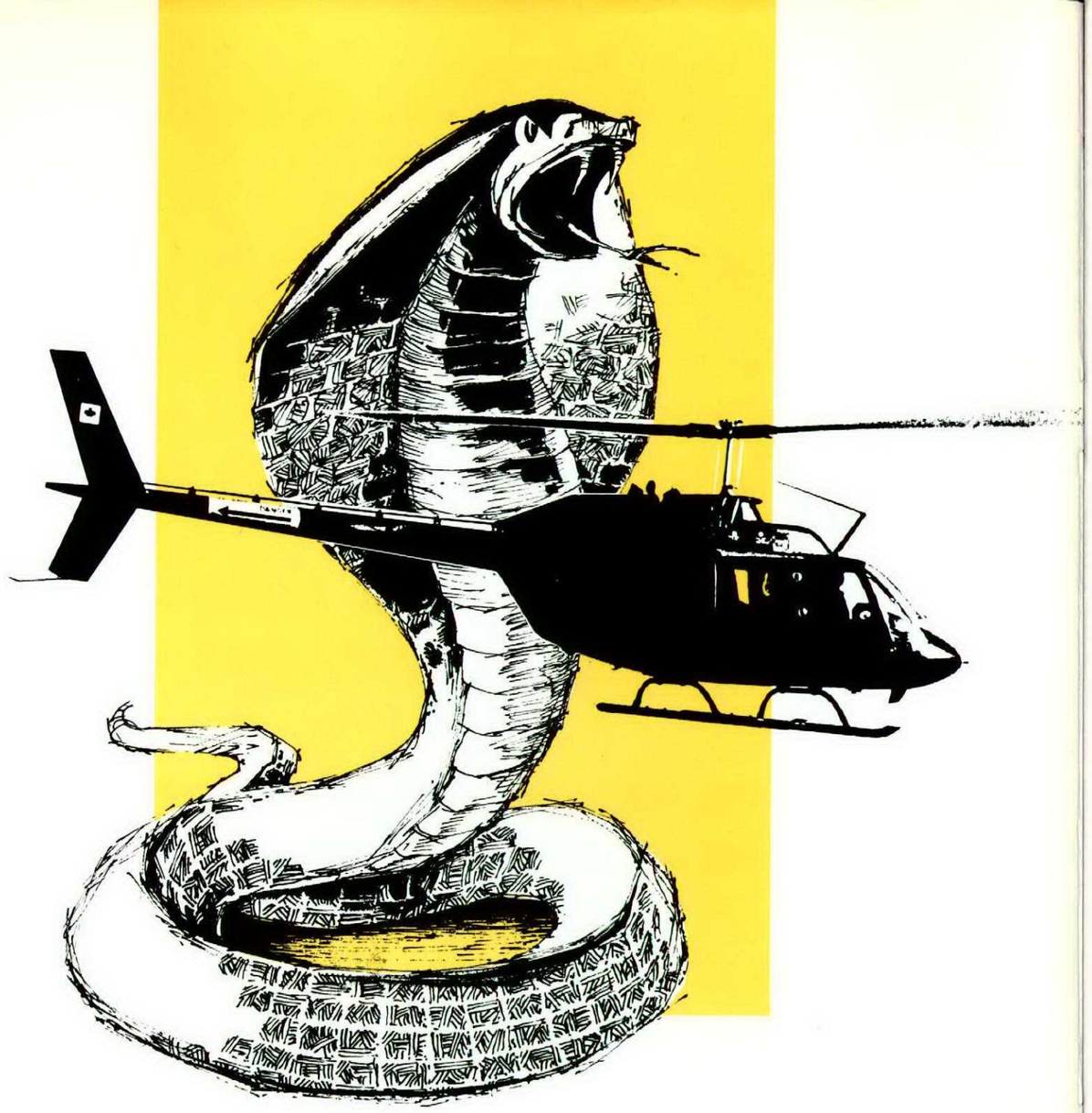
FLIGHT COMMENT

SEPTEMBER OCTOBER 1975



A WEEK IN THE LIFE . . .

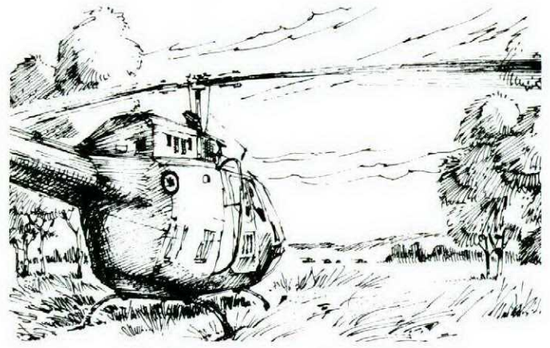
Capt J.D. Williams

"Three One, this is Two One, Contact Wait Out."

Not in itself a very inspiring sentence, but one guaranteed to catch the ear of any radio operator, pilot or observer listening out on frequency because of its content. It means that the enemy has been spotted and that the next transmission will contain the vital statistics thereof. Sure enough, in seconds the same voice which had announced the initial contact in such laconic terms is back with:

"Three One, this is Two One, Contact Papa November 514,339. Four large enemy callsigns in the treeline facing west. Will observe."

Again not that wildly exciting a transmission unless you consider that "large enemy callsigns" are attacking enemy tanks and that Papa November 514,339 is the grid reference of a small clearing about ten miles from the Bavarian village of Ingolstadt, not far from Munich.



Contact Papa November 514.339

In actual fact the two messages recreated here could be exact duplicates of messages which would herald the beginning of World War Three. In that case they would be announcing the presence of Warsaw pact armoured forces west of the present "iron curtain", and an obviously hostile presence at that. In this case however its just part of Exercise Reforger, a massive Nato exercise carried out annually in West Germany and involving literally tens of thousands of troops, and hordes of vehicles both the soft skinned and armoured variety, and aircraft.

Two One is a callsign alloted to a Kiowa helicopter of 444 Tactical Helicopter Squadron (Triple Four is an acceptable abbreviation) normally stationed in Lahr. For several weeks each year this squadron as well as the entire four Canadian Mechanized Brigade Group of which it forms an integral part is deployed in the field under simulated combat conditions to test its own readiness for battle and to perfect the techniques of field operations. "Triple Four goes to War" might even be a suitable subtitle. Anyway, last year I was lucky enough to be able to accompany them.

As a CF 104 driver with I CAG I had taken part in several previous "Reforgers". Then of course, we raced over the battle area at four to five hundred knots merrily simulating weapons drops on the (in our opinion) poor devils immersed in the mud below and then returned to our comfortable homeplate to reload, replan and reattack as necessary. This time however things were indeed different for me. It went about like this:

"Williams, you're a former "army type" how much do you remember about it?"

"Why?"

"Because you're being assigned to Triple Four to carry out a survey of their field operations. Heres your steel helmet, get your "combats" in supply, and your jeep is waiting at MSE. Any questions? OK, be at grid reference 049,320 at 1200 hrs tomorrow."

Well I, of course, was delighted. Who wouldn't be at the prospect of a week in the boonies. Especially since it had by then been raining continuously for the proverbial forty days and forty nights and southern Germany was beginning to mildew. Minutes later (or so at least it seemed) I squished into the canvas covered comfort of my jeep and roared off into battle on the Stuttgart-Munich autobahn. Shades of General Patton or Montgomery . . . Rommel maybe? Well anyway, it was a nice jeep.

Probably not many of you readers have ever had the opportunity to be "it" and play hide and seek with an entire Tac Hel squadron. I have, and I don't recommend it unless you're a lot better seeker than I am. Bear in mind of course, that you are dealing with professional hiders. Every time they move (which is often several times a day) they leave no trace behind, and every time they stop they camouflage themselves and fade into the scenery. Furthermore, if questioned they deny all knowledge of themselves as does everyone else (security measures you understand). Suffice it to say that it took the better part of a day to locate the unit and having

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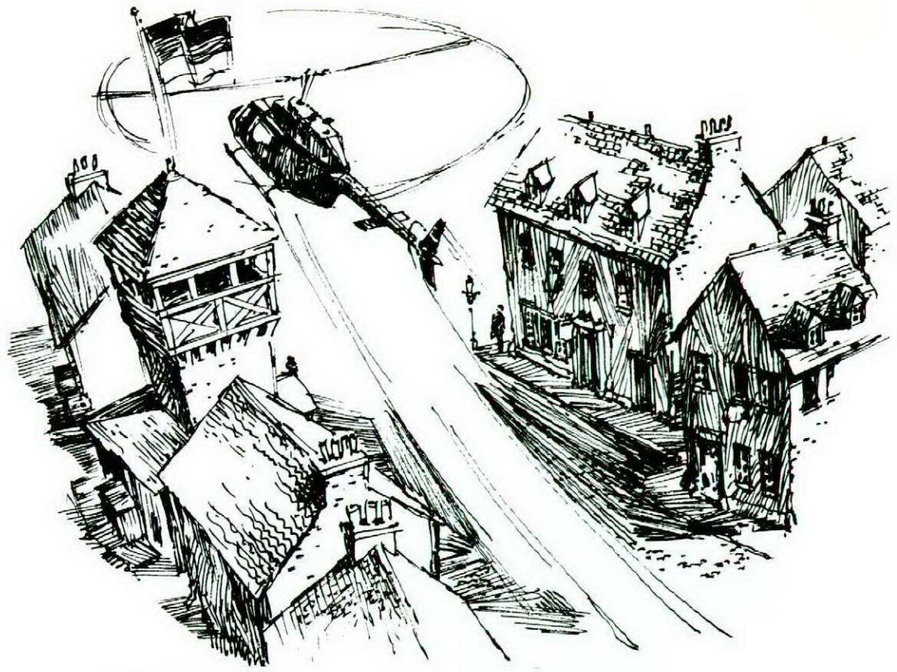
done so to "go to their location". It was however, well worth the trouble. "You're Williams" said the Colonel, as I stood before him reporting in. "That's right Sir," I answered happily, knowing for the first time in hours that I had the right information.

"Sgt. Kelly, take care of this officer. Get rid of his jeep, get him out of that camouflaged jacket, and get rid of the steel helmet. Ask Captain Phillips to find him a place in the hooch. He'll be flying with you."

Kelly smiled knowingly. "Yes Sir" he said, "I'll take care of him Sir. I understand he's an old Armoured Corps type. He'd probably sleep under a tarp on the back deck of a Centurion if he had a chance. Maybe we can get him a bed though."

I should have known better. I've spent the better part of a year reminding myself that I did know better. No matter.

What transpired in the next seven days was the most interesting and exciting time I've experienced in the fourteen years since Queen Elizabeth first said "Greetings. . . ." to her faithful servant.



. . . and through villages.

First of all, the Kiowa was my first really serious venture into the fling wing world. Sure I'd vibrated around some in a Hiller, and sampled the wet noodle cyclic of the H 34, but here for the first time I had a chance to get the whole matter straightened out in my mind. They have a beautiful attention getting device called "nap of the earth". What they do is, they put you in the back seat and make you watch while they hurtle themselves up and down hills, around trees, under wires and through villages. They know that you will watch the controls like a hawk, hoping only to survive long enough to learn enough to make it feasible to hijack the airplane and get it safely onto the ground. "Self preservation" I'm told they call it.

At just about the time you figure you're ready to put an end to all this foolishness once and for all, they set down on the ground, the observer hops out and forces you into the front seat, and the pilot turns to you grinning fiendishly and says "It's all yours". And then the fun begins.

I was born about twenty years too late to fly the Spitfire, but I'm just about sure it must have felt just like a Kiowa. You have an impression of infinite manoeuverability and limitless power. Of course, neither impression is strictly accurate because you can in fact run out of power (you could in a Spit too), and you can't do every manoeuver you could in a welded wing, but show me a Spit that could fly backwards and sideways. Sure the speeds aren't comparable, but one hundred miles per hour five feet off the ground seems more than equivalent to six hundred miles an hour at a few hundred feet, and here I am well qualified to compare. You simply would not believe the feeling of speed.

"Cover me while I winkle around this knoll."

Coming as I did from a fighter unit where one was lucky at the time to get twenty hours of flying per month it was a pleasant surprise to find that there was every prospect of getting that much or more in a week without hardly even trying, and what amazing flying it was!

It is at best difficult to describe to more conventional aviators the sort of flying that goes on in this sort of unit. I think perhaps it might best be termed as a mixture of low level tactical fighter flying and "cowboys and indians" with a little deerstalking and a dash of blitzkrieg thrown in for good measure.

"Cover me while I winkle around this knoll" one chopper will call to its wingman (they always work in pairs for mutual support). With that, he'll take-off at a godawful clip with his skid tips seemingly parting the grass, roar around the hill and dive into cover behind some bush. Just like we used to do as kids eh? Well not exactly, since he's moving a multi hundred thousand dollar piece of equipment. My "flight safety officers hair" turned a little gray at first until the realization finally dawned on me that these guys really had everything completely under control. Before the dash around the knoll the observer has consulted his map and visually checked the route for hazards and the supporting aircraft has had a look from his vantage point. In a word, the "dash" was actually a "Mini Low Level Nav", at worst a highly calculated risk. The teamwork between the observer and pilot is a revelation to a single stick driver. What a bonus to have another set of eyes and a free set of hands. Generally the observers are fully qualified tank commanders themselves, or artillerymen, and so can advise the "driver" of the tactics likely to be taken by the enemy. Also they are able to come up with a six figure grid reference seconds after a contact, a reference which has to be right since it may be the target of artillery fire support within moments. A small error could place the cobra bird in the "beaten zone", which in laymens terms is big trouble.

