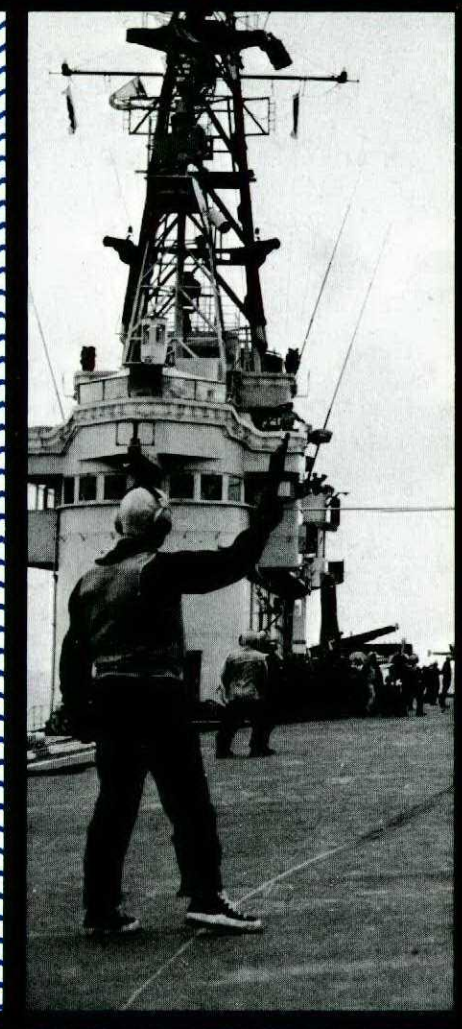
FLIGHT COMMENT

JULY · AUGUST · 1968



Maritime Command

Comments

On a square pattern radar approach eight miles from homeplate a 104 pilot noticed another 104 pass a breathtaking 100 feet in front at the same altitude. Twenty seconds *after* the near-miss the unknown intruder registered as a pop-up target on radar – a case of better never than late. IFR in-the-clear means HEADS-UP!

".. . I began feeling out-of-sorts with a slight touch of lightheadedness. . . I felt quite warm although the cockpit temperature was cool." This malaise lingered for about an hour after an emergency landing. The pilot wisely returned to base but less wisely flew in the first place with an infection he'd had for several days causing a mild fever and hence the light-headedness. The consequences of his initial error in judgement would have been potentially disastrous had he not been a short local mission on a bright sunny day.

Most of us can abide less-than-satisfactory curcumstances for a short while – if improvements are in the offing. But look at the Dakota gust lock; for well over a quarter of a century they've been a perennial nuisance. Have we become so accustomed to this menace in our midst that we still – even this year – damage aircraft by use, misuse, or non-use of these gadgets? Are there others like this one around?

An alert technician doing a BFI on an Expeditor smelled de-icer fluid in the oil tank when checking its contents. There was 1½ gallons of the stuff in the crank case. As the aircraft was replenished at several bases it was impossible to trace the error. These fluids are both stored in 45-gallon drums. . .

The article "Consider. . ." in the Nov/Dec issue was incorrectly attributed to three authors, whereas it was F/O RF Best who wrote this pointed piece of prose. (Like many other items in Flight Comment it has been re-printed in another flight safety magazine.)

cont'd on page 3

CANADIAN FORCES HEADQUARTERS — DIRECTORATE OF FLIGHT SAFETY

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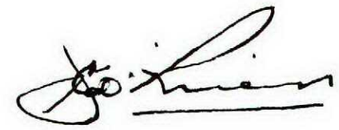
ROGER DUHAMEL, F.R.S.C.
Queen's Printer and Controller of Stationery
Ottawa, 1968

FLIGHT SAFETY IN MARITIME COMMAND

This issue of Flight Comment features Maritime Command; it is my purpose in these introductory remarks to stress the importance of safety involvement and to emphasize those aspects of our flying activities requiring application of the principles and aims of the safety program. With its operational role exercised daily, Maritime Command faces problems and situations peculiar to the environment. The challenge of anti-submarine warfare requires our pilots to exploit their aircraft to the limits of safety in conditions of severe weather, fatigue, and limited navigational aids. We accept the risks of operating from a rolling ship under IFR conditions with no alternates, or conducting extremely low-level tactics at night or on instruments – but only in the knowledge that our pilots appreciate the vital need for vigilant adherence to the principles of flight safety.

These risks and the severe penalties of air accidents mean high-priority for our air safety programs. As a result we have made considerable progress in reducing the probability of mishaps. For example, technical refinements such as radar control, the angled flight deck and mirror landing system, ignition analysers, and better anti-icing equipment have contributed to the safety of flight. On the other hand, flight safety is concerned also with the handling of aircraft on the ground or on deck. The reduced number of more costly aircraft we are now operating makes a ground handling mishap today more expensive than ever before not only in terms of dollars but in loss of operational effectiveness. While continuing to concentrate on air safety, it is toward the ground handling operation that safety programs must direct a special effort. To this end it is essential for everyone who is directly or indirectly associated with the operation of aircraft to feel personally involved and responsible for the safety program. If this can be achieved we will have taken a forward step toward our goal of eliminating accidents entirely.



REAR ADMIRAL J.C. O'BRIEN
COMMANDER, MARITIME COMMAND

Safety at Sea

by
Lt S. Brygadyr
HMCS Bonaventure

Aviation safety at sea is a way of life; the environment leaves little or no margin for error . . .

At sea, promoting safe operations to protect men and equipment is paramount – or to put it another way – commensurate to the environment. For us, this "commensurate to the environment" is important. Can you compare an operation in which a CHSS2 Sea King helicopter hovers tethered above a pitching DDH, and helicopter operations ashore? Or, compare landing an aircraft on 8000 feet x 200 feet of concrete, to landing a Tracker on a 400 x 60 pitching deck on a black night. Mad, you say? Well, not quite – just believers in the system.

Aviation onboard Bonaventure creates its share of apprehension – and its rewards. In such a climate, safety consciousness among the aircrew, maintenance crew, flight-deck crew, operations or air direction personnel stems from an awareness of the consequences of error.

The operation today is a far cry from aviation on previous RCN carriers. Safety has been tremendously enhanced by the addition of the steam catapult, angled flight deck and mirror-landing (Fresnel Lens Optical Landing System); these are all incorporated on the Bonaventure – and most other modern carriers. With these aids, an experienced aviator takes operating from "Bonnie" as *relatively* routine.

Why does safety at sea encompass the handling of aircraft to a greater degree than it does ashore? First, the Trackers – relatively large carrier aircraft – operating on a 700 x 80 flight deck create a pretty tight squeeze. It's even tighter when you put two-thirds of our birds in the hangar which is approximately one-third the size of the flight deck area. Now, change an engine or some other major component under these conditions while the hangar is in motion! Or taxi an aircraft into the deck park area with props turning inches away from other aircraft and your undercarriage inches from the deck edge. Throughout these maneuvers an amazing fact stands out – accidents are rare! This isn't Lady Luck – it's following procedures to the letter. A very thin line separates safety from disaster.

Safety in the air when operating from Bonaventure also differs to some extent from shore operations, especially in the recovery phase. The object of the exercise is to recover the aircraft in the shortest possible time to minimize the ship's vulnerability (steady course into wind). When operating under IFR conditions, for example, separations of 2 minutes or 500 feet are used. Strict adherence to procedures is required since relatively minor deviations in pattern, altitude, airspeed, timing or distance (TACAN fix) can make the operation somewhat hazardous.

And the actual landing? The navy trains persons to monitor the final phase of the approach to touchdown and to offer assistance if required; he's the Landing Safety Officer (LSO). He believes there is no such thing as a bad landing – very seldom, anyway! – only bad approaches. The bad ones are corrected by a wave-off.

The aviation safety record of HMCS Bonaventure is a good one. The environment is harsh but a sustained, dedicated effort has contributed to a safe and efficient operation. Each one of us realizes that safety cannot be taken for granted although it has become a way of life in which there's little or no margin for error.

Lt Stan Brygadyr, a native of Edmonton, joined the RCN Venture Officers Training Plan in 1957. Since his flying training in 1960 with the RCAF he has served at CFB Shearwater on Trackers in VU32 and then with VS880 for over four years. His tour included operations from HMCS Bonaventure and several USN carriers as a pilot and a Landing Safety Officer. Lt Brygadyr is presently serving with AETE as a member of VX10, Shearwater.

Comments (cont'd)

A spokesman for the Flight Safety Foundation in New York said recently "The sooner all flights into highly congested metroplex areas are integrated to include everyone using the airways, the sooner general aviation accidents can be reduced. Too many people are dying needlessly because of the positive control gap. Lack of standardization also holds true for flight instruction in general aviation. Standardization must be established, and a high quality standard introduced and maintained. Federal regulation is the positive approach to this problem . . . A strong requirement still exists to implement the mandatory use of crash position indicators on all aircraft. Many lives could be saved that are now lost because wreckage of aircraft are often concealed in desolate mountainous terrain. . . The FAA ruling requiring the introduction of non-flammable materials in aircraft cabins should reduce the risk of loss of lives resulting from smoke and toxic fumes . . ."

