting new period of growth, because today's mechanic must become a master. The safety of the pilot, his crew, the aircraft, and the accomplishment of mission are in his hands. They **must** be capable hands.

Learning must be a constant process of the good aviation mechanic—no matter how excellent his knowledge of fundamentals and his proficiency in applying them, every mechanic still has much to learn. Once the fundamentals are mastered, there are new and better ways to be developed for doing the job. And with more intricate equipment being delivered to Army Aviation all the time, there is a constant challenge to master new techniques. Progress has always been an uphill climb. Tomorrow will be different from today; and the mechanic must be ready for new developments and new responsibilities to come. This makes the aviation mechanic's job always new and interesting, forever challenging. The good mechanic can never grow stale.

The good mechanic knows his aircraft completely. He is aware of all possible malfunctions; he knows what to look for and how to find it. His ear

is as sensitive to the dissonant sound that indicates trouble as is the physician's listening to a patient's heartbeat. His maintenance is never in a hurry, never touched by the confusion, inaccuracy, and agitation connoted by the word **hurry.** Instead, he does his job right away, and the **right** way, carefully seeking out and repairing the faulty parts, using approved maintenance procedures, proper tools, and completing his job by correctly filling in all forms and reports applicable to the job.

The mechanic can fail the fine tradition of maintenance by underestimating the importance of paperwork in his job. The record of maintenance performed is not distinct from the maintenance; it is part of the job—no job is complete without it. The fundamental information on the completed reports can save many months of research and work in troubleshooting causes of failure in components. Often maintenance difficulties can be resolved by finding the answer to such a question as, "What faults did teardown reveal?" on the reports filed by the mechanics.

A good mechanic realizes the importance of using the proper tool and following the proper technical instructions in performing maintenance on today's intricate mechanisms. He reaches for the proper tools almost automatically, for he knows the importance of specialized tools for performing specialized functions.

As important as it is to use the proper tool in the correct manner, there will be a time in combat or an emergency situation when the proper tools will not be available. It is then that other traits of the good mechanic come to the forefront: resourcefulness, ingenuity, flexibility. These qualities are indispensable to the good mechanic. He must be able to change his methods and pace of work under certain circumstances, but he never changes his standards of accomplishment, his craftsmanship.

It has been said that there is no such thing as a little mistake in aviation maintenance. There is no little mistake for the simple reason that the slightest deviation from good craftsmanship, or ignorance and carelessness can be the factor in an aircraft accident. Even when vast and tragic consequences do not follow, anything less than the best possible maintenance breeds trouble—either now or later.

The good mechanic has initiative. His fundamental knowledge of the aircraft will come from his school training. After the course of instruction is over, there is no letdown; his own initiative will propel him to study and keep abreast of new concepts and techniques. He will constantly strive to make each maintenance and repair job the best he has ever performed. Not only his body, but his mind must be always alert, always on the job, doing and seeking better ways of doing. Then when the pilot brings the aircraft safely home, the mechanic knows that his part of the aviation teamwork was well done.

The feeling of being appreciated for doing a good job is essential to job satisfaction. Yet it sometimes seems that the mechanic must deal with the situation of lack of recognition for his services. Sometimes this feeling is engendered by a lack of rapport between the supervisor and his men.

But the good mechanic knows that many things in life are taken for granted. So he shrugs his shoulders and continues being his skilled, dependable self. Fine craftsmanship and willing acceptance of responsibility are the rule rather than the exception in aviation maintenance.

Without the superb work of the dedicated mechanic, the pilot's job could not have been accomplished. The safety of our aviators, and in final analysis the safety of our nation, is dependent to a great extent on the aviation mechanic. His job is a vital part of a vital service. Whenever he feels unappreciated, the elements of self-appreciation should hold fast — the pride of responsibility and the dignity of integrity, skill, judgment, understanding.

Knowledge, proficiency, and integrity — these overall traits sum up the character of the Army Aviation Mechanic, and they comprise the unchanging principle of aviation maintenance.

Maintenance of Army aircraft is not a glamourous job, and probably never will be. It is sweat on the line, and sometimes paperwork and study at night. And not all maintenance men are good; there's never been a surplus of good mechanics. But there are the men who have personal pride in their work and enjoy a sense of self-accomplishment in handling their tools proficiently — tools of ever-increasing specialization. These are the men who are to be saluted for developing a new profession in the maintenance field.

References: FSF Inc., "Aviation Mechanic's Bulletin," and "Aircraft Accident and MAINTENANCE Review," USAF.

FROSTY, MAN, FROSTY!

©

SWEATING IN the 90° heat of September in south Alabama, it is hard to imagine winter flying woes. But we know that a few thousand miles to the north, Mr. Frost is in his last days of summer hibernation. Soon, this frigid gentleman will emerge from frozen slumber and blast his icy breath across our airfields. Lest we be caught with our red flannels down, it would be wise to give a three-fingered salute and follow the advice of our younger brothers.

ICING

First in Mr. Frost's bag of winter tricks is icing. He produces this hazard in many ways. Turbulent air suspends supercooled water droplets above the freezing level in thunderstorms, over rough terrain, and over warm water surfaces. These areas give the heaviest icing during instrument flying conditions. Glaze ice forms in the dry cold air under a warm front when air temperature is near or below freezing, and raindrops spread over aircraft and freeze because of the cold temperature and additional cooling from partial evaporation. This icing is normally avoided by climbing to an altitude that is in the warm air of the warm front.

Frost is formed on any object that is cooled to below freezing in moist air. Freezing may occur on parked aircraft at night by radiational cooling, or it may occur when an aircraft is cooled at high altitude and lets down quickly into moist air.

Wet snow that accumulates on parked or taxiing aircraft may result in serious icing by freezing to the aircraft on takeoff, especially where a temperature-dewpoint spread induces evaporational cooling.

Here are some of the effects of icing and recommended corrective actions:

Stalling speed increases as lift is decreased by structural ice changing the shape of the airfoils and increasing drag and gross weight. Maintain a safe margin of airspeed, especially in critical maneuvers such as takeoff, climb, turns, letdowns, and landings.

Dynamic efficiency of propellers and rotor blades is lowered when ice changes blade profiles. Deicing of propellers is aided by alternately increasing and decreasing rpm so that air friction and propeller vibration can act to break off ice. Rapid changes in pitch will help to shake the ice from rotor blades.