The LOH observer/pilot team functions as closely as does its Voodoo equivalent. Whenever possible they are "crewed up" and fly only with one another, which becomes obvious when you see them in action. In an environment where it is not unusual to be required to monitor simultaneously three separate radio frequencies any two of which may be loaded, extra chatter is not required so many crews have developed an interesting combination of handsignals and verbal shorthand. Sometimes of course, a simple "Lets get outa here" is better than a thousand gestures, like when the vehicle just poking out of the woods ahead is part of a Vulcan/Chaparral anti aircraft combination, or a team of infanteers with a Redeye. Then its a mad dash for the quickest cover and the devil take the hindmost.

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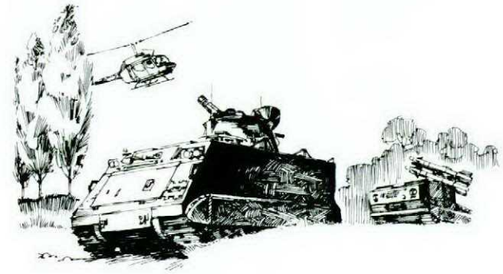


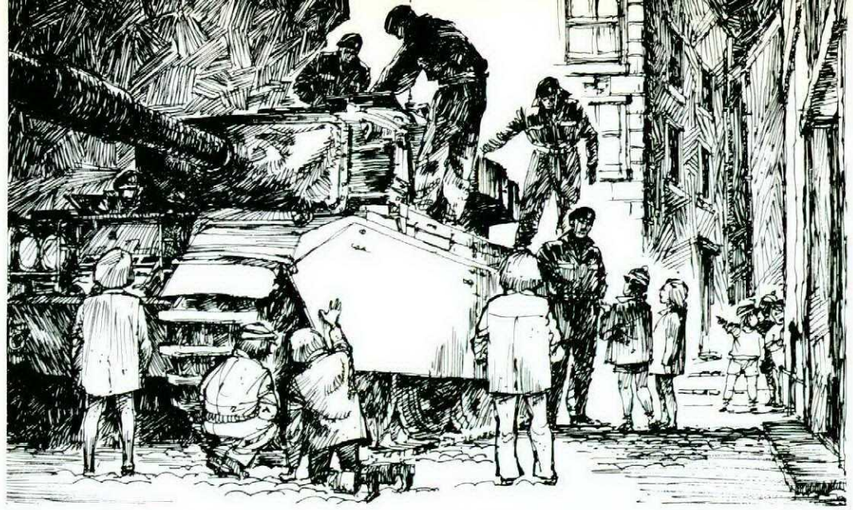
"Let's get outa here" is better than a thousand gestures.

As far as teamwork is concerned the old adage "the family that plays together stays together" is applicable. When I first arrived in the field the unit was holed up in a barn in the middle of a Bavarian farming community with the Kiowas operating out of the orchard. We lived for two days with sixty guys taking shifts with cooking, cleaning up, and "running the war". With nightfall if time permitted it was over to the local Gasthaus for a brew and a Jagermeister it certainly made it easy to sleep. An interesting thing was walking up the village "Hauptstrasse" and observing a battle tank in each driveway with the crew carrying out maintenance and the local kinder scrounging chocolate bars. Just like a John Wayne movie, although I doubt if nylons would have produced any takers among the older sisters.

Everyone pitched in and worked until all that could be done was done, and then everyone took a break – except of course, those who were assigned as sentries, – and they too were relieved periodically and brought in out of the incessant rain to warm up and dry out. I believe that all too often we peace time "light blue" types forget how much of a team effort our operation really is. We pilots sign out, fly, and sign in, and consider it a days work, while the ground types carry out their shift and head on home. In the field thats not quite the way it works. I think maybe I had forgotten, and I doubt that I am (or was) alone in this. One hundred and sixty eight hours with "Triple Four" sure helped to set straight a few misconceptions.

Well, if you get the impression having read this far that I was impressed with this unit, read on and I'll tell you why.

This is a unit in which every man is a soldier, and I do not employ the term loosely. Each and every man be he ground-crew or aircrew carries a personal weapon and is qualified in its use. Every man has assigned duties which go way beyond the normal tasks of his trade. An engine tech might double as driver of a deuce and a half and besides that would be responsible for the erection of his sections "hooch". Having done this he might find himself providing perimeter defence with his very own SMG. Sure it sounds like a lot of work – and in fact it is, but never once did I hear a complaint. Each man knows



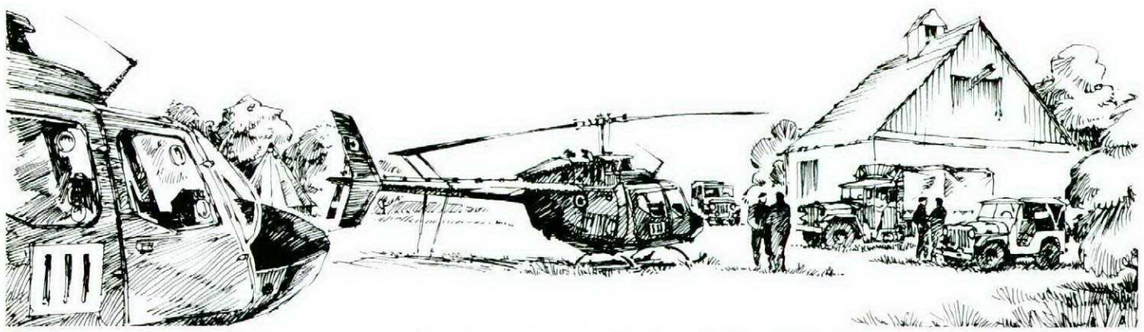
. . . and the local kinder scrounging chocolate bars.

full well that he is an important part of the overall picture. There is no deadweight because it simply could not be tolerated. At no time did I observe anything but the highest possible morale, although the weather was unbelieveably bad and the living conditions might well have been wretched. That they were not is the direct result of the ingenuity of various members of the unit who have improvised, scrounged, invented and adapted to this way of life amazingly well. Pilots and groundcrew who always before thought of themselves as "blue-jobs" or "airdales" find to their surprise that they are fascinated by the conduct of the land battle. In time they come to realize that "its all the same war", and the transformation to effective contributor to the organization has begun. I'll never forget the former naval type who, when asked how he enjoyed living in the field, replied: "Well Sir, its not the Bonny, and the water isn't quite so deep – but its a taut ship and she's a good feeder." He then slung his gasmask over his shoulder, jammed on his beret and walked squishingly into the night, his submachine gun cradled in his arms.

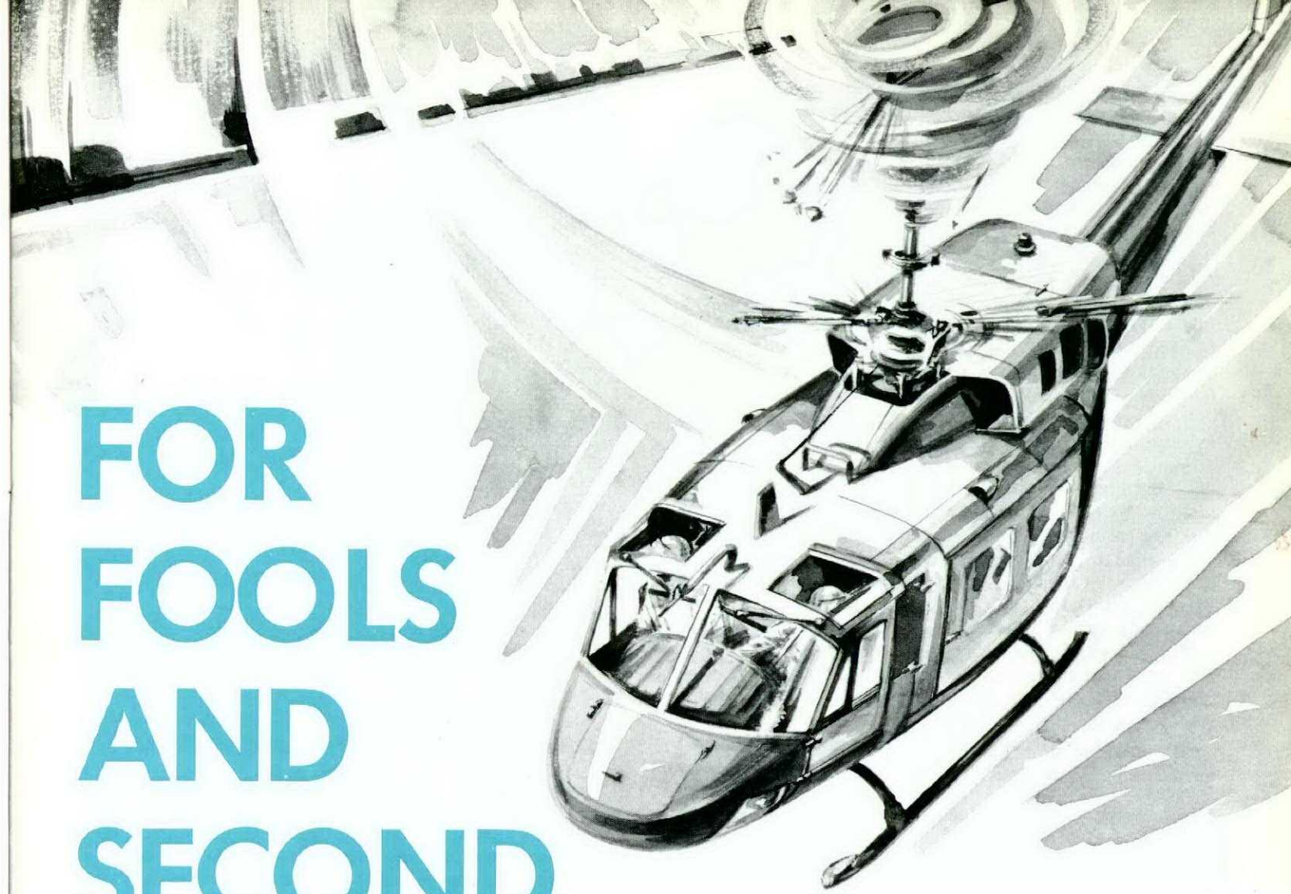
Reforger in itself is a revelation to the serious student of military matters. Here on any given day you can expect to see more equipment, more men, and more of an approximation of battle than you could gain in ten years of North American manoeuvres. An entire division in the advance or in defensive positions is something which few Canadians have seen anywhere but on a sandtable since 1945. Sitting in the command post and watching the battle develop and knowing that real troops were moving synchronously with the grease pencil markings was a fascinating experience. Is it corny to say you "felt like a soldier"? If it is, then so be it.

It is almost fashionable in this day and age to forget or to ignore the fact that the milieu of the soldier is battle. So far are we removed from this fact that it is almost shocking at times to be reminded that "thats what its all about". Troops commited to NATO are there as peacekeepers, but to use the old expression "if the balloon goes up" their ability to make war will decide their chances of survival. Triple Four is obviously "at the sharp end" of one of the worlds finest infantry brigade groups. They know it, and they are proud of it. The men come from all of the former services and clearly in evidence are "Navy" cooks, "Army" instrument technicians and "Air Force" drivers. Also of course, some of the personnel are strictly post-unification types. Clearly though, they have banded together under their cobra symbol and formed an elite, cohesive unit.

What does all this have to do with flight safety? Just this. I lived with this unit on a twenty four hour per day basis for seven days. They operated aircraft from dawn till dusk without ever missing a mission due to aircraft unserviceability, and they did so with a perfect safety record. They did all this under field conditions which were wet, cold, dirty, and fatigueing to say the least, and they had been doing it for weeks before my arrival. They have taken on one of the toughest jobs which the Forces have to offer, and they are doing a superb job of carrying it out. There is a lot to be learned from a study of a unit such as this in terms of leadership, management, morale, motivation, and yes, you'd better believe it – safety. If you ever get a chance to watch them in action – take it – you're a sure swing wing convert – I guarantee it.



The unit was holed up in a barn in the middle of a Bavarian farming community.



FOR FOOLS AND SECOND LIEUTENANTS

Col F. Max McCuller
US Army (ret'd)

Years ago at Fort Myer, Virginia, while I was company commander, two of our soldiers got into a little difference of opinion one night in the barracks, and in the end one punched the other one in the nose and knocked him head over heels down a stairway. The first sergeant and I got them to shake hands, had them patched up, got them back to duty and promptly forgot about it. About a week later the post safety officer came by and asked, "Where's your report of the accident? "

"What accident? " I asked.