In a review of recent aircraft accidents ICAO called attention to the "Need for emergency access roads along the extended centreline at both ends of runways to permit rapid access to the site of an accident occurring during takeoff or landing." There's several airports that – to put it charitably – need improving. Would any one of these long-pending projects be hastily accomplished after a tragedy had substantiated this vital requirement?

Here's a few thought-provokers from a ranking expert in the field of human factors: "... It is my personal opinion that we have been successful enough in the knowledge and skill area to make it secondary to the psychological factor in accidents. An angry person is a dangerous person. A low motivated person is a dangerous person. An over-anxious person is dangerous. A person who doesn't respect himself and others (these usually go together) is dangerous. And perhaps the most dangerous of all is a degraded person whose company or peers or family have made him feel unimportant. These are some of the qualities which I feel are primary concerns now in our safety efforts. I would like to tentatively extend Murphy's Law: *If something can be done wrong, it will be – by someone who psychologically needs to do it wrong.* Can't accidents just happen? Can't they happen for lack of know-how? To this I say an emphatic (most of the time) – NO!"

The pilot said *"passing through nine zero"* but the approach controller's initial interpretation of this was *"passing two nine zero"*. If the error had not been recognized, the controller could have given descent instructions that would have caused aircraft to hit high ground. That's just one of the pitfalls in terminology; all pilots and controllers must be constantly on alert to recognize and avoid them. Don't say things that could be misinterrupted!

The record of the past year or so proves that pilots are reaching for – or not reaching for – the undercarriage lever with the competence displayed in previous years. So far, the recent past has seen:

- gear dropped at excessive speed
- wheels-up landing
- water landing with wheels down
- gear raised before fully airborne
- gear raised on ground.

Whatever happened to the old-fashioned check list?

Climatic Briefings

The Flight Safety survey report pointed out the continuing requirement for aircrew climatic briefings.

– Flight Safety Committee

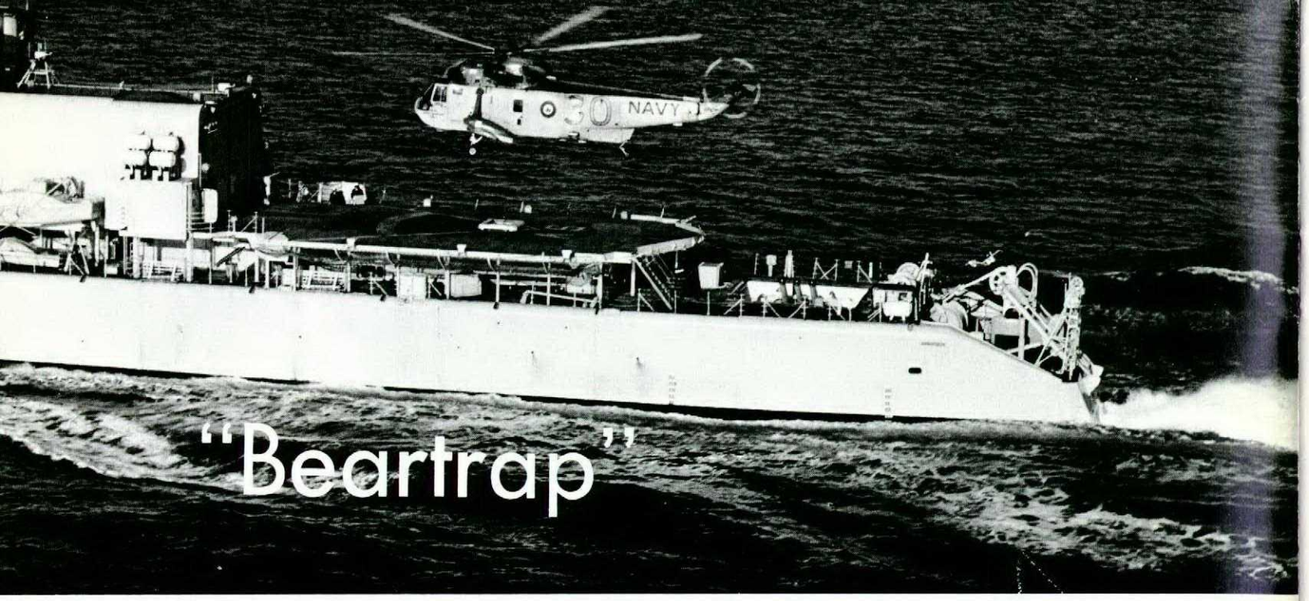
Aircrew and groundcrew of the last flight.

Quite a Record...

Eighteen years without death or injury...

The history of 2(M)OTU encompasses eighteen years and 81,700 flying hours. The 2516 aircrew officers and NCOs who graduated, flew 51,367 of these hours and accomplished this without death or injury – a commendable record indeed.

In 1960 another unit was formed – the FTTU – which trained 475 technicians for the Neptune aircraft. Both the OTU and FTTU deserve everyone's praise for this extraordinary flight safety achievement.



"Beartrap"

Landing and taking-off a 9½-ton helicopter from a pitching or rolling deck calls for skilful piloting . . .

(At the time of writing night flight operations and IFR flight operations have not been approved. Experimental Squadron 10 at CFB Shearwater is presently evaluating these areas of operation. Therefore it is not the writer's intention to speculate on hazards in night and IFR operations. The flying operations discussed pertain to day VFR.)

One of the most challenging roles in helicopter flying in the Canadian Forces is being conducted from Maritime Command's helicopter-carrying destroyers (DDH). Landing and taking-off a 9-1/2-ton helicopter from a pitching or rolling deck calls for skilful piloting, although this is only one area where flight safety must be emphasized.

Recovery is the most crucial phase of the flight. The pilot must land the helicopter on a moving deck and secure it to the ship in minimum time. The special equipment consists basically of the helicopter "messenger" winch system, the main and tail probes, the ship's hauldown system, the "Beartrap", the Landing Safety Officer's control console, and two gyro-driven artificial horizon bars mounted on top of the hangar.

To land, the pilot flies the aircraft – a Sikorsky CHSS2 Sea King – over the flight deck from astern and establishes a 16-18 foot hover. A "messenger" cable is lowered to the flight deck, whereupon a man attaches it to the ship's hauldown cable. The messenger cable is then reeled back into the aircraft. At this time the Landing Safety Officer at the control console applies 1500 lbs tension; this assists the pilot to maintain an accurate hover over the "Beartrap".

The pilot's primary reference for maintaining his position are the horizon bars located on the hangar top. These hover reference points continually change – particularly when the ship is in heavy seas. When the ship rolls, for example, the Beartrap on the deck being closer to the rolling axis of the ship than the hangar top, is displaced less than the hangar-top reference points. The pilot must therefore continually interpolate the visual information presented by the horizon bars, resisting the tendency to follow their lateral displacement.

Establishing and maintaining the correct fore and aft position over the Beartrap becomes more difficult as the pitching of the ship increases. The normal reference points on the hangar top move toward and away from the aircraft as the ship pitches. This does not normally result in dangerous over-controlling although when coupled with the ship's rolling, adds to the difficulty of maintaining the proper hover position.

The two criteria necessary before initiating a descent to landing are a proper hover position over the Beartrap and a "steady deck". Even in heavy seas steady-deck periods occur at regular intervals. These periods usually last 7-11 seconds. When these two requirements are simultaneously met the LSO applies 3000 to 4000 lbs of tension and instructs the pilot to land. The pilot lowers the collective, establishing a rapid rate of descent of approximately 6 feet a second.

If the pilot or LSO is not satisfied with the descent path, the ship's steadiness, or any other factor affecting the safety of the landing, a wave-off is made. The helicopter has the power to overcome the hauldown force; the pilot can therefore return to the hover without fear of over-torquing the engines. If the landing is continued the main probe must come to rest within the confines of the Beartrap. The inner dimensions of the Beartrap are less than four feet square allowing little margin for error. Once the aircraft is landed on the deck, the LSO actuates the Beartrap and the helicopter is secured to the ship.

A "free deck" landing may be conducted if the hauldown system fails. In this operation the aircraft is hovered six to eight feet above the deck and is not attached to the hauldown cable. In heavy seas maintaining a hover over the trap without the centering effect of the hauldown cable requires a pilot's maximum efforts. As the ship slides across a wave the pilot must be prepared to make immediate corrections unassisted, as there will be no centering effect. A landing is made upon instructions from the LSO only when he judges the aircraft to be properly positioned over a steady deck.

Lowering the messenger cord.

Sitting astride the Beartrap the Sea King has just completed the hauldown landing.

Puzzle: find the working space.

The coordination between the pilot and LSO is considerable. A small error in depth perception or failure to adhere to standard voice procedure could result in the aircraft missing the Beartrap causing an accident or incident. Procedure standards cannot be over-emphasized.

A helicopter detachment normally consists of only twelve technicians. This usually means that every man is required to service and maintain these sophisticated aircraft. In some areas of maintenance only one specialized technician is on board. He is irreplaceable and may be required to perform his tasks in spite of the hour, sea states (or upset stomach), in order to maintain operational readiness.