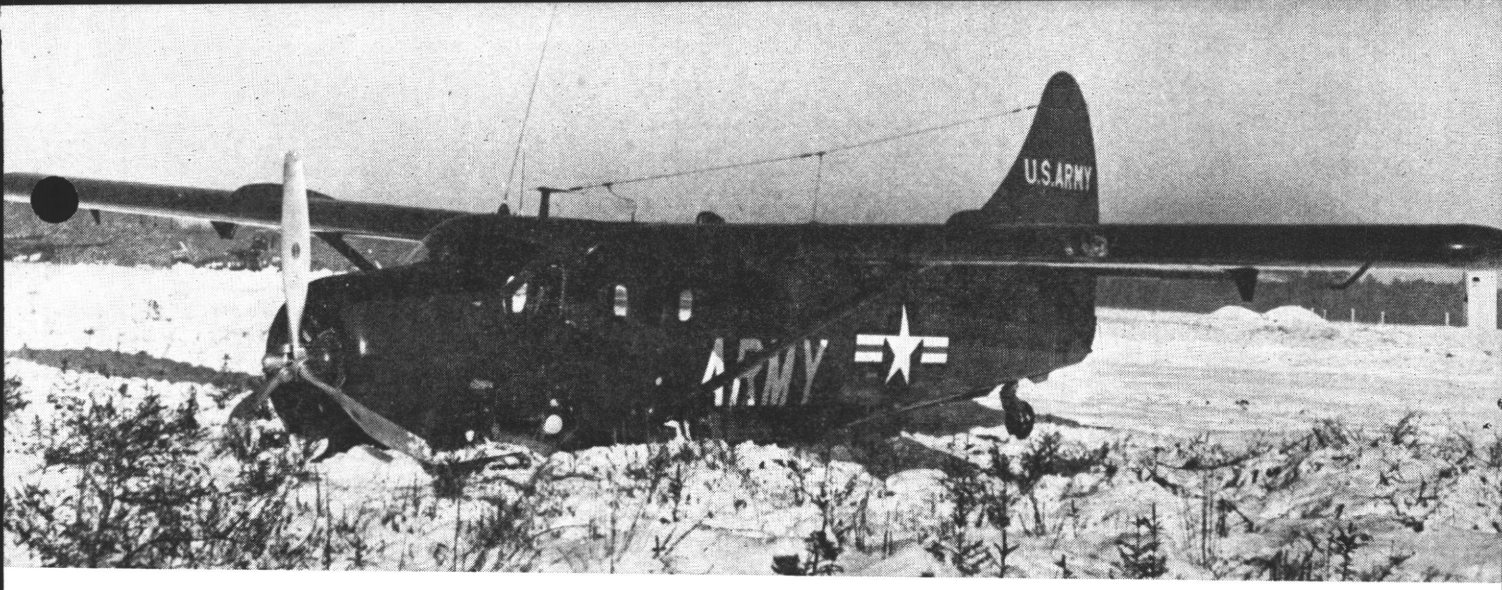
Air pressure instruments, such as altimeter, airspeed, and rate of climb, fail when ice clogs pitot tubes or static airlines. When suspecting this type of icing, rely on flight indicator and power settings for attitude indications.

It makes good sense for all aviators to know just what anti-icing devices are available on their aircraft and to be very familiar with their capabilities for handling ice.

No two winters are ever exactly alike, but there are certain general adverse weather patterns which may be anticipated each year with varying frequency.

FOG

There will be many days when the threat of a general fog formation will require careful flight planning to ensure a fuel reserve for the possibility of subminimum conditions developing quickly over a large area. Fog development is most likely where moist air moves northward over cold ground or shallow, warm front surfaces. Since the diurnal factor of sun heating is at a minimum from



A suspicious eye and ear for weather helps

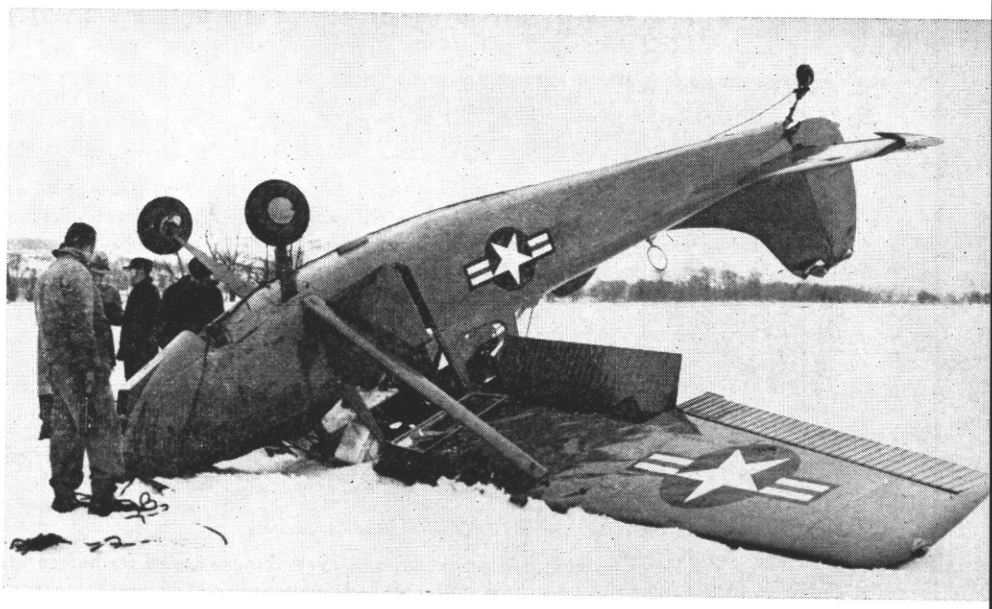
November to February, expoure to subminimum conditions is almost as great during the day as it is at night.

Learn the significance of SPREAD. The less the difference between air temperature and dewpoint temperature, the greater the risk of fog. Don't trust spreads less than 5°F. at night. When checking fog possibilities, study weather reports upwind from the station in question. If dewpoint temperatures are higher upwind, chances are that fog will form when the wetter air moves in.

SNOW

Steady snow over a long period can close all the airfields in a general area for hours at a time. Careful flight planning and a suspicious eye and ear for the weather provide the best escape from this hazard. Bear in mind that snowstorms, attended by strong winds or freezing rain, may get ahead of snow removal equipment and make runways unusable.

Experience has proved the value of reviewing past difficulties as a means of avoiding future ones. Here are a few items which deserve your serious attention:



The smooth snow may hide a ditch

At least three Army Aviators can attest the fact that landing and takeoff marks on snow-covered landing strips are not indications of a firm, smooth surface. These three aviators circled landing areas, saw tracks on the strips and proceeded to land. Two were amazed when their wheels dug in and the aircraft nosed over. The other lost his landing gear and skidded along on the fuselage. They didn't realize that the tracks on the snow had been made with ski-equipped aircraft! Another Army Aviator began his takeoff across what appeared to be a smooth surface of hard packed snow. He lost his landing gear in a ditch.

When you're shaking the moth balls from your red flannels, may we earnestly recommend you bring the -1 and other pertinent publications out of storage and refresh your memory concerning cold weather operations for yourself and aircraft?

PRE-FLIGHT

Frost, snow, frozen ice particles or just ice on top of wings, rotor blades and stabilizers should be removed prior to flight. Check your deicing equipment. Pay particular attention to air intakes.

STARTING ENGINE

That never-fail summer starting procedure will have to be modified, particularly on the first morning start. Watch minimum temperature requirements.