He said, "Well, one of your soldiers knocked another one down the stairs".

And I said, "That was no accident. He meant to do it".

In looking at some of our so-called aircraft accidents I wonder how many of them truly meet the definition of an accident. In some of them it would appear that the pilot meant to do it, almost as if he had planned it.

I'm often asked to give my views on the subject of aviation safety, or accident prevention, as we prefer to call it, and I'm always willing to do this. I like to employ a technique I picked up from Chaplain (Colonel) Owen Shirey, the former post chaplain at Fort Rucker, Alabama, now retired.

Chaplain Shirey always said if you want someone to understand what you're trying to say, first tell him everything it isn't.

Now on safety I want to tell you everything it isn't. This will help clear your mind of these things and we can concentrate on the things I think safety is. Safety isn't a monthly safety meeting, although it has a part in the overall program. Safety isn't a yellow line painted on a ramp or hangar floor or a fire extinguisher hanging in a corner. But these also play a part. Safety isn't a magazine article or poster, but they have their influence.

I could go on and on but I think this gives you an idea of what safety isn't. So what is safety? It can be summed up in one word. That one word is discipline. Early in our military careers we learned that discipline is the willing obedience to orders. In the case of aviation, those orders take many forms,

such as regulations, tech orders, OIs, and so on. These are the orders that direct how we should operate our aircraft.

You may have heard it said that regulations are written for fools and second lieutenants. My idea is that regulations are written from hard experience. Someone went out, crashed his aircraft, injured or killed himself or his passengers, and then we wrote the rules.

In the early days of aviation we had our first case of fuel exhaustion – ran out of gas. Being thinking people we then came up with a rule concerning fuel management. And that rule is that the fuel will be managed and the flight will be planned and executed so the aircraft will arrive at the destination airfield with a prescribed number of minutes of fuel reserve. Now that's quite simple. If everyone followed this regulation we would never have another case of fuel exhaustion. With proper fuel management, that 20-minute fuel warning light would never come on.

But let me tell you a story. This actually happened just recently. We received a crash facts message concerning a UH-1 that had engine failure after 2 hours and 45 minutes of flight. We queried our computer to give us the last 10 confirmed cases of fuel exhaustion in a UH-1H. The time of flight in these 10 cases varied from 18 minutes from pitch-pull to crash to 2 hours and 34 minutes total flight time. I then told the unit their suspicions of engine failure might very well prove to be correct but I suspected fuel exhaustion. I then informed the unit that they had set a new fuel exhaustion record of 2 hours and 45 minutes.

Back in the dark ages, a fastener came loose, a bolt slipped out or a nut worked its way off and we, again being thoughtful people, came up with a set of rules. The rules are that every fastening device will be safetied somehow with a piece of wire or lock washer or double nut or self-locking device, and then this thing will never happen again.

Yet, what has happened? Not too long ago an OH-6 took off and climbed to about 200 feet. You've probably discussed over a beer what would happen if the Jesus nut ever came off a helicopter. I'll tell you what happened. This one came off and the main rotor of that OH-6 left it like a frisbee, with disastrous results and two fatalities, proving again that from time to time the laws or rules of man concerning the behavior of man can be violated and gotten by with. However, the laws of gravity, the laws of physics and the laws of aerodynamics will be obeyed or end in disaster.

We have rules of flying covering just about every conceivable situation. However, we can't write a rule to cover every possible situation. Let me cite you another case. Two pilots aboard an OH-58 were flying over the countryside when they spied a coyote and, having nothing better to do, began chasing it across the prairie. Eventually they were able to put the main rotor blade through the coyote. This feat, as you will recognize, exhibits very skillful flying. It killed the coyote and was also disastrous to the helicopter. It tore it all to pieces. Luckily, no one was injured. I don't know that we ever wrote a rule saying don't chop coyotes in two with your main rotor blades. This is a little bit beyond comprehension. Sooner or later common sense has to apply.

We, as well as the other services, long ago gave up the idea of citing a primary cause for each accident. Our accidents are coded under one or more of ten possible cause factors. The cause that has always appeared in more cases than all the others is this thing called crew error. Most accident investigating boards and reviewing and approving officials believe that because a pilot is present in most aviation accidents he must have done something that he shouldn't have or did not do something that he should have done and thereby caused the accident.

Contrast this with the fact that maintenance problems and engineering design problems seldom appear as cause factors. I believe our aircraft are pretty well designed and screwed together – if they weren't, I would never set foot in another one. So let's discuss for a minute this thing called crew error and see if we can tie that in with discipline or the lack of it.

In more cases than not, in crew error accidents there has been a breach of discipline that is perhaps the primary – if we could name a primary – cause factor. I'm reminded of a friend of mine who went off to college to study logic, that is, cause and effect. As a requirement in this particular course of study he had to write a paper. So he took his notebook and pencil and went into the field to make his observations. He came back and wrote the paper. His conclusions were that the wind is caused by the wild waving of the trees. This is a common experience. You've seen it. When the trees begin their wild waving the wind immediately starts to move and we hear that whooooooosh sound. I can go further and say that, according to my own observations, out in western Kansas and Colorado and the plains states where there is a scarcity of trees, the windmills can stir up quite a breeze.

I've often told this story to the students of our accident prevention classes at USAAAVS. Early one morning I told a class of 32 students that the wind is caused by the wild waving of the trees and did not get one indication, not one lifting of an eyebrow or the upturned corner of the mouth, or any hint that this met with disbelief. Later I called out our chief instructor and told him, "Look, we've got 32 people in there who either believe that the wind is caused by the wild waving of the trees, in which case we have a problem, or they believe that I believe that the wind is caused by the wild waving of the trees, in which case we have a worse problem".

What does this story have to do with accident prevention? Simply, that man is the cause and the effect is the accident, not vice versa.

Since crew or pilot error is listed in 70 percent of our accidents, this promises to be the most fertile field to plow in the business of accident prevention. What can we do about it? We can increase the discipline of the pilot and require him to operate the aircraft in the manner in which it was intended to be operated.

Last year I came across an article in one of the trade journals written about Petroleum Helicopter Industries. They operate out of Lafayette, Indiana, and service offshore oil drilling rigs. In this article they very proudly announced that they were second only to the Army in the number of helicopters they operated, but they operated them better than anyone else in the world. This aroused our curiosity to the point that we contacted Petroleum Helicopter Industries, arranged a meeting in Lafayette and spent some time with them.

We were impressed when we walked into their maintenance hangar. Every opening was capped, everything was in its proper place, the hangar was spotlessly clean and the workmen went about their business in a businesslike manner. It was a beautiful sight to see. In talking with the operations personnel we learned that Petroleum Helicopter was very selective in their choice of pilots. Most of them were former Army helicopter pilots with considerable experience.

The operations people went on to say that after hiring a pilot they sent him to the company ground school and flight school to teach him to operate the company aircraft as the company wanted its aircraft operated. And then they saw to it that he did. Somehow, over the years, we seem to have drifted away from this idea and all too often we allow the pilot to operate the Army's aircraft as the pilot thinks it should be operated.

Let me tell you a story about another civilian contractor. The operations officer had laid on three flights for that particular day, a Sunday. After he had gotten everything squared away, he went to the golf course. While he was on the third or fourth tee a helicopter took off. He glanced at his watch and noted that it was right on schedule and noted later that it returned right on schedule. This happened a second and a third time as he continued his golf game. Then, to his surprise, a fourth helicopter took off. Knowing there was no fourth flight planned, he immediately laid down his golf clubs and got himself to the operations shack. It didn't take long for him to determine what had happened. The pilot of the fourth flight had decided to take a friend on a quote – maintenance test flight – unquote, during which they intended to go along the beaches and pick up those round glass floats the Japanese use on their fishing nets. When that pilot came back in that aircraft, the company handed him his pay and a ticket back to the states. He was no longer employed by that company.

There was probably nothing we would term unsafe in this particular flight. But the pilot did exhibit a lack of self-discipline. That is, he put the aircraft to an unauthorized use for his own purpose, and was made to suffer the consequences for his act. Luckily for him, this was dismissal rather than death or injury.

The action by the company in this particular case illustrates the application of the word "discipline" in its verb form, meaning to punish rather than to teach, as in its noun form. And when this form of discipline comes into play, self-discipline has somehow failed.

Commanders have told me they are unable to be present in every cockpit and once the aircraft is off the ground the pilot is on his own. But I feel that while each commander cannot be physically present in every cockpit on every flight, his presence can be felt in that cockpit. His presence would be the attitude, the climate, and the atmosphere that he has established through his own example, and the requirements he places on his subordinates and crews. A large number of our Army aircraft accidents could have and will be prevented through this thing called discipline, preferably self-discipline; but in the absence of self-discipline, then applied discipline.

Courtesy MAC FLYER

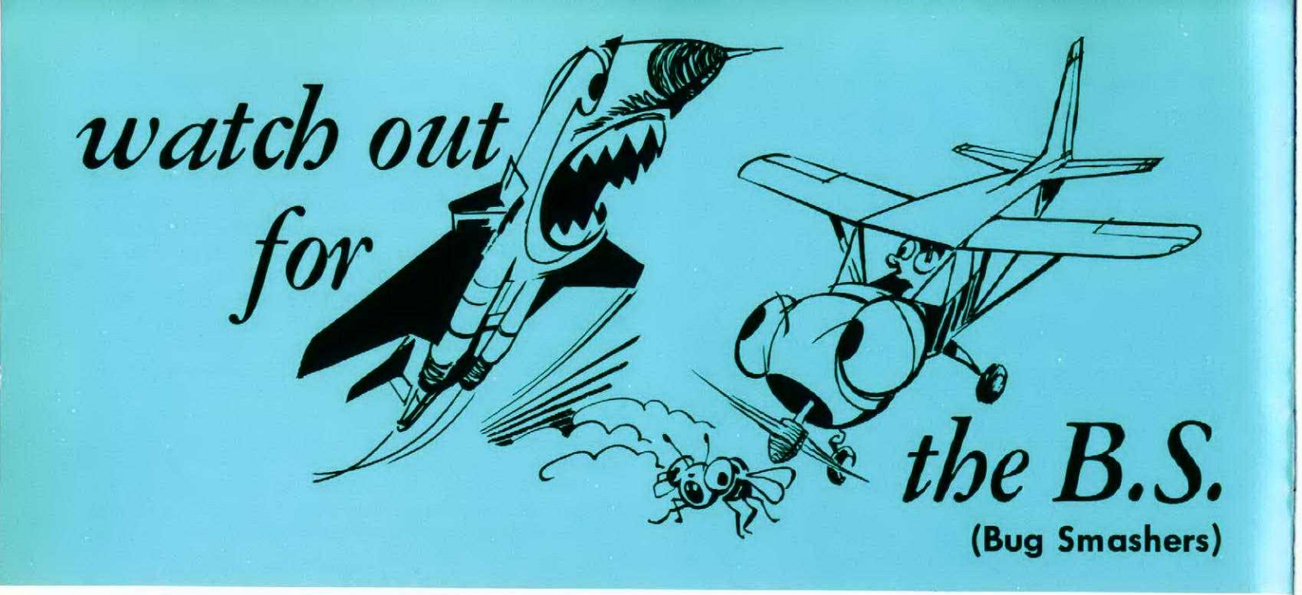
Step 6. Depart Aircraft

The last item in the Emergency Ground Egress procedure would appear to be self-evident. Perhaps that is why it is not a bold face item. Granted that it is unnecessary to remind a pilot to leave a burning aircraft, it is necessary to practice the action. The reason for physically practicing the getting out trick is to reinforce habit patterns, demonstrate that the five prior actions have been properly accomplished and functionally check the hardware. Why functionally check the hardware? Because, sometimes everything doesn't work exactly as advertised.

A good example is the pilot who, after executing the emergency ground egress (not for practice), found himself still tethered to the bird by his personal leads bundle. Fortunately, the aircraft was not on fire and he eventually disconnected himself from the disabled bird. Subsequent investigation identified a potentially serious problem with the personal lead bundle connection to the survival kit. Specifically, this connection may not separate if the withdrawal force is in a direction other than the vertical axis of the unit. Although the Survival Kit Emergency Release system had functioned properly, the connector block was binding on the sidewalls and on the bottom of the unit where the leads connect into the survival kit. Certain pilot physiques and body position tend to induce a binding force on the unit. Once jammed, pulling harder only aggravates the condition. Simply stated, if you can't push it in crooked – you can't pull it out crooked.

It is to your personal advantage to inject some realism into your ground egress training. The next time you run the drill, we suggest you practice all the steps. The next time you do the trick, it may be for real!!!!!

by Lt Col. W.L. Busch USAF Study Kit



Near Miss Report (F-111). An F-111 just missed a civilian Bonanza during a SID departure. The 111 was in a right climbing turn when departure control advised them of traffic at 11 o'clock, one mile. The instructor pilot in the left seat had his vision partially blocked by the canopy bow and his WSO saw the Bonanza first. The IP then saw the bogey, pushed the stick forward and the Aardvark passed about 200 feet below the Beechcraft. The civilian was not in contact with departure control, was flying in the TCA with no clearance, and since he took no evasive action, it's doubtful if he even saw the F-111.