Maintenance and servicing technicians on the DDH are subjected to working conditions completely different from those ashore. The working space is limited (see photo), poorly lighted, and often filled with fumes exhausted from the ship's funnels. The pitching and rolling of the ship creates many problems. Attempting a precision mechanical adjustment to a delicate aircraft instrument when the ship is rolling over 20 degrees can be a discouraging and frustrating task. Picture a technician standing on a servicing panel attempting to grease the main rotor head while the ship is rolling and pitching. Half of the man's attention and efforts must be devoted to self-survival!

Imagine a man working on an engine; tools and parts are lying on the servicing panel. Suddenly the ship turns into the seas and lurches. Screws, bolts, washers and tools are sent flying. This type of occurrence could easily result in foreign objects being deposited in the engine intake or some other inaccessible region. A technician would have difficulty accounting for all these items with the ship's violent movements hurling them to all corners of the hangar.

Fatigue is a problem affecting both aircrew and groundcrew. Of the many factors that can induce fatigue, one peculiar to this operation is ship motion. One need not spend much time aboard a pitching and rolling DDH to feel the onset of fatigue. It's caused primarily by the continual muscular effort required to maintain body equilibrium.

In high seas sound sleep is difficult to attain. Little can be done to alleviate this problem; ship stabilizers while helpful in minimizing roll cannot prevent it completely. Moreover, they have little or no effect on pitch. Because they generate noise and slow the ship it is sometimes tactically unfeasible to use the stabilizers except during launch or recovery. While it is true that fatigue associated with ship's motion decreases once persons have gained their sea legs, it normally reappears as the sea state worsens.

And there's always the exposure to *mal de mer*.

The helicopter destroyer program has an unblemished safety record. Credit for this must extend to all those from CFHQ planning staffs to the most junior men in the ships. Maintaining this record will call for continuing effort as the helicopter-destroyer concept advances to the fore in ASW efficiency.

Hold that tiger. . .

At a recent flight safety conference, an officer observed that "...many incidents are created and caused by an individual's mistaken definition of the term 'tiger spirit'. Agressiveness is an enviable pilot trait in carrying out the mission but it must be weighed against a safe return of the aircraft..."

Good Show

LT (N) W. HALLADAY

Lt W. Halladay of HMCS Bonaventure, experienced a sudden aileron jamming in his Tracker while attempting a port turn during a night mission. The controls moved freely to the right but jammed to the left, requiring strenuous effort to achieve even small aileron movements. This compelled Lt Halladay to use starboard turns for the remainder of the flight.

After announcing his problem, he was vectored into a starboard Carrier Controlled Approach (CCA) instead of the conventional left-hand pattern. Lt Halladay was set up four miles out and he commenced his night letdown under CCA procedures. At one mile from the carrier he lost all port aileron control but continued, using heavy rudder and staying slightly high. Lt Halladay performed a successful night deck landing.

A flashlight was found in the vicinity of the port spoiler control rod; after the flashlight was removed, control movements were normal.

Lt Halladay displayed outstanding airmanship and judgement in making a night carrier landing under extremely challenging conditions.

CAPT J.M. HANNAH

On rolling into his penetration turn for recovery after a training mission in a CF104, Capt Hannah experienced an abrupt deceleration of the aircraft and engine noise which indicated it was running down. Before he could effect any emergency procedures the engine auto-accelerated to 106% with unusually high and fluctuating oil pressure. The kicker began to fire inadvertenly.

Declaring an emergency and calling for a full-stop GCA he discovered that the throttle position had no effect on rpm but thrust could be changed somewhat with nozzle control. On the approach, Capt Hannah had to contend with thrust which was significantly higher than normal. At touchdown, he flamed-out the engine, thinking not only to reduce thrust but to avoid burning his dragchute. As it happened, the chute was soaked with fuel and did not deploy. The aircraft was slowed with careful braking to avoid a brake fire, and engaged the barrier at slow speed.

Faced with a night emergency during which cockpit lights temporarily went out, Capt Hannah with skill and good judgement was able to bring the aircraft to land in a fine display of flying ability.

Capt J.M. Hannah

Capt W.H. Fell

CAPT J.M. McKAY

Upon returning to base from a low-level training mission in an F86 Capt McKay selected undercarriage down in preparation for landing. The starboard gear indicated unsafe and was confirmed to be in the fully retracted position by the tower and another aircraft. Emergency procedures were to no avail, so he attempted a landing utilizing the starboard droptank as a skid.

Capt McKay performed a well-executed approach and landing bringing the aircraft to rest just off the runway centreline. In a fine display of flying skill the aircraft was landed with no damage being sustained other than to the droptank.

CAPT W.H. FELL

Capt Fell was on a dual flight in a Chipmunk when, on levelling off at circuit altitude, a sudden power loss occurred. The power then fluctuated between idle and 1900 rpm with severe rough running.

Declaring an emergency, he told the student to use engine prime with which he got some power in surges, and was given permission to land on an out-of-wind runway. Capt Fell was able to fly the aircraft to a successful forced landing on the runway.

The carburettor flame-trap screen had broken; portions of the screen material had become lodged against the throttle valve in the carburettor throat preventing normal throttle movement.

Captain Fell's knowledge of his aircraft and the high degree of flying skill displayed throughout this emergency is indeed worthy of commendation.

CPL J.M.R. OUELLET

Cpl Ouellet was on duty as GCA operator when he was called upon to handle a very tight emergency in bad weather. A T33 was in a critical fuel emergency from having to overshoot from three approaches because of an unserviceable undercarriage. In marginal weather – 200 feet broken and 3/4 of a mile visibility in rain and fog – Cpl Ouellet in conjunction with the DOT terminal control was instrumental in ensuring a safe outcome to a very tense situation.

Cpl J.M.R. Ouellet

Cpls H.L. Robertson & H.J. Morrison

Despite the poor weather and the pressure of a fuel emergency, Cpl Ouellet calmly, skilfully, and decisively contributed to saving a T33 aircraft.

CPLS H.J. MORRISON & H.L. ROBERTSON

On duty in the operations room of a northern radar unit, Cpls Morrison and Robertson received a call from the Department of Transport requesting assistance to locate a civilian aircraft lost in bad weather and without navigation equipment. Quickly and efficiently a fix was made and Cpls Morrison and Robertson provided flight-following for the remainder of the trip As a result of their locating this aircraft the pilot was able to pinpoint himself and make a safe landing at destination.

Not only was their locating this lost aircraft a demonstration of competence in their trade; their knowledge of flight-following procedures and techniques and coordinating the search with other agencies brought a quick end to a search where time was of the essence. In possibly saving the pilot's life Cpls Morrison and Robertson contributed to the safety of flight for those who overfly the Canadian winter bush.

CPL J.E. BOUDREAU

An Argus returned to the ramp from a training mission and was parked with engines running for a crew change-over. It was then that Cpl Boudreau noticed that all flight controls except the port elevator were in the controls-locked position. Examining the elevator more closely he detected an eyebolt protruding between the elevator and the horizontal stabilizer. This eyebolt had become disconnected from the control-lock actuator; the elevator was thus unlocked and the eyebolt was restricting the elevator down-travel. The captain was informed and the mission cancelled.

Undetected, this eyebolt could have created a hazardous flight control restriction. Cpl Boudreau's alertness and integrity resulted in a substantial contribution to flight safety.

Cpl J.E. Boudreau

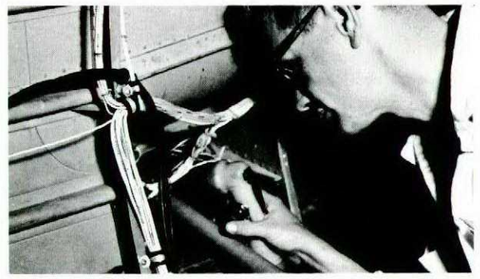
Cpls J.A.L. Croteau & J.M.G. Vallée

CPLS J.A.L. CROTEAU & J.M.G. VALLEE

While on a periodic inspection, Cpls Croteau and Callée discovered minute cracks in the main fuel lines in the T33's speedbrake well. That these cracks were very difficult to detect attests to the care with which these technicians performed their routine inspection Their discovery led to five more aircraft being found in the same condition. These cracked main fuel lines created a very serious flight safety hazard; the fact that other aircraft in similar shape were overlooked indicates the high degree of close security given by Cpls Croteau and Vallée.

CPL A.T. STENSON

During a primary inspection on a Yukon, Cpl Stenson discovered a condition which could have culminated in disaster had it gone undetected. It was while he was in the tail section of the fuselage inspecting the rudder



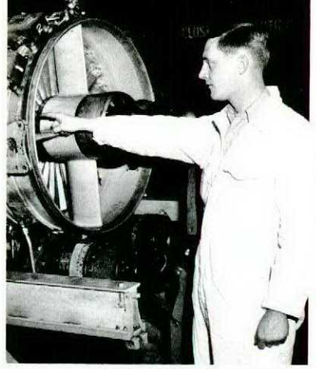
gearbox that Cpl Stenson decided on his own initiative to extend the area of inspection beyond that called for in the schedule. In so doing, he noted that the elevator trim torque tube universal joint was missing a retaining ring. This could have led to separation or severe binding of the torque tubes.

Cpl Stenson's integrity and pride in his work led him to a praiseworthy contribution to flight safety.