TAXIING

Nose wheels and tail wheels are not effective on wet or icy ramps, EXCEPT AT SLOW SPEEDS. Use wing walkers and allow yourself lots of space.

PRE-TAKEOFF

Give yourself and the engine a break; wait for minimum temperatures. Check behind before you start your runup so you won't blow snow and slush over other aircraft, runways and taxiways. Don't depend on your takeoff propeller blast to clear your wings of snow. Even dry, powdery snow may have melted and refrozen on the wings.

TAKEOFF AND CLIMB

Remember the pitot heat and use it. Maintain enough cabin heat for a clear windshield.

DESCENT

Have deicing equipment on and everything warmed up before starting descent through clouds. When throttle openings are reduced, exposure to carburetor ice goes up fast. Lower-powered descents in clouds and rain should always be made with carburetor heat on.

LANDING

If you have flown through icing conditions, remember the effect on airfoils and carry an airspeed margin for unpredicted stall speeds. Remember that blowing snow can erase visibility. Wet or icy runways must be longer than dry runways. Too much slush or water can bang up your aircraft.

This article was prepared by the U. S. Army Board for Aviation Accident Research.

FROM THE HORSE'S MOUTH

This article was prepared by the U. S. Army Board for Aviation Accident Research.

IF YOU SUDDENLY fell and broke your arm, would you go to your plumber? television repairman? lawyer?

When threatened with a lawsuit, would you seek your grocer? tailor? neighbor? wife (lots of free advice here!)?

When your Army Aviation unit has a rash of accidents, do you consult a mathematician? engineer? psychologist? fortune teller (some promise in this area, but no concrete results as yet)?

Ridiculous? Try reading a few of the more prominent safety publications and see how much material is prepared by eggheads. We must not be disrespectful of these learned gentlemen, so we will omit the fact that they have more time than anyone else to write their thoughts concerning the many fields in which their higher education makes them experts. Granted, the comparisons above were stretched from left field and scientists certainly play a most important part in aircraft accident prevention, it still remains that aviators should have a loud voice in designing aviation accident prevention programs.

Recently, a survey was conducted among the youngest pilots of a large Army Aviation unit. The great majority of these men are lieutenants, with a faint spattering of captains. These contributions are so apt, refreshing, and encouraging that we present some of them here, with no comments. We dare you to read them without gaining some very useful knowledge!

ROUTINE COMPLACENCY

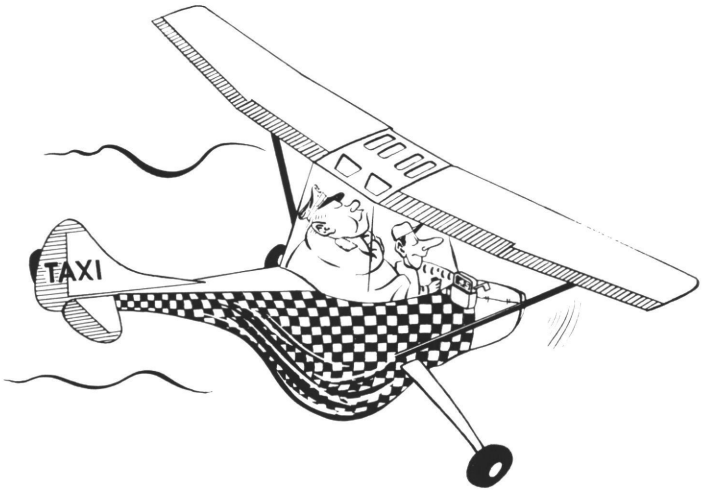
"During the past year our aviation company has undergone one Army training test, participated in two major military exercises, and has performed numerous flying demonstrations. During all this, only one serious flying accident was sustained in this more hazardous type flying. However, in the last four months we have had four most costly aircraft accidents, none of which occurred during a major exercise or flying demonstration, and the flying involved was of a less hazardous nature. Using these facts, plus information I have gained talking to other pilots, I believe it could be said that during the more hazardous type flying, pilots have been better prepared mentally to cope with all situations — more so than routine type flying—as they realize they are flying under more difficult conditions. Under routine conditions, pilots become complacent and less prepared for those situations which may quickly develop.

"In the past, our flying safety program has been geared mainly for maneuvers and flight demonstrations. Little has been said during the routine periods between maneuvers when pilots are least aware of inherent flying dangers.

"For these reasons, I feel that a flying safety program should be stressed, especially during the lax periods when only proficiency and routine flights are taking place."

SCHOOL'S OUT

"New pilots should be made more aware of the responsibility they have to themselves and the government to fly aircraft as they were taught at the Army Aviation School. Too often, new pilots feel compelled to 'prove themselves' because



Administrative vs Tactical?

they are no longer under the watchful eyes of school IPs. They take chances they never would in school and subject themselves to accidents."

"Pilots should be allowed more time and opportunities to improve proficiency flying. Every pilot gets "rusty" after he is out of school for a while. The many aspects of flying which are neglected are low-level flying and strip operations. Experience is invaluable in flying, and the more time a pilot has to devote to developing his proficiency instead of performing cross-country 'taxi service', the better pilot he will become."

"Most accidents occurring in our company involve more experienced pilots. I believe that this shows a drop in performance due to pauses in flying time, interrupted by periods of heavy flying. If training could continue in a more scheduled manner to maintain proficiency, these accidents might be prevented."

SUNDAY GOLF

"In order for a golfer to play a good round of golf, he can't go out on a Sunday afternoon two times a month and expect to have a good round every time he plays. In order for a pilot to stay proficient he must fly more than 2-4 hours every week. If he fails to fly every two or three days, he loses coordination and his depth perception is likely to be erratic during the first several landings. It always takes a while for him to get the feel of the aircraft again.

"Two of the more important factors for safe flying are to know the limitations of equipment and yourself. Know what the aircraft will do and won't do. Learn all you can about the aircraft and its equipment.

"In summary, a pilot must spend all the time possible flying. He must strive always for self - improvement. Above all, he must know the capabilities and limitations of himself and his aircraft."

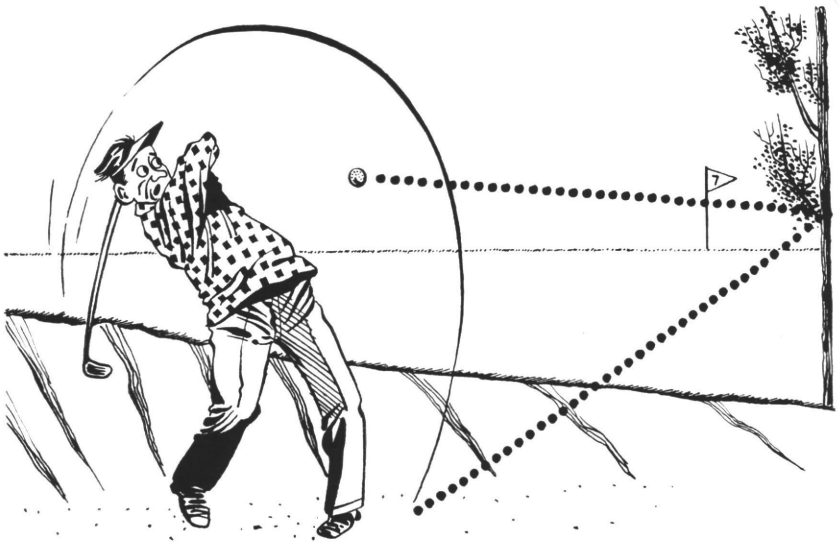
STANDARDIZATION

"The key to an effective accident prevention program is efficient flight standardization. Those responsible must be experienced, capable, and thoroughly standardized and have full backing of the division staff."