Near Miss Report (F-100). The Hun, an F model, was executing a Precautionary Landing Pattern into its home drome, an international airport. At 1-1/2 to 2 miles on final, a Cessna 150 passed 50 to 100 feet under the F-100. There was not time for evasive action. It's believed the Cessna was on a left base for the right parallel runway, but the tower did not have him either visually or on the radio. The bugsmasher was on RAPCON frequency, but was having radio difficulties and RAPCON didn't know of his location. This report concluded with a warning that light aircraft operate in the local area with "inadequate radio equipment that affords them little or no communicative capabilities at times". Amen.

Mid-Air (T-29). The T-29 was on an IFR clearance on final approach, under GCA control, when it collided with a Cessna. It was dark, but clear, with a visibility of seven miles. Since it was VMC, the pilots of both aircraft were equally responsible to see and avoid other traffic. The two blips merged on the controller's radar scope – then disappeared; both aircraft crashed into a river. The private pilot and his passenger were killed and all seven crew and pax of the T-29 perished.

Without recounting the tragic statistics listed under "mid-air", there are several tips worth passing on to you who share the crowded skies with bugsmashers.

- The experience level of light civilian aircraft pilots may be very, very low. We all had to start somewhere, and most of us began in (and some of us still fly) light, unsophisticated aircraft. If, like me, your initial pilot experience was in a bugsmasher, think back to how little you knew on your second or third solo flight. If, on the other hand, your flying background is strictly UPT jets carrying relatively sophisticated electronics, you'll have to use your imagination. Briefly, look for the bugsmasher to be where he shouldn't, at any altitude, in any weather condition. *Never feel you are safely in the arms of Mother Radar.*

- Most light civilian aircraft do not have the highly sophisticated and extensive electronic gear you may take for granted. Few light aircraft operators can afford more than one nav-aid, a backup radio, or inflight radar. You should use everything you have available (including the o1' eyeball) to avoid other aircraft. *Remember, when you are on an IFR clearance, upon request, ATC can provide you with traffic advisories relative to observed targets not under IFR control.*

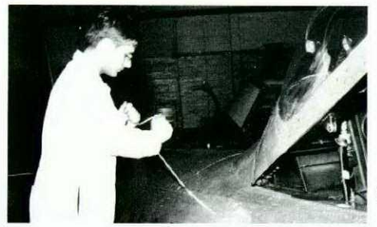
- Bugsmashers have a right to the skies, too. The civilian pilots aviation regulations basically coincide with ours in regard to VFR flight – with one important exception: the civilian pilot can fly VFR outside of controlled airspace and below 10,000 feet MSL (or 1,200 feet or less above the surface regardless of MSL altitude) *with flight visibility of only one statute mile.* Remember, if you are on an IFR clearance and the visibility is one statute mile or more, you are responsible for avoiding VFR traffic.

Keep these points in mind, especially at lower altitudes and near airfields. Use every external light available in the traffic pattern even in the daytime. Keep your ear tuned for "bogey" calls and keep looking 'til the controller calls "no factor" or you've got him safely in your sights. Oh, yeah . . . one more thing . . . I swore I wouldn't use this term, but what the hell, I can't think of a better way to say it . . . . SEE AND BE SEEN.

courtesy of TAC ATTACK

GOOD SHOW

Cpl E.T. Richardson



Cpl R.A. Martin

CPL R.A. MARTIN

Cpl Martin, an airframe technician, was detailed to remove an unserviceable T33 fuselage fuel cell pump and replace it with a new one. During an inspection of the fuel cell area Cpl Martin noticed something unusual about the inside surface of the fuel cell. Upon checking further into the reason for the lumpy and uneven surface of the fuel cell he discovered that it was caused by some rivets and other foreign material lodged between the cell and the fuselage skin. If Cpl Martin had not discovered the presence of this FOD it would have undoubtedly punctured the fuel cell and caused an extremely hazardous fuel leak.

The thoroughness with which he performed his duty considering his experience and the fact that he did that little extra beyond that which was required, led to the prevention of a very serious incident or accident and possibly saved the Forces an extremely valuable aircraft.

CPL E.T. RICHARDSON

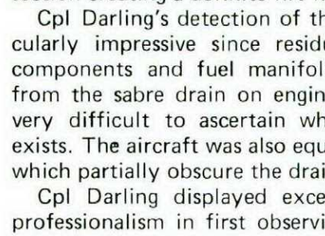
Cpl Richardson, a Weapons' Technicians Air, was assisting in the turnaround of a visiting CF101 aircraft. While waiting for the refuelling to be completed he happened to glance at the nosewheel and noticed that the port wheel appeared to be slanted. Following the refuelling operation he applied pressure to the wheel and found that it was loose. He brought it to the attention of the other turnaround crew member who was in the process of completing the rear portion of the aircraft. He confirmed the unserviceability. The aircraft was subsequently declared unserviceable and was towed into the hangar for repair.

Subsequent investigation revealed that the port nosewheel inner race and bearing had disintegrated and the axle was scored and appeared to be bent. This unserviceability required changing of the entire lower portion of the nosewheel assembly.

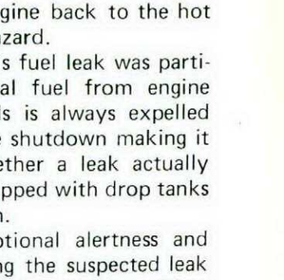
Cpl Richardson's alertness and initiative prevented a potentially serious accident or incident.

CPL R.S. BISSETT

Cpl Bissett noticed a fractured support bracket on a T58 engine as the engine was being installed in a CH124 Sea King helicopter. The bracket is one of two attached to the engine by two bolts, hence the fracture which resulted in the engine being held by only 75% of the designed support. Cpl Bissett's perceptiveness averted possible serious damage to the aircraft, engine and personnel. The possible damage is illustrated by the fact that the 400 lb engine is hoisted 12 feet for installation.



Cpl R.S. Bissett



Cpl O.G. Darling

CPL O.G. DARLING

After parking a CF101 on recovery from an Airborne Intercept mission, Cpl Darling observed what he suspected to be fuel leaking from around the engine sabre drain as well as the normal amount from the drain itself during starboard engine shutdown. Closer inspection confirmed that fuel was leaking from the area adjacent to the fuel drain. Subsequent investigation revealed that the fuel line from the afterburner filter to the afterburner ignitor valve was cracked. This line is constantly pressurized when the engine is running so that fuel from the cracked line would be sprayed along the engine back to the hot section creating a definite fire hazard.

Cpl Darling's detection of this fuel leak was particularly impressive since residual fuel from engine components and fuel manifolds is always expelled from the sabre drain on engine shutdown making it very difficult to ascertain whether a leak actually exists. The aircraft was also equipped with drop tanks which partially obscure the drain.

Cpl Darling displayed exceptional alertness and professionalism in first observing the suspected leak and then following up his initial suspicions with a thorough inspection. His action averted what could possibly have been a very serious situation, a fire in the compartment with subsequent loss of an aircraft.

GOOD SHOW

Cpl G. McLean

CPL G. McLEAN

Cpl McLean, an airframe technician, was conducting a primary inspection on a Labrador helicopter. Although not responsible for the generators he decided to visually inspect them. Using a flashlight he found that the shaft that drives the cooling fan had fractured. Gone undetected this would have caused the generator to overheat precipitating an in-flight emergency and possible fire.

Cpl McLean is to be commended for his initiative and his alertness in preventing a potentially serious incident. His action exemplifies the contributions made to flight safety by conscientious technicians.

Cpl J.M. Tothe

CPL J.M. TOTHE

While carrying out a Periodic Inspection on a Hercules aircraft, Cpl Tothe discovered a flat metal fragment measuring approximately one square inch lodged behind the A.T.M. frame. Unable to identify the fragment, he inspected the entire left hand fuselage well area without finding evidence of damage or cause of the fragment. Increasing his inspection area, he next examined the A.T.M. cooling fan motor assembly and discovered that the fragments were pieces of the cooling fan blades which had partially disintegrated when the fan disengaged from the cooling motor spline in operation.

By his attention to detail and perseverance, Cpl Tothe recognized an obscure defect and persisted with his investigation until the cause was found.

Cpl D.L. McDougall

Cpl J.W. Svenson

CPL D.L. MCDOUGALL

During a periodic inspection of a C130 aircraft, Cpl McDougall was carrying out a visual inspection of the flight controls in the under flight deck area. Noticing a split pin at the cable tension regulator that appeared to be improperly safetied he extended his investigation and discovered an unorthodox locking device attached to the elevator control cable that had been used when cable tension checks were being completed. Undetected, either of these irregularities could have resulted in the destruction of an aircraft and crew, caused by the loss of elevator control. Due to the location of the tension regulator normal visual inspection would not have revealed this hazardous condition. Therefore, Cpl McDougall's professional approach to his duties in which his attention to detail and his willingness to go beyond his normal inspection requirements made a valuable contribution to the CF Flight Safety Programme.

CPL J.W. SVENSON

Cpl Svenson was carrying out a quick turnaround inspection on a Boeing 707 and noticed that the left inboard aileron control tab did not correspond to the position of the aileron. This improper relationship was difficult to detect because of the free-floating nature of the control surfaces on this aircraft and highlights the superior alertness and attention to detail given to his job by this NCO.

Closer investigation revealed that the aileron control tab crank securing rivets had sheared thereby preventing the tab from reaching the position commanded by the aileron control wheel. During flight, this would result in reduced control effectiveness due to the reduced displacement of this section of aileron.

CPL A. GRUBER

Cpl Gruber, an airframe technician, removed a stabilizer servo panel to provide access for another technician on a CF104 aircraft. Before re-installing the panel, he carried out a routine FOD check. He found the compensator drain line disconnected and damaged. To ensure that this line had not caused any additional damage, he decided further investigation was necessary. He removed the stabilizer panel on the opposite side and he found that the line end fitting had jammed between the servo body and the rod end connection points, and had cracked one of the upper mounting points.

The extra care and attention Cpl Gruber displayed during this routine check undoubtedly prevented a very serious inflight control emergency.

CPL J.W. WIGHTON

While doing a walkaround visual inspection of the starboard leading edge flaps on a Boeing during a Periodic Inspection, Cpl Wighton noticed that one Leading Edge Actuator Carriage did not appear to be properly secured to its airframe mounting. Closer inspection revealed one bolt from the center mounting point missing and the remaining three bolts so loose that they were also in danger of falling out.

Cpl A. Gruber

Cpl J.W. Wighton

Pte J.W. Glenn

MCpl F. Reid

These bolts could easily have become lodged in the Carriage assembly causing it to jam and malfunction during flight.

Cpl Wighton displayed superior alertness and attention to his job in discovering such a discrepancy during this type of inspection, thus preventing a serious inflight emergency and, at best, costly damage to the Leading Edge Flap assembly.

PTE J.W. GLENN

Pte Glenn had been tasked to lock-wire a fuel drain cock in the left wheel well of a CC115 Buffalo aircraft during weighing operations at CFB Ottawa. He noticed that one of the two rivets holding the nearby utility hydraulic system filter was missing. Although not his trade, he investigated the area around the filter and discovered that the remaining rivet had also sheared, leaving the filter assembly secured only by the hydraulic plumbing.

In time, vibration accentuated by the weight of the filter body would have caused one of the lines to rupture causing failure of the utility hydraulic system and a serious emergency situation.

The alertness displayed by Pte Glenn and his awareness of a potential safety hazard are commendable.

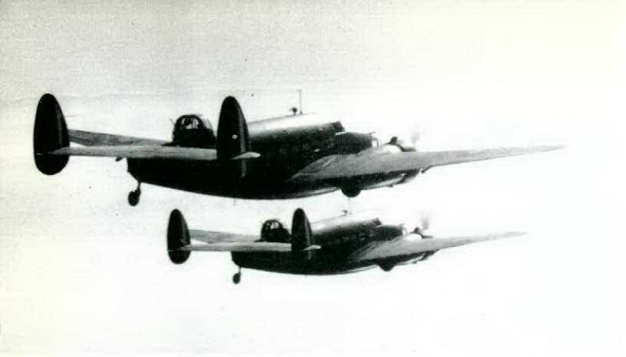
MCPL F. REID

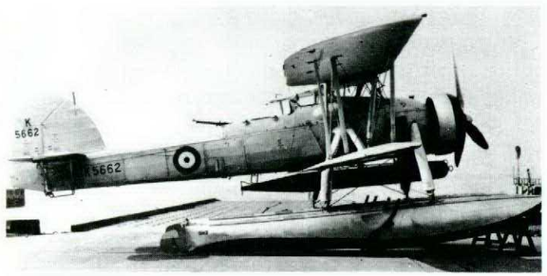
While carrying out an After Flight Check on a Cosmopolitan aircraft MCpl Reid entered the port wheel well to visually inspect the engine and propellor control cables. When he completed his inspection he decided to inspect the other cables in the wheel well area as well. When MCpl Reid inspected the main gear uplock control cable he discovered that the cable was frayed and would require replacement. This flaw in the cable was in an area that is difficult to see during a normal inspection. As this additional inspection was not part of MCpl Reid's duties, his high degree of professionalism was most instrumental in preventing a possible inflight emergency.