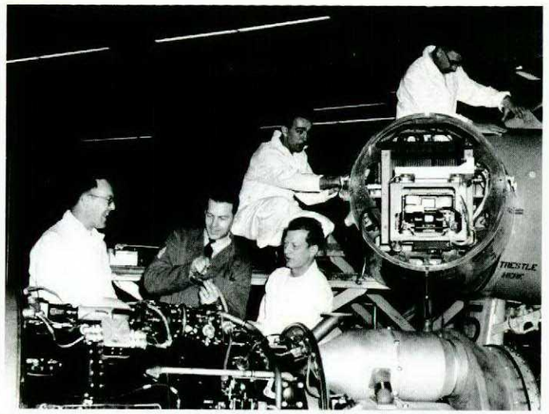
Cleared to land... by boat!

The Comox marine section's crash boat "Albatross" was renamed the "Heron" because a call to the tower often-as-not brought back the reply, "cleared to land"!

Good Show



Pte R.A. Bogora



Below (l to r); Cpl E.A. Paynter, Sgt L.J.E. D'Amours, Cpl K.A. Read. Above (l to r); Cpl J.J.C. Lamarche, Cpl G.P. Lidtke.

CAPT R.F. LAMB

After descending from 15000 feet to 7500 the student advanced power for the level-off. The instructor, Capt Lamb, suspected a flameout and took control of the aircraft, turning immediately towards base. Several relights were unsuccessful; the maximum power available after each relight was 32%. After quickly estimating his glide distance, Capt Lamb flew the Tutor to a successful forced-landing.

Demonstrating sound judgement and flying skill Capt Lamb averted the loss of a valuable aircraft.

SGT L.J.E. D'AMOURS, CPL E.A. PAYNTER, CPL J.J.C. LAMARCHE, CPL G.P. LIDTKE, CPL K.A. READ.

A CF100 was undergoing a fuel tank installation when an explosion ruptured fuel cells spreading flames around the aircraft. Cpl Paynter with his bare hands extinguished the flaming hair of an injured airman while Cpl Read ensured that the victim's clothing was not burning. Sgt D'Amours ordered the fire alarm pulled and after ensuring that no one was trapped in the fire region he grabbed an extinguisher and fought the blaze. Cpl Paynter then drove the badly injured airman to the hospital. Cpls Lamarche and Lidtke ran for extinguishers while Cpl Read assisted Sgt D'Amours in combatting the blaze. Suddenly a flash occurred and Sgt D'Amours ordered his crew out of the hangar. Cpl Read took the second injured airman to hospital.

The fire department extinguished the flames and the aircraft was quickly towed from the hangar – a wise move considering the explosion of the seat catapult later.

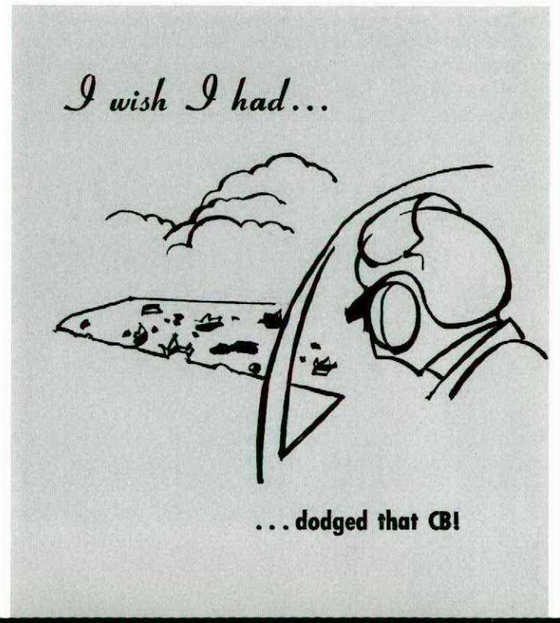
Throughout the emergency Sgt D'Amours and his crew, at great personal risk, courageously fought a blaze which if allowed to get out of control, could have consumed the hangar and its contents. All these men demonstrated a high degree of personal integrity and courage in saving a valuable hangar and its equipment.

(A flight safety analysis of the occurrence appeared in a previous issue under the title "A Roar and a Yellow Flash".)

PTE R.A. BOGORA

Pte Bogora was performing an inspection on the inlet guide vanes of a CF104, when he noted that one of the blades did not look normal. By running his fingers carefully along the blade he discovered a rough area on the back face. This roughness turned out to be a long crack which would be barely discernible without careful examination. In detecting this damaged blade - which is at the engine intake – he was able to avert a blade failure which could have had disastrous consequences.

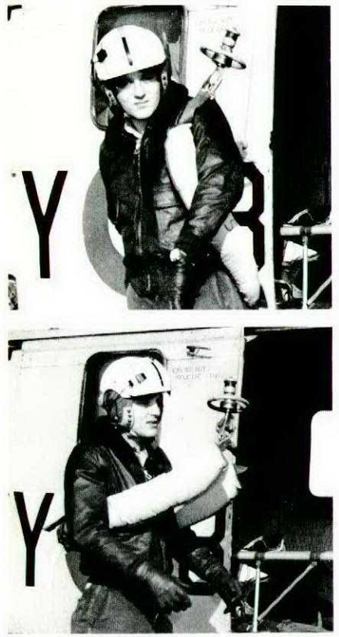
The fact that Pte Bogora noticed such a minute flaw in one of many guide vanes attests to his capability and thoroughness. On many occasions investigations of aircraft crashes have pointed out that a slight imperfection can cost us aircraft and lives.



Helicopter Rescue at Sea

You may well ask what has rescue at sea to do with flight safety. If the avowed purpose of flight safety is the conservation of resources, your friendly rescue helicopter is primarily concerned with conserving our most valuable resource – the aircrew.

Lt (N) J.W. McDermott
FSO, Helicopter Utility Sqn 21



Since the arrival of the first H04S helicopter 16 years ago the primary role of the utility helicopter has been rescuing people, and as long as we have aircraft overflying water the requirement will continue. During these years we've been given some excellent rescue equipment and have developed some good rescue procedures, yet our best efforts are too frequently thwarted due to a lack of knowledge of rescue equipment and techniques by the very person we are attempting to save. By advertising our techniques and equipment we can give all aircrew the assurance of a successful rescue.

Virtually every aircrew member in the forces must face the possibility of going for an unscheduled swim and should know how to deport himself when the faithful old whirlybird arrives on the scene.

Let's assume the unlikely and put you in the middle of a cold unfriendly body of water. Being a real professional, you checked out all your safety equipment before flight and are now safely bedded down in your dinghy with all safety equipment in operating order. You have activated your emergency radio and if at night – your mae west light. Before long a fixed wing aircraft orbits your position and – with luck – not too long after a helicopter comes chugging over the horizon.

To make the rescue the helicopter will have to hover over your position so he can employ his rescue hoist. This maneuver is not without its problems. At night, the helicopter will have to activate some black boxes to carry out an automatic doppler approach to the hover, and an automatic hover. This entails flying a pattern over your position dropping electric marine markers to establish the correct approach path. If you can survive this bombing without panicking, stay with your dinghy and have a little patience.

As the helicopter approaches, the rotor wash on the water will tend to blow your dinghy away. As the helicopter must be directly over your position for pick-up it seems logical that it's best to abandon your dinghy – yes, and let it blow away. If for some reason a pick-up cannot be accomplished and you are out of the dinghy we will put one of our crewmen (and another dinghy) in the water to keep you company.

Let's assume that the helicopter is hovering above your position and is ready for pick-up. The next thing you are likely to see is a kapok-padded web strap called a "horse-collar" dangling on the end of a wire cable approaching you. Let the strap enter the water before you touch it because if you don't you will be in for a healthy slug of electricity. With the horse-collar in the water, grasp it by the bottom of the loop and put it over your head, slide both arms in, as if putting on a coat and you should end up facing the hook with the strap around your back under your arms. Cross your arms over your chest and you'll soon be airborne and on your way home.

The horse-collar will be your – and our – biggest problem. It is amazing the odd positions people get into trying to don this apparatus. The prescribed method is the only safe way and unless you're properly in the collar the crewman will not hoist you – for good reason. If you're not clear on how to get into this rig, find out right away; the collar could save your neck.

If there's more than one person below us we will likely drop a rescue seat. This contraption looks like a three-fluked anchor and can accommodate two or three people at a time. Again, let the seat enter the water before touching it, then simply straddle one of the flukes and cling to the stem. cont'd on page 13

AND
NOSE KNOWING NOSE BLOWING

LCOL I.H. Anderson
Institute of Aviation Medicine

Poorly understood and often ridiculed, the nose gets more than a fair share of abuse. Nevertheless, the wine and tea taster, the perfumer, the diver – and by the way, the aviator – depend for their livelihood on its continuing serviceability...

...the nose gets more than a fair share of abuse.

Most of us have a rather sketchy appreciation of the hazards of flying with trapped gases in nasal sinuses or middle ear. On the ground, the condition is merely a nuisance – in the air it's dangerous.

If you're on an instrument approach on a dark, dirty, stormy night, the last thing you need at this moment is an intensely distracting pain or discomfort in your ears or sinuses. As an experienced pilot you *may* overcome this distraction, but another pilot – or an inexperienced student – may be so fearful of serious ear damage or physical incapacitation that his ability to control the aircraft may be dangerously impaired.