"I recommend a thorough check-out standardization of all pilots reporting to this station. I recommend that a group of the most experienced IPs be formed into a standardization board."

"Standardization is an important factor for there are

Sunday golfer is no pro



usually many possible ways of doing things, but there is always one way that is better than others. In Army Aviation, even though the aviator's initial training is fairly standardized, the aviators in the field develop their own set of rules and techniques. A continuous standardization program will not permit pilots to forget basic rules and techniques."

PILOT ERROR

"I believe an active safety program should be initiated consisting of conferences concerning accidents and their causes. We should not be satisfied with the term 'pilot error', but should attempt to determine what caused these situations to develop, what corrective action was taken by pilots, and the correct technique to be used in a like situation."

PROFICIENCY

"I recommend that pilots be allowed enough flying time each month, in addition to administrative flights, to maintain a high level of proficiency for the type of flying required in tactical situations. We should have followup checks to ensure that pilots are maintaining proficiency."

"All pilots who have under 600 total hours should ride with an instructor pilot at least once every six months. This could be scheduled within platoons with no inconvenience to anyone. After pilots have been checked out in new aircraft and satisfied instructor pilots in all phases required by standardization, they should be assigned flights in the aircraft to develop proficiency."

"The initial check-out for all pilots should be more inclusive. At the present time, it is looked on as a formality."

"Aircraft accident rates are directly proportional to flying proficiency, and pilot proficiency is proportional to flying experience. Flying proficiency must be considered two-fold: namely, past experience and current ability. Emphasis must be placed on current ability and this must be maintained by continuous, and not sporadic, flying.

"This post had, at one time, a flying safety record which was much envied. The monthly average flying time of each and every pilot was considerably higher than it is at present."

AVIATION SAFETY OFFICER

"Reviewing the volume of publications of various types from all sources concerning flying safety, and the concern expressed at all levels of command, it would seem that there is enough said about the subject and little actually done about it.

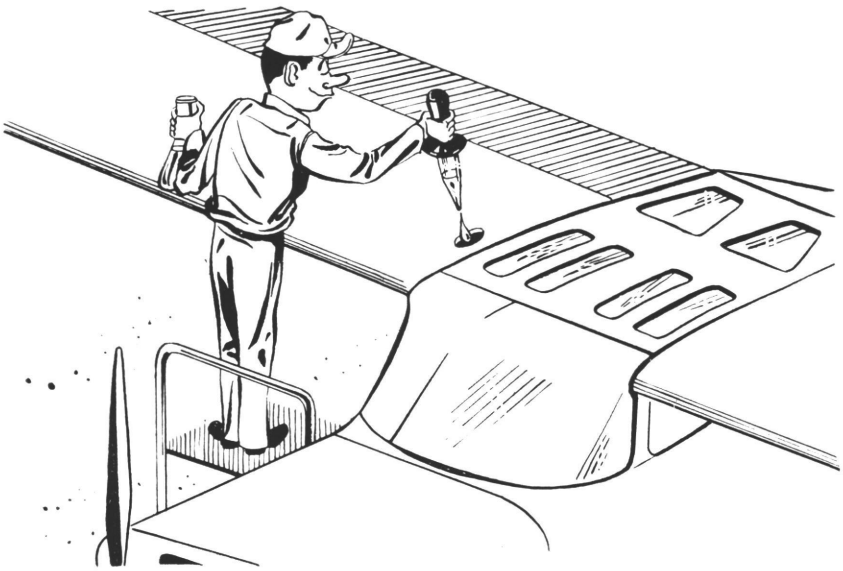
"I feel, therefore, that the only logical recommendation I can make at this time is that a full time, working safety officer be appointed for this unit, or preferably, for this installation. This officer should be mature, well experienced in aviation, and be placed on full-time duty as flying safety officer. If not a graduate of the safety course at USC, he should attend this course at the earliest practical date."

AUSTERITY PROGRAM

"During the current austerity program, each pilot will be limited to a relatively small amount of flying time compared to the average when accidents were almost nonexistent. This brings up a point to be considered: Which is the better solution to budgetary problems?

"(1) Saving money by rationing aviation fuel, thus reducing pilot proficiency, or (2) saving money by reducing aircraft accidents by increasing pilots' current flying ability and saving investments made in pilots and passengers? The only possible solution is the second answer. Aircraft accidents here

Fuel austerity vs proficiency



have cost the Army approximately $500,000 in the last six months. If a small portion of this amount could have been spent on an active flying proficiency program, the net savings would undoubtedly have helped the budget.

"If a maximum must be set on monthly flying time, service missions should not be counted toward that maximum. As much time as possible should be devoted to a proficiency program."

"The following points are suggested for a flying proficiency program:

1. Standardization of instructor pilots.

2. Standardization classes, to include: re-emphasis of Aviation School procedures, principles of flight; effects of wind gust, degree of bank, and weight on stalling speed; discussion of wind drafts over various terrain and vegetation; and a safety forum discussing aviation accidents and pilots' experiences.

3. Standardization flights.

4. Establish the SOP that new pilots will not be assigned service missions until they have a complete checkout and have flown a minimum of 30 hours in the local area.

5. Establish an organized program where pilots can work strips in supervised groups. This should be several times each week, ensuring that each pilot spends at least one hour per week working in field strips and confined areas."

"Perhaps most important to this unit, is a larger, better standardized force of instructor pilots. Those few presently assigned are in administrative positions demanding so much of their time, that they cannot properly check out incoming aviators.

"Another need is a better program of planning proficiency flying, involving training in such areas as cross-wind strip work, forced landing practice, contour flying, terrain evaluation, etc."

PROCEDURES

"I notice that attempts to standardize flight for a particular aircraft failed. I wonder if IP's could, in all cases, adhere to either the flight handbook or procedure sheet established by this command and stop dismissing the absence of procedures as technique. I don't feel that an IP who hasn't followed procedures and dismisses it, just because he hasn't yet had an accident, can do a good job of instilling the importance of procedures in others."

TRAINING

"I recommend more frequent and more realistic training flights, and annual or semiannual proficiency checks for all pilots, with emphasis on correcting unsafe habits which may have developed.