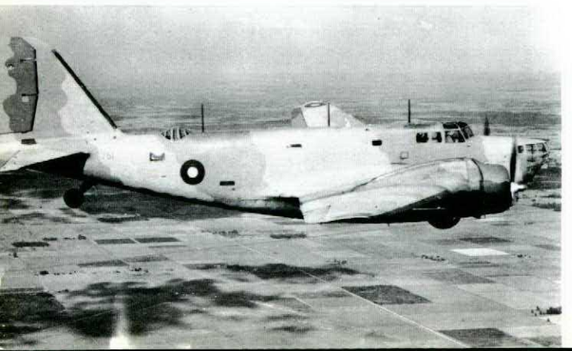
CPL D.D. MURDOCK

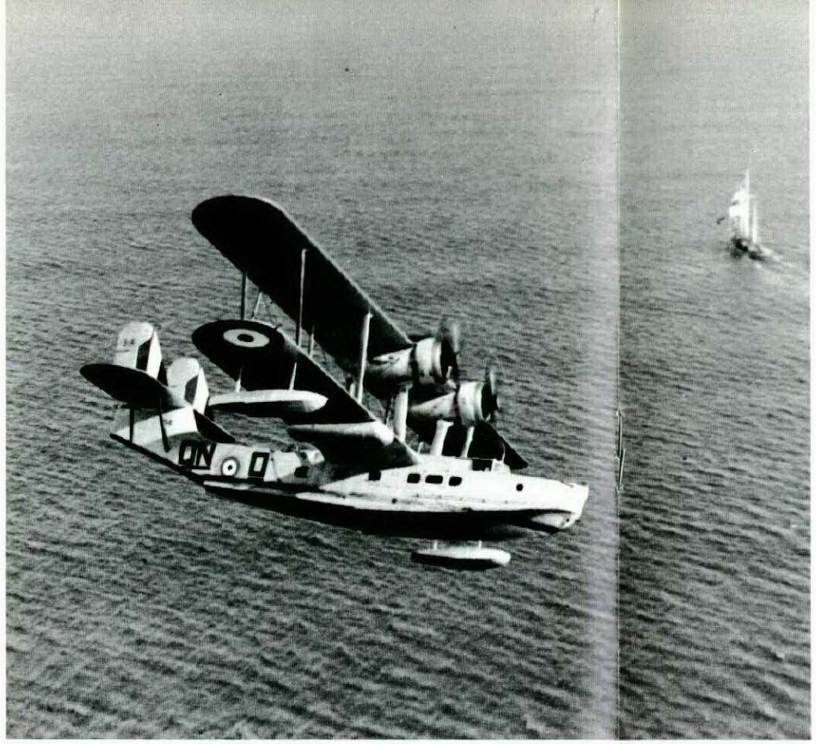
Cpl Murdock, a crewmember refuelling a transient T33 aircraft, was about to install the right hand main tank fuel cap when he noticed some metal particles in the fuel cell. Cpl Murdock visually inspected all other fuel tanks and determined that the particles were isolated to the one cell. He advised the POL Compound and the refuelling tender was immediately quarantined until it was checked and declared serviceable. The aircraft was defuelled and all filters checked serviceable. The presence of metal particles was attributed to the roller bindings of the fuel cap.

Cpl Murdock's alertness to the possibility of fuel contamination probably averted a serious fuel component breakdown. He has consistently displayed this level of concern for flight safety.

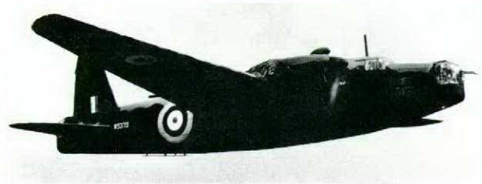


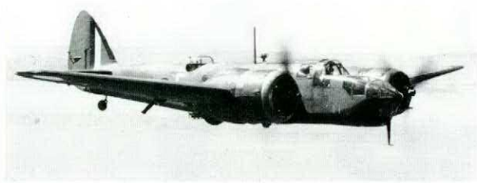


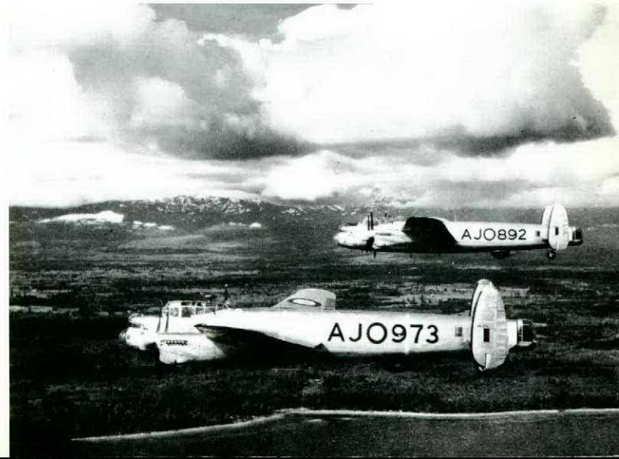




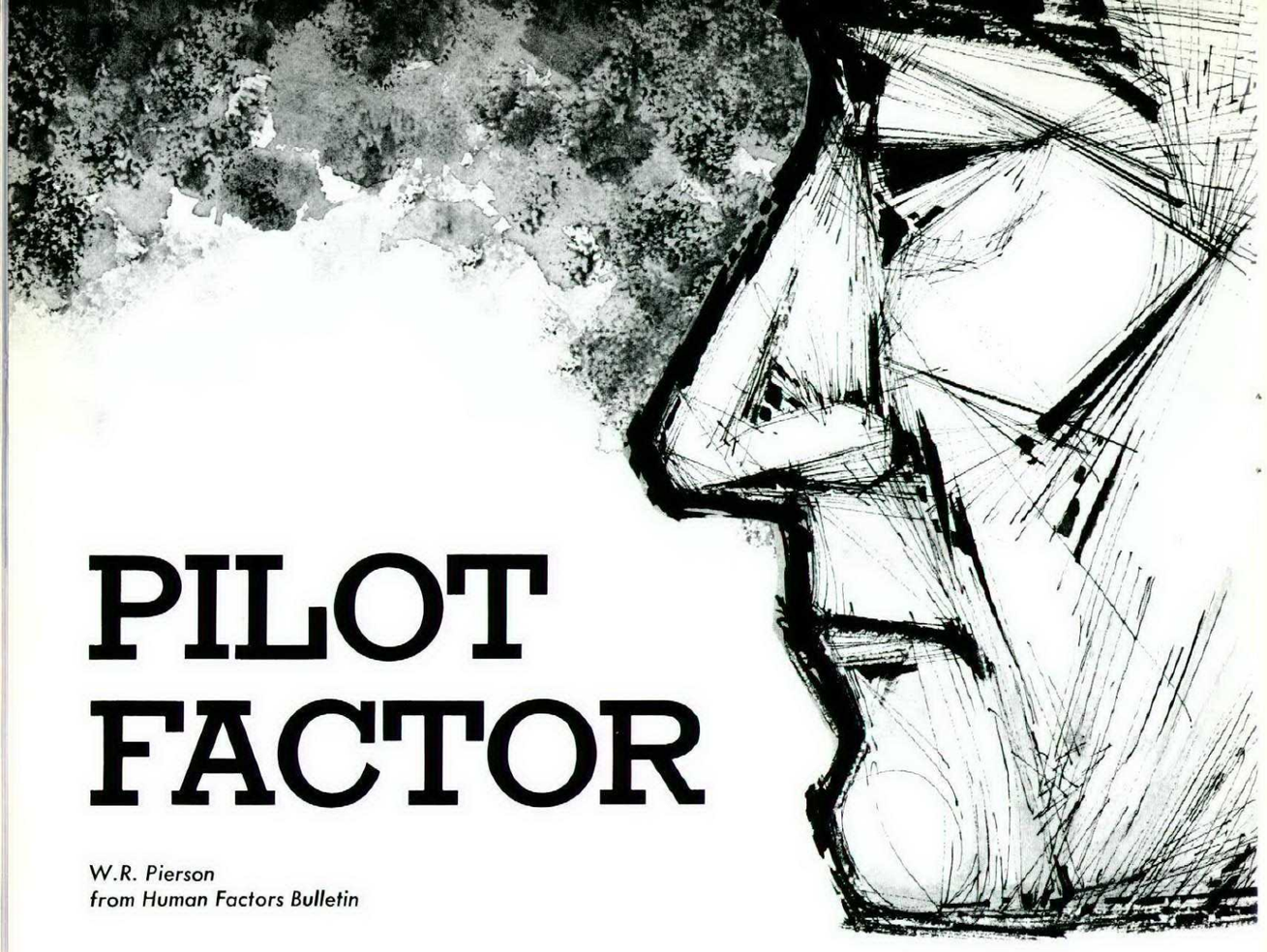
MARITIME PATROL OLD-TIMERS







Flight Comment, Sep-Oct 1975



PILOT FACTOR

W.R. Pierson
from Human Factors Bulletin

Pilot Error is a term which fixes blame and assigns cause for an aircraft accident. Whether or not so intended, the implication is that it was caused solely and directly by some action of the pilot; yet there are numerous accident potentials over which the pilot has little or no control. Hence, the term "pilot error" has been supplanted by "pilot factor". The purpose of this bulletin is to provide an orderly classification of pilot factor so as to better understand the cause and prevention of such accidents.

Accidents involving pilot factor may be grouped into four general categories: (1) those which are induced by the design of the vehicle, (2) those which result from system operations, (3) those resulting from the effects of the environment, either natural (pressure, temperature, humidity) or manmade (noise, vibration, acceleration), and (4) those accidents caused by some act of commission or omission on the part of the pilot and which are not influenced by 1, 2 or 3 above. Accidents due to the human factor may be classified as (a) failure to control the aircraft accurately, (b) initiation of an uncontrollable sequence, and (c) poor planning. These could be considered as subcategories of (4).

In a study of US Army helicopter accidents nine discrete factors were tentatively identified which related 96% of the 1,520 pilot-factor accidents to only one factor per case. Three of these factors, *procedural decisions, precise multiple control,* and *attention,* accounted for 777 (53%) of the single cause factor accidents.

The other factors identified were: disorientation, overconfidence, crew co-ordination, limited experience, task saturation, and other weather. The three factors noted earlier might be considered as subcategories of (4), accidents caused by some acts of omission or commission by the pilot.

A very early investigation reported that when airline pilots were questioned about specific acts contributing to errors in flight, 79% of the 92 interviewed reported either "confusion of two controls" or "forgetting to operate a control". The first two accident causes and the factors of *attention* and *precise multiple control* seem to substantiate this.

Discussion

The reasons for failure in the man/aircraft complex may be attributed to one of the following:

(1) **Human sensing system:** vision interference, as by weather, structural members, scotoma, i.e., blind or dark spots in the visual field, or of incorrect perception of attitude as provoked by illusions, disorientation and acceleration.

(2) **Aircraft sensors:** incorrect reading caused by parallax and inconsistencies resulting from erroneous kinesthetic feedback.

(3) **High centers of the central nervous system (memory, judgement):** errors caused by hypoglycemia, hyperventilation, hypoxemia, toxic contaminants, etc.

(4) **Effector mechanisms:** failure resulting from inadequate human power, inappropriate sensitivity, faulty configuration of controls and displays, and inadequate or inappropriate dynamic characteristics.

To these must be added the external factors of air traffic (density and flow), ground movement control, airport facilities (runway lighting, taxiway markings, etc.), number of scheduled stops, and local regulations affecting flight profiles (noise abatement, over-water approaches, etc.).

Based upon the foregoing and the written statements of more than 1200 experienced pilots attending aviation safety management courses, the following classification of pilot-factor accidents/incidents is proposed:

A. Design-induced Pilot Factor

1. Anthropometric, e.g., faulty configuration of controls, limited travel on controls, inability to place eye reference point, inappropriate control sensitivity.
2. Disorientation, e.g., "leans" from curved glare shield, coriolis from placement of displays, flicker vertigo from canopy vibration.
3. Vision interference, e.g., structural members in line of sight, critical instruments blocked.
4. Task overload, e.g., faulty functional flow, dissimilar readings for similar instruments, unfamiliar control operations.

B. Operations-induced Pilot Factor

1. Airport Facilities, e.g., runway and taxiway markings.
2. Air Traffic, e.g., density influences on cockpit priorities.
3. Disorientation, e.g., pitch-up illusion, dark night takeoff illusion, VFR features, etc.
4. External factors, e.g., noise abatement procedures, over-water approaches, etc.
5. Ground control, e.g., ground movement control, location of equipment such as trucks, construction vehicles, etc.
6. Schedule, e.g., fatigue, number of takeoffs and landings, pilot workload, etc.
7. Transient physiologic states, e.g., hypoglycemia from poor meal schedules, hypoxemia and sicklemia from low ambient O_2 pressure, eye and mucosa irritation from ozone, ear problems in rapid descent, etc.