If this occurs – and there's plenty of supporting evidence that it does – an aircrewman, particularly a pilot, who knows his nose could live longer.

Words, words, words – you say. Okay, here's a recent hair-raiser:

> *An instructor and student are descending from 25,000 feet when the student develops pain in his ears. The instructor climbs back to 9000 feet and proceeds to pull 5-1/2 G while the student is advised to perform several valsalva attempts. During this ear-clearing the student blacks out and begins to convulse. When the G is eased off the student returns to consciousness.*

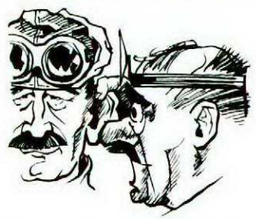
The report concludes with the alarming prospect that "...at worst, there may be many students and ex-students flying who believe that pulling G simultaneous with valsalva attempts is a reasonable way to clear blocked ears or sinuses." In spite of extensive aeromedical training in the Canadian Forces it is disapointing that the report has to admit "...it indicates a major lack of appreciation of the hazards involved and we cannot be sure that this is a completely isolated case."

And now, to the *nose knowing*. If gas is trapped in your middle ear there's three main reasons for it:

Unequalized Pressures Eardrum damage commonly occurs when military pilots descend rapidly on becoming hypoxic, for example. Under normal conditions, however, an experienced pilot automatically clears his ears on descent and may not be conscious of his swallowing or mouth movements. Interestingly, this automatic process does not always function in the artificial environment of the decompression chamber; a pilot will often have to be reminded to clear his ears during "descent".

Physiological Obstruction About 6% of student pilots having ear or sinus problems on descent are found to have an obstruction in the form of excess tissue in the area of the eustachian tube aperture in the throat. Often associated with enlarged tonsils, it can usually be rectified. A person with such an obstruction will often suffer discomfort on ascent as well as descent; a good general rule to remember is that a person with ear discomfort on ascent will probably have worse trouble coming down.

Transient Obstructions The experienced flight surgeon is familiar with the leathery-looking much abused eardrum of the older aviator. The eustachian tube is easily plugged with mucus, and infection or hay fever may swell throat tissues blocking air passage to the inner ear. Mucus which is not completely cleared into the throat on ascent can become sticky when dry oxygen is breathed, and remains to plague the victim on descent. Aircrew should consciously try to observe their own reactions to transient and unexpected obstructions because the flight surgeon depends very much on your judgement as to whether you are fully fit to fly when your active infection has gone.



The experienced flight surgeon is familiar with the leathery-looking much abused eardrum of the older aviator.

Sinuses – those wretched holes in the head – can create serious difficulty for some people. A blocked sinus can create visual problems, toothache, or other severe head pain. If you're susceptible to sinus problems you should know the "systems engineering" aspects of these cavities.

Unlike the ear, the air in the normal sinus is free to come and go during ascent or descent. (Those experiencing persistent sinus difficulties in the first few hours of flying should be examined for a physiological obstruction.) An infection or allergy tends to close the sinus aperture; this can result in air escaping on ascent but unable to enter on descent. Another affliction, probably more common to experienced or senior aircrew is the chronic or semi-chronic nasal discharge. Many smokers suffer from this condition which results in a continual gathering of mucus in the sinus which is then pushed out into the nose. On descent this can simulate the eustachian mucus problem and pain in the sinuses results.

So much for the nuts and bolts – what can you do about it? We'll discuss it under two headings: before-flight and in-flight. Here's some before-flight rules:

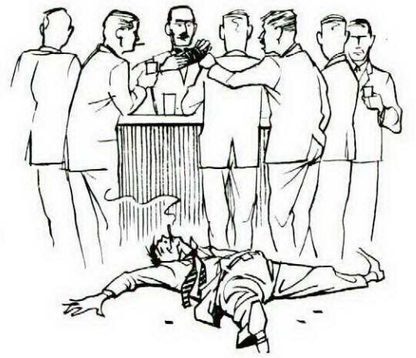
- If you cannot "click" your eardrums by valsalva on the ground – *don't fly!*
- If you can clear your ears with slight difficulty on the ground you may, if you are experienced, decide to fly – but *be prepared!* Assume that you will have trouble on descent and make appropriate fuel and weather allowances. If you are a student, see your flight surgeon.
- If one or both nostrils are completely blocked and will not clear by a simple sniff – *don't fly!*
- If one or both nostrils can be partially cleared by sniffing proceed with caution if you are experienced. Sniff hard on ascent and at altitude to get the passages as clear as possible. Plan for discomfort on descent. If you are a student see your flight surgeon or, if only mild congestion is present, inform your instructor. Do not risk solo instrument flight.
- If the congestion is associated with any kind of fever or malaise – *don't fly!*
- If you suffer repeated discomfort in ears or sinuses see your flight surgeon and consider requesting the opinion of a specialist.
- If you think you have hay fever consult your flight surgeon. Desensitization often works.
- Blow your nose and perform the valsalva properly! (explained in this article)
- Don't use unathorized decongestant remedies.

Desensitization often works.

Let's say you are airborne and you have troubles:

- If you have discomfort in ears or sinuses on descent, climb to a least 1000 feet of cabin altitude if possible. Sniff hard to clear away mucus and then try a valsalva. Descend as slowly as practicable clearing ears frequently.
- If your cabin altitude is below 12000 (and only "if") lower your mask and try using a benzedrex inhaler; however, use this sparingly.
- For an experienced pilot with a nasal drip problem a 1000-foot ascent followed by a 2 to 3 G turn may assist in dislodging a plug. But there's a few *nevers:*
  - ▹ Never risk disorientation by this maneuver.
  - ▹ Never do this if you suspect you have a fever or malaise.
  - ▹ Never do a valsalva while pulling G.

  The latter poses a definite possibility that you will faint and convulse. This reproduces the conditions in studies done by the IAM showing that a normal person may faint if subjected to G forces and hyperventilation. Coupled with an ingredient of the old "mess trick", namely, a sudden increase of pressure in the chest (achieved by doing a valsalva, for example), you will almost certainly faint.
- Avoid "oxygen ear" by descending on normal oxygen regulator settings. Also, allow time for air exchange to take place before going to sleep.
- Make a conscious gentle effort to clear the ears repeatedly on descent if you suspect trouble – don't wait for the discomfort to prompt ear clearing.
- Employ these procedures sensibly according to your flying conditions; if you don't succeed or if you consider it unwise to ascend and attempt to clear your ears or sinuses, continue your letdown and *be prepared for mild impairment.* Inform the ground of your problem and set yourself up for the slowest and least complicated procedure available, giving yourself as much time as possible.



Coupled with an ingredient of the old "mess trick"...

And now, to *nose blowing*. The nose filters, warms and moistens inhaled air and it's an extraordinarily efficient and ingenious structure – under normal conditions at ground level, however. Sinuses, on the other hand, are of uncertain origin in man's evolution and their design limits are easily exceeded in rapidly changing atmospheric pressures. Operating with these handicaps calls, amongst other things, for good nose-blowing techniques.

Polluted atmospheres and irritating tobacco smoke often cause nose, throat and sinus problems. Design inadequacies complicate sinus clearing; mucus does not naturally gravitate into the nose – although there are hairs to direct this movement. Air passing through the nose does create a venturi effect; when nasal airspeed is increased by sneezing, sniffing or snorting, drainage at the sinus exits is assisted. Blowing the nose with a handkerchief may be socially desirable, but it contradicts the design intent if you close a nostril and build up pressure to forcibly expel air. Raising the pressure in the nose and throat forces mucus back into the sinus and inner ear to become a good bacteria culture medium.

The implication of this is now probably beginning to dawn: aircrews should logically become a group of sniffers! If you use a handkerchief ensure that the rapid exhalation of air is *unimpeded;* this can be done by a good test sniff before blowing. This will remove any mucus present in the rear part of the nose and throat. (It may be small comfort, but the acid in the stomach is perfectly capable of sterilizing the feedback.) When nose blowing, the pressure should never be great enough to cause the eardrum to click; this could mean that you have forced mucus into the middle ear passage.

So much for nose blowing; let's look a little further at the commonly-used techniques to accommodate pressure differences in the sinuses and the ears while flying. The valsalva which is simply raising the pressure in the respiratory tract – while useful – signifies the failure to some extent of the normal clearing mechanism.

Earthbound man when walking down a mountain was usually talking, swallowing, or moving his jaw allowing the eustachian tube to open periodically to equalize the slowly-changing pressures. On a more rapid descent the aviator may forget to compensate for his natural limitations and may be unaware of trouble until he feels discomfort in the eardrum or sinuses. By then a valsalva is usually needed to equalize pressures by forcefully opening the eustachian tube. Ideally, experienced aircrew equalize pressure by jaw movements or swallowing during descent but if you are obliged to employ valsalva it is wise to take precautions:

- All mucus should be cleared from the throat by a good rude sniff before valsalva; much of the danger of pushing infected mucus into the sinus or ears will be thus avoided.
- A valsalva while flying should never be so vigorous that you feel your face getting red. If your ears or sinuses do not clear with about twice the normal pressure that you normally exert to make your ear click it is unlikely that you will clear them by more strenuous efforts; worse, you may hazard your very consciousness by prolonged raising of the pressure in your chest thus impeding return of blood to the heart.