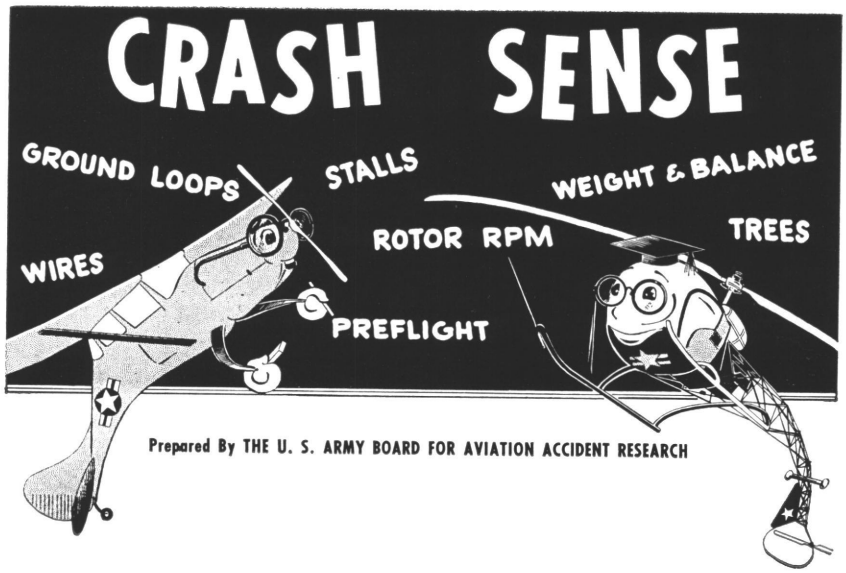
"I recommend development of a flight safety program with less emphasis on statistics and more on recognition of possible unsafe conditions and procedures to follow to avoid these conditions."

"I propose that a training section be formed under the supervision of a senior, dual-rated pilot. The fixed wing class, of one week duration, would be attended by six pilots. The most promising students would be retained as assistant instructors for the following week. The rotary wing class would follow a like procedure, with perhaps a smaller number of students.

"The course of instruction would consist of informal classes, flight instruction, and at least one evaluation ride given by the senior instructor. Particular emphasis would be placed upon emergency procedures, short field technique and the basic maneuvers."

Realistic training pays off

Requests for "Crash Sense" to describe an aircraft accident investigation from beginning to end have come from many sources. This issue will be devoted entirely to covering two accident investigations. In one of these, the accident investigation board did an outstanding job in determining cause factors and preparing a complete and thorough report. In the other, the investigation was completely SNAFU.



Accident Number One

HISTORY OF FLIGHT

Two aviators of a Shawnee transportation company were assigned the mission of providing air support for filming a television show. They proceeded to the set, where a pontoon bridge was to be lifted. Aviator One, flying the aircraft on the trip out to the bridge site, made a reconnaissance and completed a landing. Aviator Two left the aircraft, and Aviator One kept the engine running to burn off excessive fuel.

In a short while, the first practice pickup was attempted. The pickup was completed and Aviator One increased rpm to 2700 to lift the load. During this attempt, the pontoon bridge buckled and was released by activating the manual release.

The aircraft was landed in the vicinity of the pontoon bridge while the bridge section was reinforced for another pickup attempt. Aviator Two returned to the aircraft and, flying from the left side, came to a hover over the load. After pickup, he had trouble centering over the load and again released it.

Aviator Two moved off, then returned and centered over the

With external loads attached to Shawnee

Lateral stability is decreased considerably

load. The ground guide man gave the signal to pick up. While power was being applied, the load became airborne. The aircraft moved sideward to the right, and continued until the forward rotor blades struck the ground. Soon after, the aft rotor blades also hit; the blades of both rotors disintegrated. The aircraft continued to roll and came to rest on its side. The load was released just after the forward rotor blades struck the ground, and it came to rest upside down. Aviator One shut the engine down by turning the magneto switch off, and the crew members left the aircraft.

INVESTIGATION

Competent investigations always begin far in advance of aircraft accidents. In this case, the command was ready with a **preaccident plan.** In accordance with paragraphs 5-8, DA Pamphlet 95-5, this plan provided for:

a. A crash alarm system.

b. A crash rescue plan.

c. Appointment of an aircraft accident investigation board prior to the accident consisting of the most capable investigation personnel available to the appointing authority.

d. Assignment of responsibilities for technical assistance, including engineers, signal, PIO, aviation medical officer, Provost Marshal, and safety officer.

e. An aircraft investigation kit containing equipment needed immediately upon arrival at the accident scene.

f. Authority to call for technical assistance from any agency available to the command.

In addition to furnishing the fastest possible means for rescue of personnel, a preaccident plan gets trained investigators at the scene of the accident with a minimum loss of time.

Shortly after the Shawnee crew evacuated, the wreckage area was roped off and guards were stationed to prevent removal of, or tampering with, any of the physical evidence. One investigator quickly located and interviewed witnesses. Another investigator directed a search for all pieces of the aircraft and began a diagram of the debris. A third investigator directed the taking of photographs.

To build a house, you must first obtain all the materials

that go into it. To complete an investigation, you must first collect all available evidence. Otherwise, neither house nor investigation will prove useful. Too often, aircraft accident investigation boards begin laying the foundations for their houses before investigations are complete. Jumping to unsupported conclusions before all the evidence can be collected is like laying the roof before the rafters are up.

RECONSTRUCTION

After all members of the accident investigation board were completely satisfied that all possible evidence had been gathered they began to reconstruct the accident. Using overall and detail diagrams, photographs, aircraft flight and maintenance records, weather reports, statements of crew, eyewitnesses, and technical advisors, they were able to establish the sequence of events prior to, during, and immediately following the accident. They now knew WHAT had happened and their next job was to analyze the evidence and determine WHY it happened. Again, too often, when circumstances indicate human failure, accident investigation boards list pilot error in slot 7 of the 285 and consider their job finished. Actually, at this point, only the foundation for the house is complete.

From the evidence, the board was able to accurately reconstruct the sequence of events and gain a clear picture of what took place.