C. Environment-influences Pilot Factor

1. Natural, e.g., airport elevation, ambient temperature, humidity, etc.
2. Man-made, e.g., noise, vibration, accelerations, air pollution, etc.

D. Innate Pilot Factor

1. Errors of Commission, e.g., failure to control the aircraft accurately, initiation of an uncontrollable sequence, activation of wrong controls, judgemental error not influenced by design, operations, or environment.
2. Errors of Omission, e.g., poor planning, inattention, omission of checklist, etc.
3. Medical, e.g., cardiovascular problems not reported, hyperglycemia, non-prescription drug use, etc.

IN SUMMARY . . .

An orderly classification (taxonomy) of pilot factor has been presented in the hope that the causes of pilot-factor accidents can be appreciated in accident prevention programs. It is suggested that modifiers, e.g., design-induced pilot factor, be utilized rather than the gross classification of pilot error.

This taxonomy does not go beyond two subcategories, and any suggestions as to further refinement would be appreciated.

Glossary

Anthropometry: Science which deals with size, weight, proportions and composition of the human body.

Hyperglycemia: Abnormally increased content of sugar in the blood.

Hypoxemia: Deficient oxygenation of blood.

Sicklemia: An hereditary genetically determined anemia of the red blood cells.

"Arms . . . to have or not to have!"

If you have ever been guilty of flying or riding with your arms resting on the canopy rails, a recent incident in ATC may convince you to mend your ways!

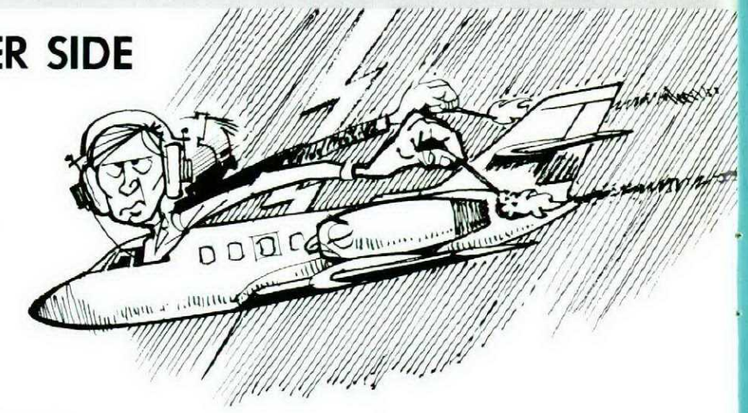
Picture what could have been the disastrous result of this already extremely serious situation . . .

An IP and student were on a night navigation mission at FL 400 and approximately .85M. With absolutely no warning, the IP's canopy (rear seat) separated from the aircraft. The rapid decompression and wind blast blinded the IP and pinned him in his seat so that movement was difficult. He eventually was able to bend forward, out of the wind stream, and push the stick forward to start an emergency descent. The IP was able to successfully divert and land without further incident. Aside from being scared to death, the IP suffered virtually no ill effects from this experience. The IP has stated that he sometimes flew with his arms resting on the canopy rails. Had he been doing so the instant he lost his canopy, this incident would have been a terribly grisly tragedy! The point should be *clear*! The dangers of using the canopy rails for arm rests far, far outweigh the small degree of additional comfort you might achieve. Surely no one is so uncomfortable that they would risk serious injury. It is your decision and they are your arms . . . to have or not to have!

by Capt Robert S. Hinds
USAF Study Kit

Would U Believe?

ON THE BRIGHTER SIDE



The Silence is Deafening

Many of us in today's Air Force have never flown without a brown bag chock full of nylon strapped firmly on the old back. Probably it is natural for a CF5, Voodoo or CF100 jock to wonder what our Cosmo or Falcon driving buddies would do if faced with the horrible silence from both engines at once.

Here is what one crew did.

Not too long ago, a T-39 was cruising at FL 370 over the midwestern United States. It was night but the crew had excellent visibility at altitude and far ahead of them they saw a line of thunderstorms across their path. They requested a climb to FL 410 which was approved, but no sooner had they levelled off then it became apparent that 410 wasn't going to hack it. They requested further climb to FL 430 and radar vectors through the weather. Center approved the climb and advised that their present heading would take them through the area of lightest radar returns.

Moments later the sturdy little Sabreliner entered cirrus clouds and encountered moderate turbulence. The pilot pulled off some power and slowed the aircraft to 200 KIAS. At this low speed they got a sudden jolt of severe turbulence – and *both engines flamed out!* Things got busy in the cockpit as the aircraft lost cabin pressurization and all electrical power except the battery. As the pilots struggled to sort things out, the powerless teeny-weeny fell into the thunderstorm raging below them.

As they descended, the two pilots tried numerous airstarts on both engines – with no success. Going through approximately 20,000 feet, a passenger in the rear of the aircraft called out that he could see flames coming from the number one engine. The fire warning light for number one came on at about the same time so the pilots pulled the tee handle for number one and quit trying to restart it. They continued their efforts on number two.

Descending through approximately 10,000 feet, the crew began to see lights on the ground through holes in the clouds. They continued to try to restart number two engine and prepared for a crash landing. The reluctant engine never did start, but *using the illumination from nearby lightning flashes,* the pilot managed a night, power-off, crash landing in a corn field.

Several crewmembers were injured but there were no fatalities.

Quiet Racer

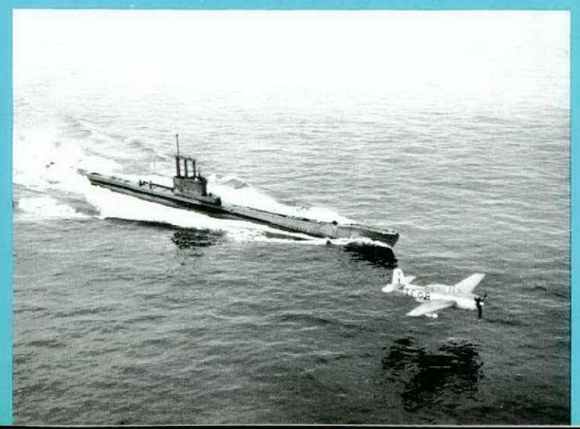
An experienced pilot was on his first ride in the right seat of a C-47. The instructor pilot in the left seat demonstrated a takeoff and stayed in closed traffic, briefing the new co-pilot on his duties in the pattern. The crew completed their before landing checks on downwind leg and turning final they were cleared for a touch and go landing. About 400 feet above the ground on short final, the instructor pilot asked for a final gear check. The co-pilot complied; however, he gave a visual thumbs down signal a little too enthusiastically, and *his swinging left hand punched the right feathering button.* The propeller came to attention in the feathered position just as it was designed to do.

The instructor, feeling the yaw and power loss, advanced both throttles slightly. Assuming they were making a missed approach, the co-pilot asked, "Going around? " and snatched up the landing gear before the instructor could say anything! Realizing he was now committed to a missed approach, the instructor applied full power to the left engine and asked the flight engineer to unfeather the right. Unfortunately, instead of unfeathering the right propeller, the over-eager flight engineer *reached up and smartly feathered the left!* The instructor was then in command of a C-47 glider.

Still unwilling to give up, the instructor called, "Landing gear down", but the co-pilot misunderstood and *lowered full flaps instead.* The instructor pilot managed to get the gear down himself, then flared and landed smoothly on the runway.

Unfortunately, someone operated the landing gear controls out of sequence, which kept the left main gear from locking full down. After touchdown the left main folded and the left wing tip and propeller were damaged.

GRUMMAN AVENGER



The "Grumman Avenger" featured in this issue "Flashback" was one of the most outstanding naval aircraft of the Second World in which it saw wide service with the USN and the Royal Navy. The aircraft carried a crew of three and was employed as a carrier or shore-based torpedo bomber, level bomber, and anti submarine patrol bomber.

The Royal Canadian Navy acquired the Avenger in 1951 and equipped two squadrons, VS 880 and VS 881 with upgraded models of the aircraft. Eventually a new model emerged which for obvious reasons was know as a "Guppy" and was used for airborne early warning as well as postdetection strike direction.

Surplus Avengers are frequently seen in Canadian skies employed as both forest fire fighting waterbombers and budworm sprayers. The 1900 horsepower Wright Cyclone engine coupled with Grummans sturdy airframe has proved a rugged and reliable performer three decades after it was initially sent into combat.

DRUGS and their place in aviation

H. D. Madill, Ph.D. DCIEM

In considering the topic of drugs and their relationship to flight safety, it is important to first establish an impression as to how a drug is defined. Drugs can be defined, in a general manner, as a class of chemical substances which when absorbed into the body alter the physiological responses in the recipient. Some of the most convenient means of defining drugs may be based upon the most prominent effects they produce, e.g., sleeping pills or sedatives, or as primary treatments for specific maladies such as hay fever remedies or pills to reduce feelings of motion sickness. Drugs are also grouped into medical or non-medical classifications depending upon their primary usage. Non-medical drugs may range from the illicit, sometimes addicting, mind altering substances to those which are legitimate and have gained wide "social acceptance".

Within the context of drug usage and flight safety, it is necessary to consider the entire broad spectrum of the definition of drugs. It has been reported many times that the drug which has been found to be most frequently implicated in affecting pilot performance is none other than ethyl alcohol, a non-medical drug.

It is to be hoped that other non-medical mind altering drugs, which do not have "social acceptance" and in fact are illegal, will not compound the problem that exists with ethyl alcohol. One of the drugs which currently remains in this class is marijuana. It has been shown conclusively to impair the performance of men and women in operating road motor vehicles. Although no comparable flight performance studies have been conducted utilizing this drug, the known effect of its use indicate that it imposes a threat to any man-machine operational task.

Drugs which fall into the medical group need to be used with caution when combined with flight operations. This group of drugs is well recognized for the treatment of maladies and sold either by the control of a physician through prescription or by over the counter sales for self medication. There is an excessive dependence by society upon the usage of drugs to modify its mildest ills. Coupled with this is the fact that there are very few drugs which are verified as being compatible with flight performance.

Various studies conducted on drug usage in countries such as the U.K., U.S.A., Australia and Canada indicate the large proportion of the population which is dependent upon the use of drugs. Estimates of 15 to 30% of the U.S. population have been reported to use over the counter drugs. In addition to this group 10 to 20% of the population has been estimated to be on prescribed drugs. Of these prescribed drugs 24% were probably of the mood modifying type (tranquilizers, sedatives, etc.). Surveys and sales information gathered in other countries, including Canada, support these figures. We are truly living in a drug conscious, if not drug dependent, society.

With these general statements in mind, it remains only to emphasize the necessity of aircrew and personnel involved with the highly responsible and often times demanding tasks in aviation, to look upon drugs with extra caution. In so doing one should have a particular regard for maintaining a close professional relationship with one's flight surgeon or a physician who is well aware of the demands of their operational role.

Self diagnosis and self drug treatment by aircrew can be a very dangerous practice. It is important that individuals seek the advice of a physician knowledgeable in the demands of flight and also drugs compatible with flight performance when requiring medical aid. Drugs which may be administered with a high degree of safety to non-flight personnel may have side effects which could become extremely hazardous in the air. The safety of a drug is not normally established for all environmental situations when it is licensed for marketing. Thus it requires the knowledge of a physician to administer only those drugs to active flight personnel which have thus far been proven to be compatible with flight.

It normally is the condition of the illness itself rather than the medication which is the disqualifying factor in flight. Pilots being normal, may have the tendency to shake off their sense of not "feeling up to par", or perhaps rely upon self medication. If in spite of the warnings against this practice which I have stated above, self medication is employed, particular attention should be paid to the fallacy "common" drugs or drug compounds.

Aspirin or aspirin compounded with codeine and caffeine should be avoided during flight unless it has been previously indicated that one can tolerate the drug. At all times, one should avoid taking aspirin on an empty stomach. Also, if one is taking a pill for its aspirin content, make sure that it is not compounded with other cold remedies. Cold remedies such as those containing anti-decongestants or anti-histaminic drugs should not be used prior to or during flight. Nasal decongestant sprays should only be used upon the advice of one's flight surgeon. Anti hay fever remedies are also not to be used before or during flight. The effective anti-histamine members of this class of compounds may produce severe drowsiness as a side effect. Stomach remedies must be taken with extreme caution. If an antacid is necessary one should only use the aluminum hydroxide gel or tablet. Anti-spasmodics to prevent abdominal cramps and diarrhoea can cause severe side effects. With respect to stomach upsets of this nature the condition is such as to cause one to seek aero-medical advice regarding its cause and correct treatment. There are many drugs and drug compounded mixtures available for purchase and self medication. As a general rule, do not act as your own physician. If you do have a requirement to self administer drugs, make sure you know what is in the compound that you are taking. As a general rule check it out with your flight surgeon first.

Regarding the non-medical drugs of social acceptance, much has already been said about alcohol thus it will not be elaborated upon here. Coffee and tea are pharmacologically active beverages. In moderate doses they may be beneficial, however it is recommended that the intake of coffee be limited to three or four cups per day.