... a good rude sniff before valsalva ...

That's the brief – and oversimplified – story about nose knowing and nose blowing. We have not discussed the short-term and long-term treatment of conditions such as fever, chronic rhinitis, sub-mucus hemorrhage, and various other nasal conditions; neither have we discussed the effect of repeated middle ear and eardrum damage or infection, on your flying career. We end on a serious note by observing that cases in the past demonstrate that the the continued health of your upper respiratory tract is vital. Continuing abuse of the delicate and complex components of this system could result in a medical restriction to your flying career – and remember, the sudden onset of pain can easily be the starting point for an accident sequence.

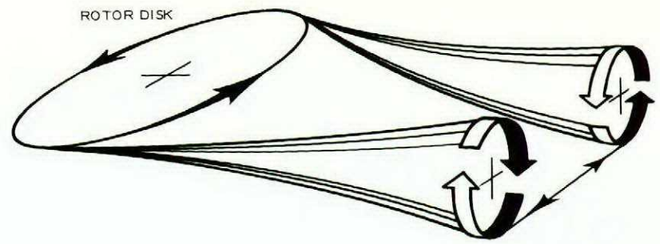
LCOL I.H. Anderson completed his medical training in Aberdeen Scotland in 1952, where he also received flying training with the RAFVR. After two years in the RAF he transferred to the RCAF and spent four years at CFB St Hubert. After a year at Harvard University studying industrial hygiene and aviation medicine he was transferred overseas where he spent three years as SMO 2 Wing, and from 1963 to 1965 he served as Air Division Flight Surgeon. He presently commands the School of Aviation Medicine and is a deputy OC of the Operational Medical Establishment of CFIAM.

Winter tires - the year 'round

Luke AFB has found one way to help eliminate jet engine ingestion of stones, etc, on its runways. It has installed snow tires on all vehicles operating on the flightline or crossing runways, because these tires will not pick up rocks, stones, etc, and carry them onto the ramps or runways. Their use, Luke assures us, has reduced substantially engine FOD.

- Flight Safety Foundation

ROTOR WASH TURBULENCE



The helicopter wake showing how the vortices roll up at the tips and expand downstream.

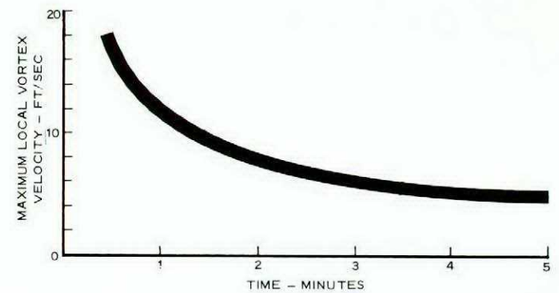
A C130 ran off the runway after a hovering Chinook helicopter interfered with aircraft control. A Caribou crashed on landing after it had encountered rotor wash turbulence at round-out.

These two major aircraft accidents plus other incidents and occurrences in the USAF sparked a study into helicopter rotor wash turbulence. The study concludes that helicopter wakes are generally similar to those from fixed-wing aircraft – and are demonstrably hazardous.

The helicopter's lower operating speeds produce higher intensity wakes than fixed-wing aircraft and therefore are more dangerous. Although it is hazardous for an aircraft to fly into the rotor wake vortices the chances of this occurring are small.

The highest hazard exists during takeoff and landing; helicopter traffic about an airfield must therefore be stringently controlled. The penetrating aircraft should be on or above the flightpath of the vortex-generating aircraft or have a seperation time of at least 1-1/2 minutes if below the flightpath of the vortex-generating aircraft.

The lighter the aircraft penetrating the turbulence the more serious the hazard. The vortex intensity of the helicopter rotor wake is a direct function of disc-loading.



Typical decay rate of maximum local vortex velocity from helicopter wake.

A helicopter with a high disc-loading will produce wakes of greater intensity at a given speed regardless of its size. The study concludes that "In general, helicopters should not be hovered closer than 1000 feet upwind of an active runway or operated at high thrust under no-wind conditions closer than three rotor diameters to other aircraft."

Everyone's involved in this one – pilots and air traffic controllers. Canadian Forces experience to date has yielded no accidents – yet.

cont'd from page 9

We will lower a crewman into the water if you're unconscious or injured; we employ a double-lift harness for such a rescue. With this harness both the rescuer and the rescued are hoisted together.

Just one more point before you return to that dart game; in all helicopter rescues you must remove your parachute because our rescue hoists have a capacity of 600 lbs and cannot therefore lift you and a parachute full of ocean as well.

We sincerely hope that you'll not need our services but someone who reads this article may find it has saved his life. If you're still not clear on *all* the points make sure you find out because when the time comes to employ the "You Splash, We Dash" service no matter how fast we dash, you – the survivor – must know how to assist in your own rescue.

(We strongly support the author's warning. A pilot recently lost his life after incorrectly employing the horse-collar. Pay particular attention to the method of boarding the helicopter; in fact, make sure you're thoroughly briefed on all the details.)

Argus and Atlantic

. . . the crew usually has thoughts about the good fortune of those whose role permits them to fly well above the weather while they have to sweat it out down below in the soup!

On a cold, windy maritime evening a member of an Argus crew on 2-hour alert sits in the warmth and comfort of his home. The TV weatherman is describing an ominous low-pressure system moving towards the Maritimes bringing rapidly deteriorating weather conditions. The telephone rings, and the cozy atmosphere is suddenly shattered by a call from squadron ops: "Alert crew is being launched". With a hasty goodbye the crew member leaves his family, trudges to his car and drives to Base Ops for briefing. This scene is re-enacted in 14 other homes – the normal crew being 15 men.

Base Operations has already set in motion a host of facilities including sqn ops, servicing, meteorology, base transport, flight kitchen, armament. They stand ready to provide a pre-planned support service.

At Base Ops the aircrew get a detailed weather briefing including a more technical explanation of that low pressure area seen earlier on TV. The local weather is in fact deteriorating rapidly but will remain above takeoff limits for departure. The centre of the low is in the operating area creating very poor weather; conditions will improve slowly as the storm passes to the north. The base weather forecast for 20 hours later, offers considerable improvement: good ceilings, strong northerly winds – and blowing snow.

The operational briefing outlines the required task, the operating area, on-and off-task times (the times to spend in an area), outbound and inbound routing, traffic information, intelligence and communications procedures.

Next, it's the crew captain's turn. After consultation with his lead navigator and lead radio officer, he gives a detailed crew briefing covering: pre-flight requirements, transit procedures, altitudes and routes, coast crossing procedures, on- and off-task procedures, tactics required to carry out the assigned task, weather reporting and forecast requirements, clearance requirements, routing for return flight, alternate airfields, crew rotation periods, in-flight meals, and emergency procedures. The lead navigator and lead radio officer then brief on navigational and communications and any special requirement for detection equipment to be utilized.

In the meantime, the two flight engineers have been doing a pre-flight inspection of the aircraft. Within an hour of the alert being called the aircrew is on the pre-flight inspection. It is now snowing heavily; snowploughs are busy clearing the runway and taxiways. The pre-flight is completed in the hangar; with its crew on board the aircraft is rolled out into the darkness.

Before the start-up the flight engineers report wet snow sticking to the aircraft. Though it was cooled prior to the roll-out the de-icing will cause a delay although the servicing crew – anticipating this – are ready immediately. The aircraft is de-iced and after a wait for evaporation, the start-up is made and the aircraft taxied to the run-up area. During run-up, a piece of electronic gear is found unserviceable entailing further delay. Although the equipment could be brought more quickly to the aircraft, this would mean exposing the groundcrew to the hazards of an unlighted area, so the aircraft returns to the lighted ramp area.

Airborne and on their way, the crew busy themselves with normal preparation such as stowing rations, preparing charts, and consulting publications. Within 30 minutes after takeoff, the crew is ready for coast-crossing procedures, involving final checks of equipment – particularly armament systems. From here, the Argus and crew are operational. Leaving behind the chatter of ATC traffic they descend seaward into the inky blackness and switch over to operation control. On approaching the operating area – 400 miles out to sea – the weather rapidly deteriorates. The radar operator reports he has detected the forecast frontal system and gives the reassuring and necessary headings for penetration through the least severe areas. So far the weather has been as forecast. Icing and turbulence allow little oportunity for crew rest. At times like this the crew usually has thoughts about the good fortune of those whose role permits them to fly well above the weather while they have to sweat it out down below in the soup!

With on-task time approaching the crew has its final briefing in preparation for the long hours ahead. Tactical requirements in Maritime Command require accurate flying and navigation at extremely low altitudes day and night under virtually all weather conditions. This sortie, however, is to be conducted at medium altitude, relieving the tension of low-level operations, but puts the aircraft in the icing and turbulence levels. The tactical situation could turn this medium-level operation to low-level – and that means 100 to 300 feet.

As time passes, the weather forecasts and reports from Maritime Headquarters indicate a drastic change in the home base region requiring a change of the alternate airfield and recalculation of prudent limit of endurance (PLE). This figure is constantly being revised requiring a team effort to coordinate information on aircraft weight, three-engine fuel consumption assuming an emergency condition under the worst possible conditions, altitude selection, and forecast weather and winds. A change in destination and/or the alternate requires a complete recalculation.