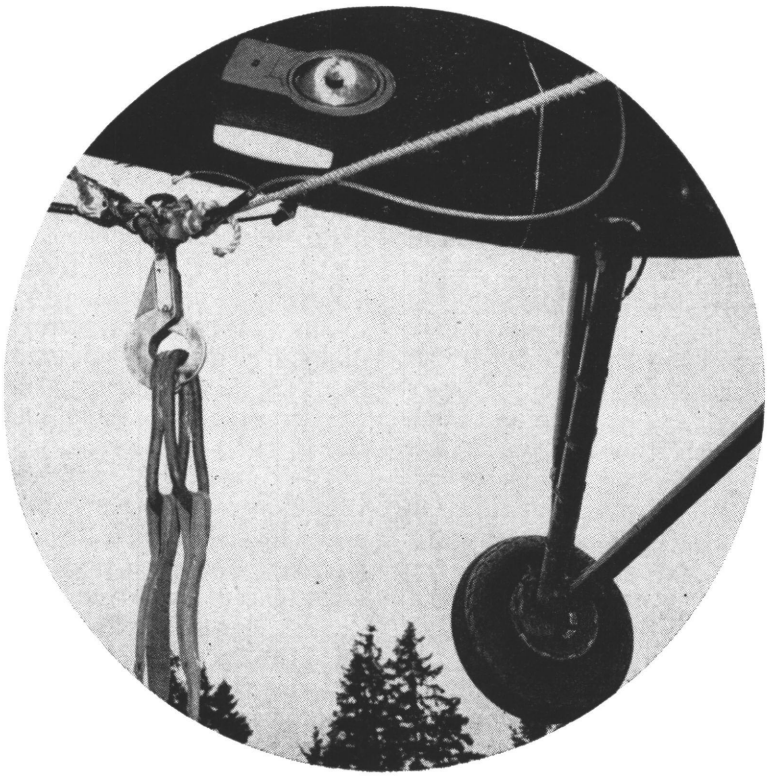
During the last pickup, as slack in the cables and power was being applied, the pontoon bridge left the ground, unknown to the pilot. The bridge touched the ground while the aircraft was moving to the right. With the weight of the load on the ground, the left load cables became taut, applying tension on the two right cables of the helicopter sling, causing the aircraft to tilt to the right.

At this point, the pilot, Aviator Two, called to Aviator One to release the load. He applied left cyclic control. Aviator One pulled on the manual release and found that it would not release the load. The right cables of the aircraft were firmly anchored to the left cables of the load. With left cyclic ineffective, the aircraft continued its motion to the right, lifting the left side of the load and pulling down harder on the right side of the aircraft. It continued to increase the angle of right tilt.

Aviator Two reduced power, attempting to center the aircraft over the load. This action, with the left side of the load in the air and pulling on the right side of the aircraft, resulted in a greater twisting action on the aircraft. The aircraft continued its motion to the right and started to drag the load. The left side of the load continued to rise and the right side dragged on the ground for 7 feet.

As the aircraft continued tilting and moving to the right, Aviator Two applied right pedal, attempting to right the aircraft longitudinally into the direction in which it was moving. The right cables continued to pull on the right side of the aircraft, increasing its angle of tilt, forcing the aircraft into an extreme attitude and bringing the rotor blades close to the ground. As the front rotor

Cargo hook will not release manually at times



blades made contact, the aircraft had tilted to such an extent that the load was now centered under the aircraft and there was almost equal tension on the four sling cables, now within the travel limits of the release cable.

Aviator One was still working the manual release, and the load released and came to rest upside down. Rotor blades disintegrated and the fuselage slid along on its right side. There was no sudden stoppage of the engine; the rotor heads continued to rotate with the blade stubs digging large holes in the ground.

WEATHER

Weather at the time and location of the accident was broken clouds at approximately 900 feet with 5 miles visibility in light rain. There was no appreciable wind. Although raining lightly, this was not considered as a contributing cause factor because the pilot, by his own statement, could clearly see signals given by the ground crew.

HARDWARE

Investigation of the aircraft and its components revealed no mechanical malfunction. A factory technical representative assisted in the inspection, and his report was included in the evidence.

Due to the extreme attitude in which the aircraft was placed, the cargo sling release mechanism would not function. An unsatisfactory equipment report was submitted on this item. The cargo sling mechanism from the wrecked aircraft was thoroughly checked and found to be operating normally. The abnormal situation was caused by the aircraft's right movement over the external load. This condition permits enough slack in the sling release cable that it will not be actuated far enough to allow the cargo sling hook to release.

It was determined that the external load weighed approximately 2,100 pounds, well within the limitations of a Shawnee for the existing density altitude. The board noted that the copilot's window assembly did not release when the emergency release handle was actuated after the accident. Investigation revealed the window was held in position by the seal placed on the metal frame of the nose enclosure. This condition was caused by deterioration of the seal under extreme heat conditions.

CREW

From statements of witnesses and the pilot, it was determined that Aviator Two did not realize that the external load had left the ground during the pickup in which the accident occurred. As a result, he attempted to center over a load that was clear of the ground. The control forces used caused a condition which is inherently dangerous to a helicopter of tandem rotor configuration. (With external loads attached to Shawnee aircraft, lateral stability is decreased substantially. This fact is demonstrated to pilots undergoing training in the H-21C.)

The commanding officer of the Shawnee company was called by the board as an expert witness. He stated that he had experienced similar flight conditions in which external loads left the ground without his knowledge, and that another aviator had reported difficulty in releasing his load while the aircraft was off-center to the right.

Crew flight records showed that Aviator Two had a total of 317 flying hours in Shawnee aircraft, with a total of 455 hours overall flying. He had been properly instructed in the technique of hauling external loads. Aviator One had a total of 163 hours in Shawnee aircraft and total flying time of 352 hours. He had not yet accumulated enough flying time to be qualified to haul external or internal loads without another qualified aviator in the cockpit.

MEDICAL

The helmets worn by the pilot and copilot afforded protection from mechanical injuries during the crash. However, one of the helmets fell off during the crash and the other during evacuation. The two pilots were flying with chin straps loose.

The crew chief, who was occupying a passenger seat just aft of the hoist hatch door, received a hard blow to the head. It was noted that he used good judgment in not trying to evacuate the aircraft from the rear where fuel fumes were heavy.

The crash caused rotor blade fragments to be thrown with considerable force over distances up to 100 yards. Spectators in the area had been ordered out prior to the crash. However, it was noted that similar operations had been conducted near troops and spectators in the past. (Note: One soldier was killed by flying debris when a Mojave crashed near his position.)

CONCLUSIONS

Aviator Two was not aware that his external load had

cleared the ground, and his corrections allowed the aircraft to get in a condition where lateral control became ineffective. While the pilot attempted to use other controls, the forward rotor blades made contact with the ground.

There was no established signal that could be used by ground personnel to show the pilot when his external load was completely clear of the surface. Upward motions by guidemen will not allow pilots to know the conditions of their loads in those cases where the bulkiness and weight of the load compares to the load involved in this accident.

The pilot's decision to use less power in an effort to center over his load proved poor judgment. At the point this reduction in power was made, flight controls were actuated in a manner that tended to bring the aircraft closer to the ground. First contact of the rotor blades with the ground followed immediately.

It was found that in the circumstances which prevailed in this accident, the manual cargo sling release will not operate. This factor made recovery from an unusual attitude extremely difficult and affected the pilot's reactions because he was depending on the manual release to drop the load.

Crash helmets will not provide maximum protection for which they were designed if worn with chin straps loose.

Rescuers who approach a Shawnee resting on its right side will find the words PUSH IN FOR RESCUE upside down. This might not be understood because of excitement and could possibly delay rescue.