Cigarette smoking is probably the most abused drub by aircrew. The mere fact that it is tolerated in no way makes it a drug compatible with flight. The carbon monoxide inhaled during smoking is sufficient to produce significant impairment of night vision and when it is combined with altitude in non-pressurized aircraft, the problem is greatly compounded. Studies on cigarette smoking and flight have shown that after the inhalation of the smoke from three cigarettes at least four to five percent of the blood haemoglobin (oxygen carrying component) is combined with carbon-monoxide thus reducing the oxygenation of body tissues slightly. This condition may be measured at sea level as a reduction in visual acuity and night vision which is equivalent to that produced by hypoxia occurring at 8,000 feet. If one were to smoke in a similar fashion at 9,000 feet it would produce a similar decrement in visual performance as that experienced at 12,000 feet.

It is of course to be recognized that drugs in general have greatly assisted in maintaining good health and operational capability. This is true in flight performance as elsewhere but it is also to be stressed that the maintenance of the drug aspect of one's health is better left to the specialist. After all would you not take off after putting chicken fat in your fuel tank – would you?

On the Dials

In our travels we're often faced with "Hey you're an ICP, what about such-and-such?" "Usually, these questions cannot be answered out of hand, if it were that easy the question wouldn't have been asked in the first place. Questions, suggestions, or rebuttals will be happily entertained and if not answered in print we shall attempt to give a personal answer. Please direct any communication to: Base Commander CFB Winnipeg, Westwin, Man. Attn: ICPS.

New Letdown Charts

As all readers of "On The Dials" know, a new format for all instrument approaches is being adopted. The new approach charts were developed in co-operation between MOT and DND and started appearing approximately a year ago. All the remaining approach plates will be changed to the new format as soon as Ottawa complies the data. The intent of this article is to point out some of the major differences in the new approach plates.

Explanation of the new approach plates are given in the front of the new GPH 200 and the GPH 201.

The largest change in the new plates is the category system. These categories are based on aircraft speeds. The speeds are based on 1.3 times the stall speed in landing configuration (wheels and flaps down) at maximum certified gross landing weight (1.3 VSO).

Aircraft Categories

a. 50 – 90 Kts
b. 91 – 120 Kts
c. 121 – 140 Kts
d. 141 – 165 Kts
e. Above 165 Kts

It is the intention to publish limits for categories a, b, c, and d for low altitude approaches (i.e. GPH 200) and limits for categories b, c, d, and e for high altitude approaches (i.e. GPH 201).

One of the handiest changes that has come about is the RADAR APPROACH PROCEDURES CHART which is or will be published for all major airports still maintaining PAR and ASR facilities. In the future, all aerodromes having PAR approaches will have the minima published on the approach plates for that airport. The approach plates that are now published contain all the pertinent frequencies required, type of approach, runway, runway and elevation, minimum altitude, ceiling-vis, and the glide path angle. They also contain missed approach procedures for all radar approaches. This having never been published before, is the largest and most significant change in the new radar plates.

Our helicopter professionals will be pleased to note that eventually COPTER ONLY approaches will be adapted into the GPH 200 after the amendment of the GPH 209.

Approach plates in the future will have separate blocks with the primary frequencies listed for that particular approach.

Minimum take-off and alternate limits are now and will in the future be displayed at the bottom of aerodrome layout charts for all major aerodromes. *These minima apply to civilian users only.* For military limits consult CFP 100.

For those of our readers, lucky enough to have INS (Inertial Navigation Systems) all major airports will list INS geographical co-ordinates to the nearest tenth of a minute on the aerodrome charts.

Runway widths will only be shown when less than 150 feet.

cont'd on page 23

WINDBLAST AS A FACTOR IN EJECTION

Capt. R. E. Noble and Lt. S. W. Olsen, DCIEM

The purpose of this article is to report on the injuries experienced by CF aircrew as a result of windblast during ejection, and to make recommendations aimed at the prevention of injuries in future ejections.

Many analyses have been conducted over the years in an attempt to identify conditions that cause or contribute to injury in ejection from jet aircraft. These analyses have been instrumental in identifying escape-system modifications that would enhance aircrew safety when crewmen are forced to use the last means available to them for survival.

The CF has recorded ninety non-fatal ejections from 1966 through 1974. Of these, eight crewmembers escaped free from injuries, sixty-three received minor injuries and nineteen received serious injuries. There were ten fatalities, but these are not relevant to this paper.

Table I

Non-Fatal Ejection Statistics 1966–1974
Total = 90

AVERAGE Q FORCE (PSI)	NO. OF EJECTIONS	INJURIES NIL	MINOR	SERIOUS
.56	23	3	15	5
1.3	26	3	17	6
2.4	14		12	2
4.5	6		4	2
7.5	4		2	2
Unknown	17	2	13	2
TOTALS	90	8	63	19

Definition of Serious and Minor Injuries

For the purposes of this paper, a serious injury is defined as any injury which:

- requires hospitalization for more than 48 hours within seven days of the accident;
- results in a fracture (except simple fracture of fingers, nose of toes);
- involves severe hemorrhages due to lacerations, and/or severe nerve, muscle, or tendon damage;
- injuries to an internal organ; or
- produces second or third degree burns over more than 5% of the body.

A minor injury is defined as any injury which does not meet the criteria for serious injury.

From Table II our data disclose that:

a. minor injuries are experienced through all recorded ranges of Q forces; and
b. the predominant minor injuries were facial, i.e., cut noses, lips, foreheads and muscular aches including non-specific pain with soreness behind the legs.

Detailed investigation of each ejection has revealed that the following six factors could contribute to minor injury and that windblast was not the sole factor causing minor injury:

a. Certain equipment was not used or fastened properly, i.e., loose restraint systems and/or loose parachute harness. For example, and I quote: "When my parachute opened, the Quick Release Box (QRB) moved up over my chest and struck me a severe blow on the chin". An investigation revealed that his parachute did not fit him properly.
b. The failure to use visors. For example, another quotation: "My visor was up at the moment when the birds smashed through the canopy". The pilot had facial injuries from the bird and canopy debris.
c. The absence of a negative "G" strap. Quote: I was in a negative "G" situation and was being forced upwards with the result I had difficulty reaching down for the D-ring".
d. A less than satisfactory oxygen-mask suspension system which contributed to facial injuries. Quote: "The windblast seemed quite severe; my helmet came off and the next thing I felt was the chute opening and blood running down my face". Medical examination revealed that the pilot's face was cut by the oxygen-mask suspension system.
e. The design of our ejection seats requires that the user reach (and look) down and grasp ejection seat handles or D-rings. This posture enhances the chances of injury by placing the body, particularly the head and neck in an awkward position.
f. The ejectees had insufficient time to position themselves properly prior to ejection. Their immediate concern was to get out of the aircraft.

In addition, it must be recognized that some causes of minor injuries remain obscure because the investigating medical officers may have had a problem in determining in what phase of the ejection sequence the injury occurred, i.e., during egress/windblast, tumbling, parachute opening shock or landing.

Table II

Minor Injuries – Total = 63

AVERAGE Q FORCE (PSI)	NO. OF EJECTIONS	TYPE OF INJURY
.56	15	Facial
1.3	17	Facial
2.4	12	Facial
4.5	4	Facial/Muscular Aches
7.5	2	Facial/Muscular Aches
Unknown	13	Facial

From Table III our data disclose that:

a. serious injuries, like minor injuries, are experienced through all recorded ranges of Q Forces and surprisingly, there is little difference in type of injury in the higher Q forces; and
b. thirteen of the nineteen (68%) serious injuries occurred at a Q force less than 4.5 PSI.

In addition, detailed investigation of each accident indicates that except for the burn injuries, the ejectees were poorly positioned at the time of ejection or interrupted the man/seat separation process by holding onto the ejection seat handles, or flailing as a result of windblast. For example:

a. "Q Forces .56 PSI". Quote: "I saw the houses ahead and pulled back on the stick as I pulled the alternate handle. There was a second delay and I thought the seat hadn't fired. I reached for the control column and the next thing I was conscious of was falling toward the ground". Aircrew suffered compression damage to T-10, T-12.
b. "Q Forces 2.4 PSI". Quote: "I told the Major I was going to eject. I leaned slightly forward to grasp the D-ring with both hands and sat upright as I pulled. In retrospect, I believe I never made it all the way back to the upright position". Aircrew suffered compression fracture T-7 and T-8.
c. "Q Forces 4.5 PSI". Quote of the medical member's statement. "The pilot was uncertain of his position at the time of ejection. He believes he may have been looking over his left shoulder and down when he pulled the D-ring with his left hand. His poor position in the ejection seat combined with windblast resulted in the ejectee receiving a fractured right arm, two broken ribs and compression fracture T-12, L-2".

Table III

Serious Injury – Total = 19

AVERAGE Q FORCE (PSI)	NO. OF EJECTIONS	TYPE OF INJURY
.56	5	Contusion to kidney Compression fracture T-10, T-12 Compression fracture T-4, T-6 Fractured ribs/torn bladder Burns
1.3	6	Fractured skull Compression fracture T-11, T-12 Compression fracture T-12, L-1 Compression fracture T-10, T-11 Compression fracture T-8 Compression fracture D-9, 10, 11 and 12
2.4	2	Compression fracture T-8 Burns
4.5	2	Compression fracture T-12, L-2, Fracture upper arm, broken ribs Compression factor L-1
7.5	2	Burns Burns
Unknown	2	Compression fracture T-11 Compression fracture T-10, T-11

Discussion

Our data analysis indicates that the effects of windblast are primarily minor facial injuries. There is little evidence of flail injury, however, in our opinion, this is related to peacetime flying when aircrew manage to lower the speed of the aircraft prior to ejection. Conversely, it is postulated that there would be an increase in injuries from windblast in time of hostility due to higher speeds and uncontrollable situations. This postulate is based on the ejection experience of the United States Navy in Southeast Asia.

It is perplexing to those involved with the design of escape equipment to learn that one pilot may eject at a speed in excess of 300 knots and escape relatively free from injuries, whereas another may eject under similar circumstances and suffer serious injuries. Fifty-five percent of CF ejections studied occurred at less than 300 knots and seventy percent at less than 400 knots.

This study of each ejection indicated that where maximum use was made of the restraint system and the time available to prepare for ejection, the ejectee decreased his chances of serious injuries. Furthermore, the types of serious injuries illustrated in Table III indicate that the position of the aircrew prior to ejection is much more significant than windblast. While there may be cause for concern over the potential injuries as a result of windblast at high Q Forces, our experience has been that these injuries have been minor in nature and were similar at all Q Forces. Thus, although windblast has major injury potential, our evidence points to the inadequacy of helmets, restraint systems or lack of positioning devices as major factors resulting in serious injuries during ejection.

The high incidence of facial injuries is in our opinion unacceptable. There are helmets available that will provide facial protection. However, except in special applications, the expense and trade-offs, such as visual restrictions and weight of these helmets, exclude them as an item in the aircrew personal safety equipment inventory.

The number of aircrew receiving serious injuries is equally disturbing. True, the design and production of ejection seats is complex and expensive. Nevertheless, to protect our aircrew the ejection seats should have better leg restraints, and especially, arm and head restraints. The additional cost would be trivial.

Because we have very few ejections, it is possible that our aircrew become complacent about their escape equipment. Aircrew should be (and in most instances are) kept informed of the merits of their escape equipment, particularly the action they can take to enhance their chances of an injury-free ejection. But in addition to this there should be a greater emphasis on the periodic use of the ejection seat trainer.

Our data indicate that the present ejection seat equipment will perform reasonably well though with some risk of injuries. The threat of injuries is compounded in times of hostility when a crewmember may be concerned with escape and evasion following a parachute landing. The ultimate prevention of injuries during ejection is the elimination of the need for ejection. Until this is achieved, however, we *must* be concerned with the protection of the man to the very best of our ability.

Conclusion

The problem of aircrew receiving injuries from windblast during ejection may never be fully resolved. However, the provision of improved helmet equipment and restraint systems combined with an education program on all aspects of ejection, can greatly enhance the possibility of escaping injury on ejection.

Recommendations

Based on the CF Accident Statistics Relevant to Windblast, it is recommended that:

a. helmet designers and manufacturers produce a helmet that will provide facial protection but not at the expense

of other requirements;

b. ejection seats have not only leg but arm and head restraints; and
c. responsible authorities ensure that aircrew are kept fully informed on all aspects of ejection with emphasis on the use of the ejection seat trainer.

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a canopy knife can save your life

The point where a normal landing can turn into an emergency, or where a controllable emergency deteriorates into something else is unpredictable. In such instances, crew kowledge of cockpit evacuation techniques may make the difference between life and a flaming death. This was certainly the case for an F-4 crew who had no idea their night approach would end in disaster.

Lightning and heavy rain made ground communications very difficult, and turbulence buffeted the aircraft about the glide path. Rain also hampered ground radar returns, and the GCA controller strained to follow the trace pattern on his scope.