With off-task time approaching, the crew sees with pleasure, the dawn; at least, the darkness is no longer a factor to contend with. As the Argus is turned homeward, Maritime HQ and ATC coordinate the clearances. After 12 hours in the tactical area the mood of the crew on the return is understandably more relaxed, although the expectation of an approach in minimum weather conditions after 18 hours aloft is of concern.

At home base the ground support staff have been clearing the field. However, the weather is still 200 feet overcast, 3/4 mile in light snow and blowing snow with the wind 30 degrees off the runway heading at 30 mph gusting to 40. Finally, the GCA controller's voice heralds the end of the flight with "... in radar contact..." and it's all over – till the next time.

The safe and successful completion of this flight required the dedication and cooperation of those from the operational staff that plan and brief for the sorties, the flight kitchen staff who carefully prepare the in-flight rations, the drivers who keep the runways clear of ice and snow, the technicians who maintain and service the aircraft. If any one group or person fails, the efforts of the aircrew would be to no avail. It's got to be *prevention through professional teamwork* – and that's how we like it.

After 1-½ hours at 35000 feet the T-bird captain became dizzy and nauseous. The copilot performed an immediate descent to safe altitude and the aircraft was landed without further incident. The pilot had the flu and acute pharyngitis and should not have been flying...

After getting a false fire warning along with symptoms which seemed to confirm fire, the pilot ejected without having done a complete check...

Despite the pilot knowing that ice had formed on his aircraft he made an incomplete inspection for icing after parking with engines running to pick up a passenger at another base. After takeoff, and after clearing the ground effect the aircraft began to lose altitude and airspeed, crashing on level ground.

During a descent the pilot exceeded the aircraft speed limitations by nearly 10% and states he felt vibrations throughout the aircraft. He landed the aircraft at another base and found the port elevator damaged beyond repair; the starboard elevator and rudder dented and wrinkled; port side of the vertical stabilizer punctured; and an antenna torn away. The pilot then flew this aircraft back to base...

GO – NO GO

On a low-level exercise the aircraft struck a heavily-forested hill after continuing into weather conditions appreciably less than the minimum required for visual flight.

On learning that the live runway (9,800 feet) was unavailable for a few minutes for snow removal, the pilot opted to land on an alternate runway (6,200 feet) which was slippery with ice and snow. The substantial fuel load – which would have enabled the pilot to remain airborne pending the snow removal – made him wary of landing under these conditions. Intent on hitting the button the pilot landed the aircraft 200 feet short in 12 inches of snow, extensively damaging the undercarriage.

Once, or many times, in his flying career every pilot will be faced with a go - no go decision either before a flight or while airborne. Not thinking through the possibilities beforehand can cause indecision or the wrong decision - as can an intemperate desire for "mission accomplishment" lead a pilot to fly in the face of reason. Have you thought out the various situations which may arise and set your personal go - no go limits? These situations could happen to you; the time for thinking is NOW...

After takeoff a loud bang was heard throughout the aircraft; blood could be seen on the left front windshield establishing a possible birdstrike or multiple birdstrikes. The captain continued the flight over the Rocky Mountains and grounded the aircraft at the next stop after noting skin damage to the fuselage, damage to the starboard mainplane leading edge, damage to leading edge port horizontal stabilizer, damage to radar, damage to an engine air intake scoop.

On a test flight the pilot experienced a gross loss of thrust just as the aircraft became airborne. As the aircraft started to sink the pilot ejected successfully from a height of 25 feet. Had he remained with the aircraft he would have died in the destruction that followed. His quick reaction to a known possibility saved his life.

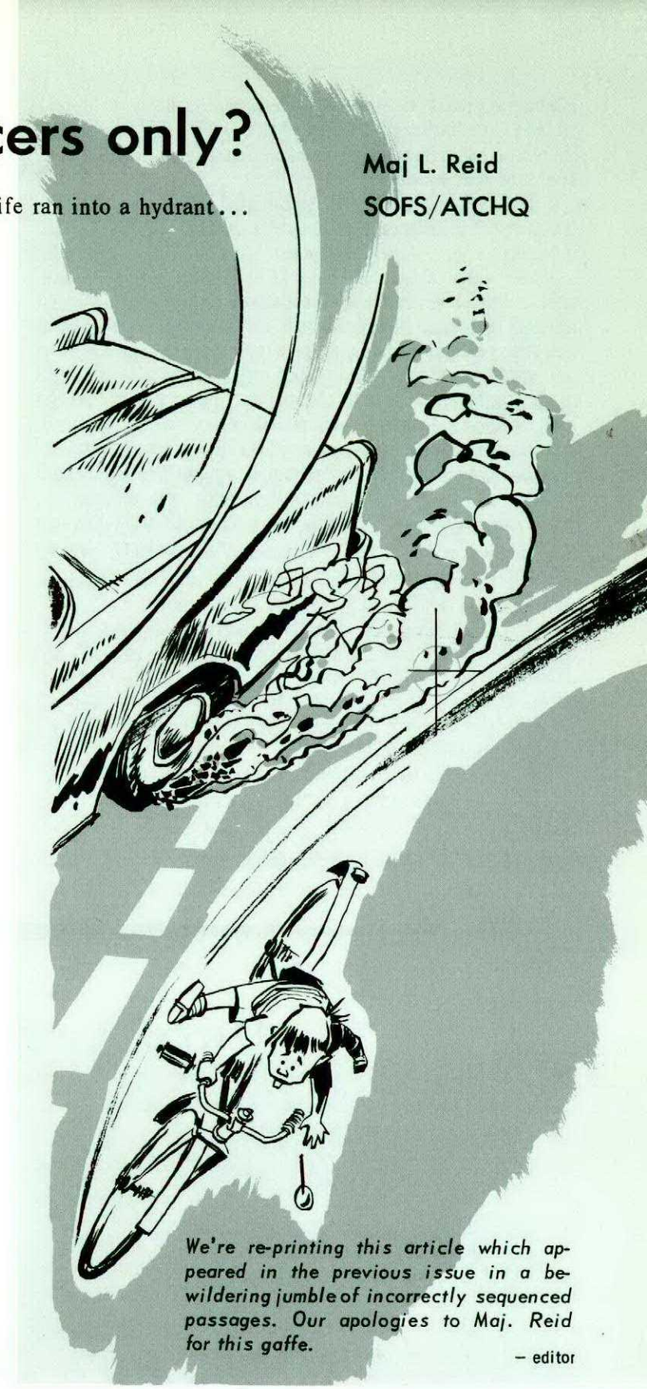
A chase pilot on a low-level mission advised the lead to pull up to avoid deteriorating weather ahead. The lead aircraft continued to fly straight and level into cloud and the aircraft struck a hill.

During a ferry flight in a helicopter the pilot pressed into deteriorating weather and lost ground contact. While attempting a 180 degree climbing turn he struck a wooded hill.

For flight safety officers only?

If your wife ran into a hydrant...

Maj L. Reid
SOFS/ATCHQ



We're re-printing this article which appeared in the previous issue in a bewildering jumble of incorrectly sequenced passages. Our apologies to Maj. Reid for this gaffe.

– editor

For Flight Safety Officers Only?
Now that I have *everyone's* undivided attention (!) let me apologize for the ruse and invite you to read on...

The scene is the parking lot of a local shopping centre. A housewife, with more haste than caution, bashes the front right fender into a hydrant. The most serious damage was to the lady's pride and composure; the fender nonetheless would require repairing. Convincing herself that the damage was negligible, she drove the short distance to her home and parked in the driveway. The thought of mentioning the incident to hubby crossed her mind but she reasoned "Why provoke him with trivialities?"

At this point fate steps in. Soon after her return, hubby decides to slip over to the in-and-out store for a six-pack. Never one for pre-flighting the family wagon, he leaps in and is on his way. You may have guessed the rest of the yarn by now; anyway, here's the brutal ending. The "minor" bash had, in fact, forced in the fender restricting the turning of the front wheels. This becomes evident only when unsuspecting Dad attempts a quick turn to avoid a cyclist. Fortunately, nothing more than a near miss resulted – plus, a ruined 750 x 15.

The earlier "minor" mishap could have caused a much more serious accident. The moral of the tale should also be clear: complete and prompt reporting of even minor occurrences prevents accidents. This is also true of vehicle or industrial safety. That is why reporting forms are readily available and simple to use.

An incident report (CF215) is only one of several ways to prevent an aircraft accident. The UCR, and Safety Comment form (CF212) are other examples. Each of these items arises from a **pre-mishap** investigation. If they are used to report *every* potentially dangerous situation or hazardous condition, many accidents will be nipped in the bud – eliminating the need for a **post-mishap** investigation.

Let's apply these terms to our story. In every accident there's a sequence of events leading to the occurrence itself. The town engineer, by positioning the hydrant at the curb, unwittingly contributed to the sequence of events. By not allowing herself more time to shop, the wife became hasty and incautious. Look at any accident and you'll find a sequence of events leading to the ultimate occurrence. Seeking out these factors for elimination is pre-mishap investigating. (Incidentally, there's ample evidence to prove that the elimination of just one factor in the chain will prevent the accident.)