The forward roof escape hatch, used by the crew to evacuate after this accident, might not provide clearance for personnel burdened with packs and other equipment.

The copilot's window could not be used to afford escape because it was sealed by heat damage to the material used for weather stripping.

Ground personnel in the vicinity of helicopter accidents are extremely vulnerable to flying debris.

Both Aviator One and Aviator Two experienced difficulty in locating controls and switches by "feel" due to the unusual attitude in which the aircraft came to rest.

RECOMMENDATIONS

It is recommended that this accident be brought to the attention of all Shawnee aviators, with a full explanation of how the accident occurred.

All Shawnee units have a continuing training program for ground crew personnel who handle external loads and guide aircraft in making hookups over loads.

Aviators not rely on the manual cargo sling release mechanism, but employ all methods of actuating the cargo sling release when circumstances warrant.

Development of a cargo sling release mechanism which will operate from any attitude.

All Shawnee aviators be instructed to open all windows in the nose enclosure as a part of the pilots' preflight inspection.

Weather stripping for emergency release exits be made from a material with heat resistant qualities.

Crash helmet chin straps be secured for all takeoff, landing, and hovering maneuvers.

Unnecessary personnel and spectators be kept at least 150 yards away and sheltered during sling load operations.

Ground crewmen be equipped with steel helmets, goggles, and light-colored gloves (of orange or white to improve recognition of hand signals during periods of reduced visibility).

All personnel, both air and ground, be instructed in the most efficient means of breaking plexiglass (i.e. striking near the frame, with the heaviest, hardest object available).

Rescue instructions be painted in both directions on the surfaces of aircraft to enable easy reading regardless of how the aircraft comes to rest.

Pilots be instructed that switches are most quickly found by visual orientation when the aircraft is in an unusual position.

Consideration for the wearing of light leather gloves by aircraft crews. A Navy air safety magazine has carried several stories of helicopter pilots who avoided severe hand burns by wearing gloves. Gloves also reduce danger of cuts during escape.

Accident Number Two

An Army Aviator was assigned a Seminole test flight. The aircraft took off with pilot and crew chief aboard, flew for two hours and returned for landing. The aircraft was either landed with the landing gear retracted, or the gear failed during landing roll. Damages totaled more than $8,000.

From the accident report, it was clearly evident that no pre-

accident plan existed for the unit:

Item 1 — The aircraft accident investigation board was not appointed until four days after the accident.

Item 2 — No statements of witnesses were taken, although the accident occurred at a heavily populated airfield.

Item 3 — Photographs were not taken until after the aircraft had been moved.

Item 4 — Although qualified aircraft technicians were immediately available, they were not used.

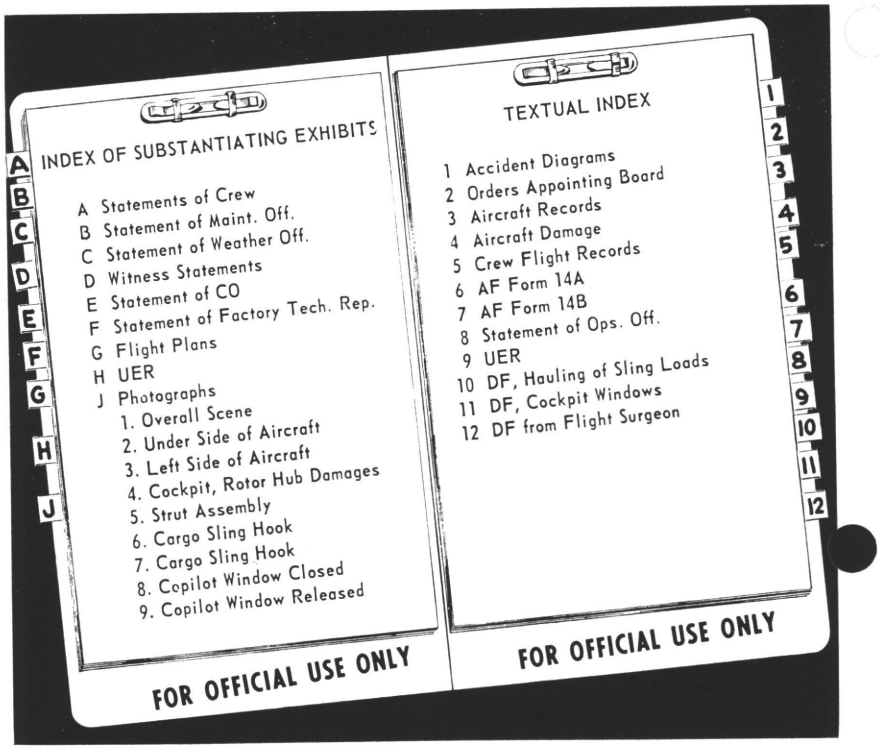
TESTIMONY

This accident report contained 55 long pages of verbatim testimony which was taken in an evident "gestapo-like" atmosphere. During this inquisition, witnesses were actually threatened with punishment. **Sample: "By not recalling what happened when obviously you must know, you are subjecting yourself to very severe punishment."**

The control tower operators testified that the aircraft landed with the wheels down, and the gear retracted during the landing roll. This was also supported by the crew chief and pilot. In the face of this, the accident investigation board reached the conclusion that the pilot had landed with the gear retracted. They listed the cause factor as PILOT ERROR and recommended that the pilot be placed before a flight evaluation board.

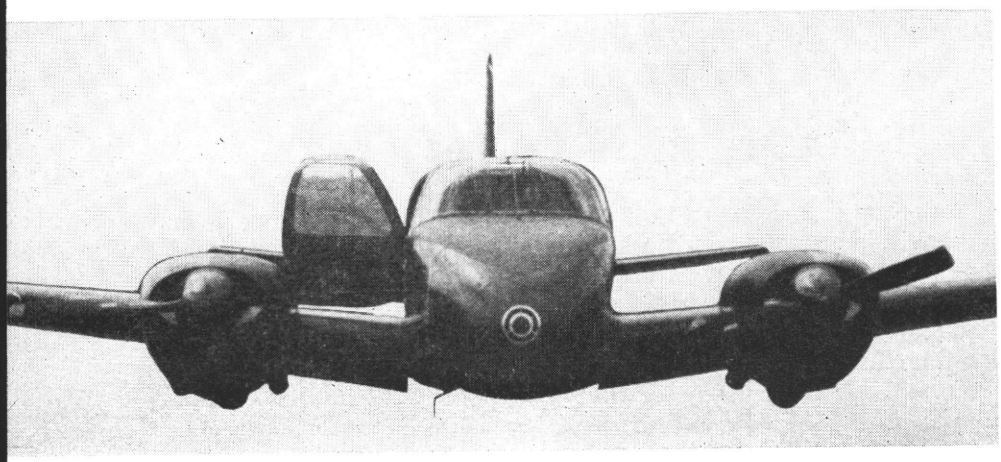
With an inadequate investigation, sketchy and conflicting evidence, any attempt to analyze this particular accident would be pure conjecture. However, a statement by the medical officer indicated that the pilot had, for some time, shown signs of emotional instability manifested by heavy and continual drinking. No mention of medical or possible supervisory cause factors was made by the investigation board in its report.