The crew reached decision height, searched ahead, and could see only rain and darkness. Then a tremendous force wrenched the aircraft and threw the men against their straps. They felt the aircraft shudder crazily and spin to the right, but didn't see the rice plants a feet below them, nor realize that the landing gear and right wing had just sheared off against a mound of mud that divided two fields.

The pilot rode in confusion as the plane careened forward, throwing up giant sheets of water. But the PSO reached down and grasped the lower ejection handle. A sharp tug, a hazy combination of sensations, and he and the seat arched upward into the night sky. Moments later, he felt the sharp tug of parachute deployment and an almost simultaneous ground impact.

Trapped By Fire

Aircraft and pilot continued over another earthen mound, then the pilot sat stunned in a dark silence broken only by the crackle and reflection of fire. Seconds later, he realized the danger he was in and forced himself into action. Releasing his body from the seat, he attempted to open the canopy, but movement of the normal selector lever brought no reaction. He pulled the canopy emergency jettison handle, and nothing happened. Then he rotated the manual unlock handle and pushed up on the plexiglass with all his strength, but it wouldn't give.

Rivulets of water running down the outside of the canopy shell just inches from his eyes reflected the orange glow of a fire burning forward. He had exhausted all normal means of egress, and he realized that entrapment meant death. Then he saw the canopy knife by his left arm, took it from its retainer, and stabbed upward repeatedly.

Cracks appeared, then shards of plastic fell into the cockpit. He continued chopping upward until the hole was big enough, then took off his helmet and pulled himself through. Quickly slipping down over the nose of the aircraft, he splashed away from the fire which, except for a canopy knife, might have been his funeral pyre. His steps carried him to the PSO, who had escaped with only a sprained ankle.

Knife Technique

The F-4 Dash One states that canopies should be retained during all emergencies (except ditching) that could result in a crash or a fire. This recommendation is based on the premise that canopy protection outweighs entrapment hazards. But it also means that other crews might need to hack their way out of an aircraft.

During an informal test conducted recently at Shaw AFB, a crewmember broke through the rear canopy of an F-4 and hoisted himself out of the cockpit in less than 15 seconds. It took just four strokes with the canopy knife.

As with everything else in the military, there is a recommended way to use the knife. The handle should be held securely with one hand, and the other hand should be placed palm up beneath it to provide driving force. The knife cutting edge should face the user to prevent the angled blade from slipping back toward the user's hand and head. A few strong upward strokes should shatter the plastic and open the way for egress. Areas close to the canopy frame will not give way as easily as those at top center.

The canopy knife is a crude instrument. But it has been successfully used in the crude circumstances for which it was designed. It can save your life.

(Adapted from a report by Michael Grost, Field Representative for Martin-Baker Co. Ltd.)

Airscoop Feb 75

cont'd from page 19

Enroute facilities will be shown on plates when these facilities and fixes are beyond the distance of the inner ring and when they are designated as part of the procedures for transition, initial approaches or missed approaches.

Airports having RVR capability will report RVR equivalent to published visibility minimums in the minima box on each approach plate. Also published in the minima box will be the HAA (Height Above Aerodrome) for each ceiling minimum mentioned. Ceiling minimums on the new charts have been rounded off to the next higher twenty foot increment. No more trying to fly at an MDA of 333, etc.

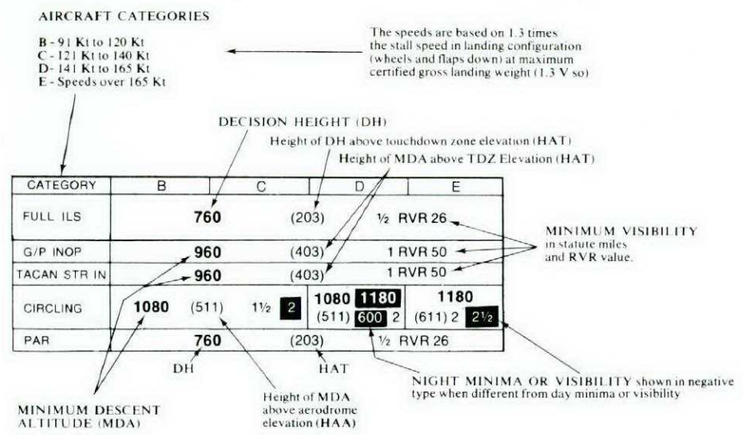
There will only be one spot height or obstruction shown inside the inner ring on each low altitude approach plate. This will be the highest obstacle within the inner ring based on the facility for that approach. On the high altitude approach plate an additional obstruction between 10 NM and 20 NM will be shown if higher than the obstruction or spot height within 10 NM.

Procedure to identification (e.g. ILS, NDB, VOR, etc) indicate types of facilities on which procedure is based. Runway number is given when procedure can be used for straight in approach. Procedures for an aerodrome are published in the sequence NDB, RNG, VOR, TACAN, LOC (BCRS) RAR, ILS, SID, NOISE ABATEMENT, AERODROME CHART AND PARKING AREAS.

ILS-NDB: Denotes two instrument approach procedures on one chart.

ILS/VOR/DME: Denotes one instrument approach procedure and describes the navigation equipment required to conduct the procedure. The procedure is not authorized when any of the listed components are not available or not in service.

The difference in the two approach plate systems is quite wide and because of the new approach plates, close attention to all your letdown plates becomes even more important than in the past (if this is possible).



Comments to the editor

Dear Sir:

Upon first seeing the cover of Flight Comment, Edition 2/75, I knew that sooner or later I would make an attempt to paint it in oils. In that respect and although the aircraft in the foreground is self-explanatory, I would very much like to know the name of the castle in the picture and its possible location.

I plan this project for the winter months and I appreciate any assistance you may be able to give me; at your convenience, of course.

Thanking you again, I am.

Yours truly,

Aurea LeBlanc (Mrs.)

The castle is the Schloss Hohenzollern at Hechingen which is about 40 miles southeast of Baden Soellingen. The CF104 aircraft was piloted by Capt Muncy of 421 Tactical Fighter Squadron and the photo bird by Maj "Hank" Morris, recce pilot par excellence also of the "Fightin Four Two First"

J.D.W.

Dear Sir,

For some unexplained reason, I have found the last few issues of Flight Comment to be of far more interest to even we recreational pilots than previously. . . not quite so much technical overtone I suppose.

However, Edition 2/75, contained some conclusions from a NTSB bulletin which sound rather profound, but at which I, as a sport pilot, take exception.

It is with the profile of the private

pilot most likely to be involved in a fatal accident. . . no instrument rating, pleasure flight, one passenger, adequate briefing, less than 50 hours during preceding 90 days.

As an active participating recreational private pilot, an officer and director of numerous clubs and whatever in the civil area, I must point out that such a profile probably describes 95% of all private pilot flights, so it would follow that the group would tend to have the accidents and therefore become a questionable statistic.

Unless the NTSB provide a profile for the pilots carrying out SUCCESSFULL flights as a comparison, the statistic is MEANINGLESS.

It is like saying that auto accidents involved people who were most likely driving cars. This less than 50 hours during the preceding 90 days infuriates me. . . the private pilots NORM is 50 hours per year, yet most of us NO NOT CRASH. At $20 per hour, the magic 'tut-tut' phrase would cost $1000 per three months, and there are not many of us able to hack that, we pay our own way, you know.

My friends fly every possible weekend, one or two hours per day, but with family commitments, maintenance requirements, upcoming possible relicensing requirements and the weather . . . we're lucky to get five hours per month. . . and yet, very, very few of us go boring off to get killed.

Those that do, more than likely have some personality problem, descreetly refered to in your magazine as. . . Sierra Hotel. . . a trait not appearing in the statistics.

Sincerely,

Tony Swain
Western Director, EAA Canada

The Editor, being the owner and flyer of a de Havilland Tiger Moth is well aware of the problems of civil lightplane pilots, and has spent some 2500 hours pondering on this area of aviation. We in Flight Safety must concentrate unfortunately on those who "DO CRASH" or "HAVE CRASHED" or even "MAY CRASH". We just try to help those who might otherwise "go boring off to get killed" and perhaps aid in the resolution of their personality problems. Your letter and your involvement with the experimental Aircraft Association show that you too are involved and concerned. Its just a pity we don't have more time to congratulate all the competent and dedicated civilian aviators (general aviators?). Canada has thousands of them. *J.D.W.*

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Comments to the editor

Dear Sir:

Your May/June issue with the Mitchell Flashback article and comments about making history work for us, took me back thirty-odd years to the fateful days of aviation that were World War II. As a young country boy completely in awe of flying and aeroplanes, I considered myself fortunate to live within a relatively short distance of three Commonwealth Air Training Plan bases.

With the yellow painted aircraft constantly overhead, I soaked up every bit of information I could get my hands on about the Training Plan, aircraft, and the aircrew, and dreamed about the day when I could enlist and fly up there with them. I remember I kept a note book in which were carefully recorded the serials of every aircraft that came close enough (and quite a few did) and my idea of a real treat was a Sunday afternoon visit by car with my parents to one of the RCAF airfields to watch the planes take off and land.

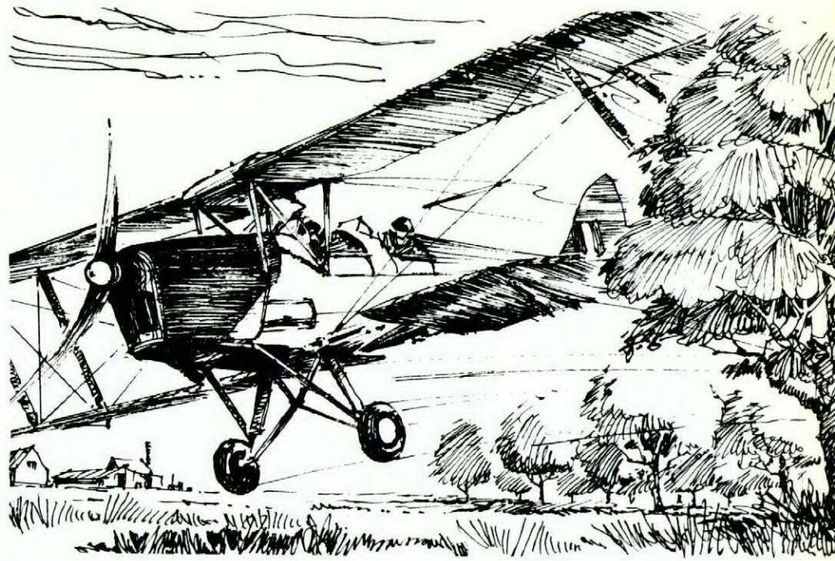
I suppose the young men who were up there learning their deadly trade possessed the same feeling of intoxication and adventure about flying as I, for many of them were just a few years older. The exhilaration which I finally came to know years later in civilian flying probably masked the dangers for some, and the lucky ones of these who did not take their vocation seriously learned not to repeat their transgressions. For too many, however, there was no second chance.

Dispite the fact that I had witnessed a wheelsup landing by a Harvard and later saw the non-fatal result of another crack-up caused by a pilot who had allowed himself to run out of fuel, I still did not comprehend that there were risks in flying. I was not prepared therefore when a tragedy happened close by which was to throw a pall over me and my enthusiasm for aviation for many months.

With thousands of Commonwealth trainees visiting our country, it was not uncommon for Canadian families to extend their hospitality to young men on leave. Many of them had never been away from their homeland, and the opportunity to enjoy the Canadian countryside was a welcome respite from the vigorous training schedules.

Two of these young men from an EFTS station nearby had visited a farm a couple of miles down the road from where I lived and had promised the two daughters of the family to repay the hospitality received by an aerial visit. They were as good as their word.

A Tiger Moth appeared over the farm the following week and proceeded to buzz the buildings and surrounding area.



An apple orchard, with neat rows of trees where the young men had strolled with the girls just a few days before, unfortunately presented a challenge to the unwary pilot. He brought the Moth down almost to ground level and attempted to fly between the apple-laden branches. As the girls watched in horror, a wingtip contacted one of the trees and the plane struck the ground, violently cartwheeling for some distance before coming to rest.

The fuel tank mounted in the top wing centre section was torn open by the crash and its contents drenched the young flyers trapped in the wreckage. The hot engine manifold did the rest.

This terrible wastage of young men was probably repeated many times during the war judging from histories published since, and contrary to what I would have thought, it was not confined to the young inexperienced fledglings who had not as yet developed respect for their machines. At least one seasoned ace is said to have died unnecessarily during the low-level 'stunt flying'.

With the advent of the jet age, aircraft became less forgiving and imprudence is now much more apt to have fatal results. I believe Santayana summed it up when he said if you do not profit from history's mistakes you are bound to repeat them.

Sincerely yours,

Robert Rickerd
31 July, 1975.

Thank you sir, for your letter and for your interest. Santayanas famous statement couldn't be more applicable if he'd been a flight safety officer. We hate to "harp", but we see precious few "new" accidents, just replays of the old favourites. It's sort of like summertime TV – but sadder. *J.D.W.*

Failures are made not by those who dare to fail but by those who fail to dare

Lester B. Pearson