And there you have them: two accidents, two investigations, two reports—different as night and day. Accident No. 1 lights the way to improved Army Aviation. Accident No. 2 sheds no light. Its diagnosis of PILOT ERROR is a trite and oft-repeated phrase which will not prevent future accidents. In the final analysis, the worth of any accident investigation is measured by its ability to provide corrections and improvements in all possible fields.

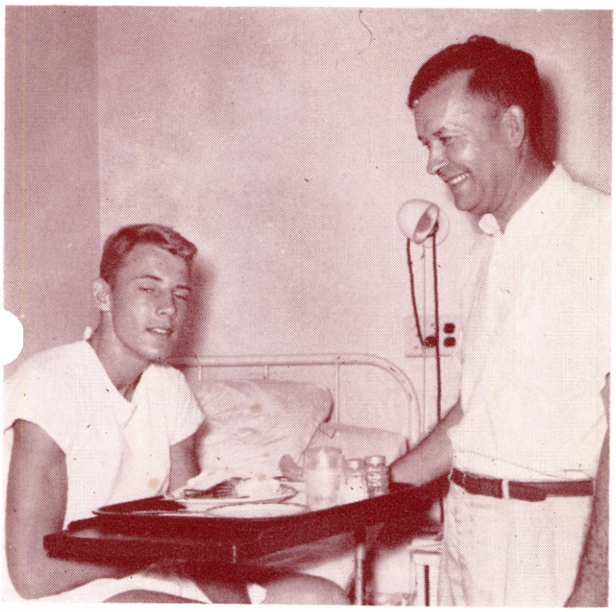


Thorough investigation and reporting have no substitute

Landing gear retracted — how?



SEARCH AND RESCUE



The heartening sight of a Shawnee in the sky above the mighty Grand Canyon provided glad news to a victim of near tragedy last summer.

Army Aviation again played a dramatic role of air rescue in the area of the world's mightiest chasm—Arizona's Grand Canyon.

Pilot, CWO Clifford T. Bradley, and his copilot, CWO Louis E. Goselin, assisted by crew chief Forrest Robbins and a park ranger, flew a Shawnee from the U. S. Army Electronic Proving Ground, Fort Huachuca, Arizona, to snatch young John Manson Owens from certain death.

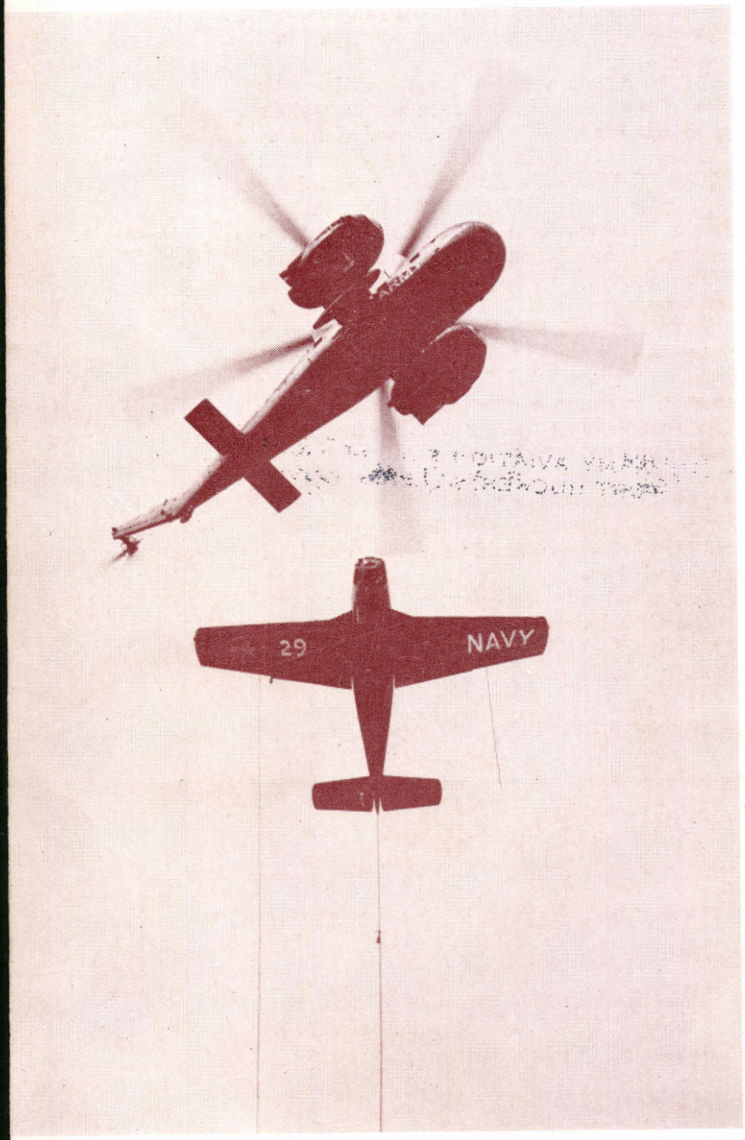
Hovering at 1,100 feet above the canyon floor, the Army Aviators saw rocks piled forming the letter "H." Going down into the narrow, twisting canyon for a closer look, they saw the boy waving a white flag.

Bradley maneuvered into the canyon, held one wheel onto a sandbar and hovered in the intense heat. The crew chief and park ranger jumped out and assisted the boy into the waiting helicopter amid a dense cloud of sand and dust.

Ten minutes later they were setting down at the Grand Canyon hospital. The versatility and skill of Army Aviators had saved another life.

Above: 15-year-old John Manson Owens, III, and his father in Grand Canyon hospital after dramatic rescue from the depths of Grand Canyon by a Shawnee (H-21) flown by CWO Clifford T. Bradley and CWO Louis E. Goselin, assisted by crew chief Forrest Robbins and a park ranger. Right: they look over a map of the area just before the search mission. (Photo courtesy Arizona Republic)

ARMY HELICOPTER AT WORK



Service to the fighting elements is the keynote for Army Aviation. If there is a philosophy of Army Aviation, this is it. Serving the commander to the best of his professional ability, improving the Army's capability to provide a bulwark for freedom, and striving for better ways of doing old tasks is forever foremost in the mind of the Army Aviator. The diverse tasks being performed here are well within that scope—service. Not only to the fighting elements but to communities periled by fire, flood, and famine, not only to suffering individuals bu to sister services in need of Army know-how an equipment, service by Army Aviators is unstinted, devoted, and constant. This is part of their creed.

Disassembling these downed Navy and Air Force aircraft would have been costly in time, manpower, and money — and possibly caused further damage. As a service to the Navy and Air Force, the Mojave completed the lift from crash site to airfield in a matter of minutes.