If we fail to recognize a sequence of events building up, the inevitable accident cannot be prevented. It is then that we must work backward in time to find the cause – the post-mishap investigation. Post-mishap investigation reports are called the CF210 and Board of Inquiry. We all realize that from a purely economic standpoint the cost of doing this type of investigation far exceeds the relatively meager cost of processing a pre-mishap investigative report.

Both types of investigation are nevertheless the sum-and-substance of aircraft accident prevention. Post-

mishap investigations, although after-the-fact, do determine cause factors to prevent a recurrence. I reiterate therefore, that both methods of investigation are aimed at accident prevention.

I have mentioned briefly several of the pre-mishap investigation methods that are currently in use – the incident report, Safety Comment, and the UCR. There's another – the safety survey. If the town engineer had been alerted to the hydrant hazard he would have relocated it or had the curb extended. The chain of events would have been broken, preventing this mishap.

CFP135, Flight Safety for the Canadian Forces, contains a guide for FSOs to conduct a safety survey. Also, ATC Technical Instruction 00-80-1/2 dated 15 Aug 67 gives the terms of reference for the Base Aircraft Maintenance Safety Officer and provides checklists for safety surveys within the maintenance complex. These instructions cover the area that has been loosely described as the *ground side* of flight safety. The BAMSO, while working with the BFSO (who covers the *air side)* becomes an important member of the flight safety team.

It is not intended that these officers should carry out the surveys on their own; the surveys should be called for by the staff officer concerned and carried out by his delegates. BAMSO and BFSO are thereby free to monitor the overall program and to pursue action on survey recommendations.

Let me hasten to point out that the Safety Surveyor is not a spy attempting to catch anyone off-guard, nor should the safety survey of a particular section be made in surprise. In order to derive maximum benefit from the program, the checklist should be presented to the section some time in advance of the actual survey. A conscientious supervisor will ensure that his section meets the minimum standard as prescribed in the checklist. If the survey confirms this, its aim has been achieved.

Of course, the job is a never-ending one; in order to eliminate potential accident cause factors the survey must be repeated. Let me add before concluding, that the safety survey checklist items may be modified to the needs of the particular base, bearing in mind the ultimate aim of the survey.

To sum up:

- *Every aircraft incident is significant enough to warrant reporting.*
- **A sequence of events precedes every aircraft accident; break the sequence and in all probability the accident will be avoided.**
- **The Safety Comment, UCR, Aircraft Incident Report and safety surveys are pre-mishap investigation devices. Use them frequently to help reduce aircraft accidents.**
- **Whenever we fail, the post-accident investigation will uncover the cause factors. The findings are used as future accident prevention devices. Post-accident investigations are reported on Form CF210 and/or CF211 (Board of Inquiry).**

We need a continuing prevention campaign aimed at getting to that *next* accident before it can occur. And why not? – it's our country's resources and maybe our very lives that can be saved.

Owed to a Mae West

There once was a pilot from one of the Wings
Who never did wear his Mae West;
It was useless in Europe (he always knew best),
To fly around strapped in such things.

But one day from his dual he had to eject,
(And no sweat, 'twas over the ground),
But his place of landing he couldn't elect
And a river was all that he found.

He floundered and struggled to get to the shore
('Least that's what the autopsy said),
For he didn't quite make it (his swimming was poor),
And he ended up drowned and quite dead.

His friend in the back seat was better prepared,
For although it was land where he hit;
To fly without Mae West was more than he dared
And to save him it still did its bit.

Though the temperature fell on that dark dismal night
His inflated life-jacket was warm;
From its pocket removing his flashing strobe light
He attracted his rescuers ere dawn.

The moral, of course, to this sad little rhyme
Is that – though it may chafe you and bind –
Your Mae West is far better worn every time:
One day it might save your behind!

– Air Division

GRASSHOPPERS

. . . grasshoppers are attracting birds to the airfield . . . the CE Section has a chemical on order and spraying will commence as soon as this chemical is received . . .

– Flight Safety Committee

On the Dials

In our travels we are often faced with "Hey you're a UICP, 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. In answering these questions any can of worms opened up in the process can be sorted out for everyone's edification. 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 communications to Commander, Canadian Forces Base Winnipeg, Westwin, Manitoba, Attention: UICP School.

The New Hold

On 1 March new holding procedures came into use in Canadian airspace. The Canadian Armed Forces will employ the USAF procedures because of their ease of application, although the Department of Transport has adopted the ICAO procedures for civil use. Both procedures are essentially the same and are compatible with most of the systems employed around the world – notably, of the FAA in the United States. Air traffic control will separate aircraft on the assumption that pilots are adhering to these procedures; therefore, compliance is essential. Since the adoption of these procedures, the staff here have fielded numerous queries regarding their application. A few of the more frequently asked questions are here.

Is there an easy way to apply these procedures?

Here is a system you may find helpful. Remember that the aircraft heading at the initial holding fix passage determines the direction of the turn to enter the holding pattern. For pre-planning you can estimate this heading, which will normally be your inbound heading unless subsequent heading changes are anticipated or required. Check 70 degrees either side of this heading. If the inbound holding course is in this sector, turn outbound in the same direction as the holding pattern to parallel the holding course; eg, right-hand pattern, turn right to enter. If the inbound course is not within this sector then turn outbound in the shorter direction to parallel the holding course. If on a convenient heading, the teardrop entry may be used.

The diagram illustrates how the situation will appear on a radio magnetic indicator (RMI). (Rotate the page to orientate each "aircraft" with the nose up and you will get a rough approximation of how the situation would be displayed in the cockpit.) Note that aircraft B and D must turn in the direction of the hold because they have the inbound holding course of 270 degrees in the double 70-degree sector (the shaded area). The other two aircraft will take the shortest turn to parallel the outbound course, with aircraft C having the option of flying the teardrop. Note also that if the hold were non-standard the same rule and areas apply; however, in this case aircraft B and D would turn left and aircraft A would have the option of the teardrop.

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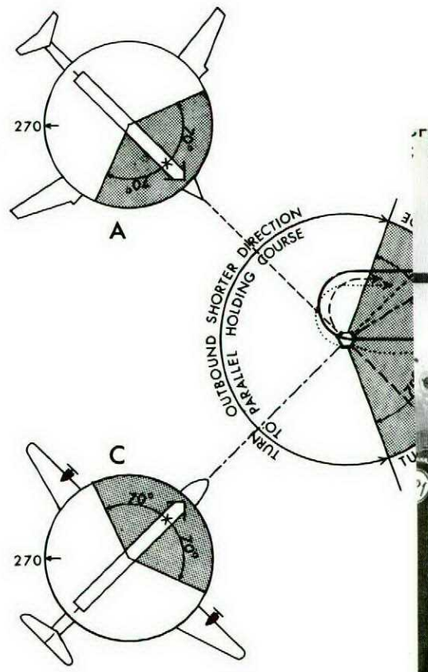

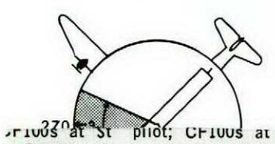

CF104s at ... pilot; CF100s at North Bay, tour on Dew Line at GCI site; CF104s at 4 Wing, 1965-68. ... hours on T33s; CF104s at 4 Wing, 1965-68.

Col C. Allison (right) congratulates (l to r) Capt Ouellet, Maj Myles, Maj McCrimmon, and Capt Krahn (inset).

Why is it not mandatory to intercept the 30-degree teardrop course before turning inbound?

Your first outbound leg after initial holding fix passage will not exceed one minute at or below 14000, or one and a half minutes above 14000 feet. Outbound timing is imperative or you may proceed beyond your protected airspace. On the other hand, track interception on your teardrop is not essential since the procedure itself is not a compulsory maneuver. Therefore, turn inbound when the timing is up, whether or not you have intercepted track. After some experience in flying the new holding procedures it will become apparent that entry into the hold is much easier if the teardrop is employed whenever possible.

Can jet aircraft still use a rate one-half turn for entry and holding?

The size of the protected airspace is calculated on numerous things, one of which is the assumption that the pilot will normally attempt a rate one or 30-degree bank turn, whichever requires the lesser bank. If your rate one-half turn requires less than a 30-degree bank, then you are losing some of this protection. Remember, that other aircraft are being separated under the assumption that you will be flying either a rate one or a 30-degree bank turn.

I note that the hold must be entered as well as flown at or below the maximum airspeeds. Does this mean that I must reduce my airspeed prior to reaching the holding fix?

Yes, however don't slow down too soon. The USAF indicate that the reduction in airspeed is to take place within 3 minutes of crossing the holding fix. This sounds like a good idea.

Got The Message ?

There once was a pilot from one of the Wings
Who never did wear his Mae West;
It was useless in Europe (he always knew best),
To fly around strapped in such things.

But one day from his dual he had to eject,
(And no sweat, 'twas over the ground),
But his place of landing he couldn't elect
And a river was all that he found.

He floundered and struggled to get to the shore
('Least that's what the autopsy said),
For he didn't quite make it (his swimming was poor),
And he ended up drowned and quite dead.

His friend in the back seat was better prepared,
For although it was land where he hit;
To fly without Mae West was more than he dared
And to save him it still did its bit.

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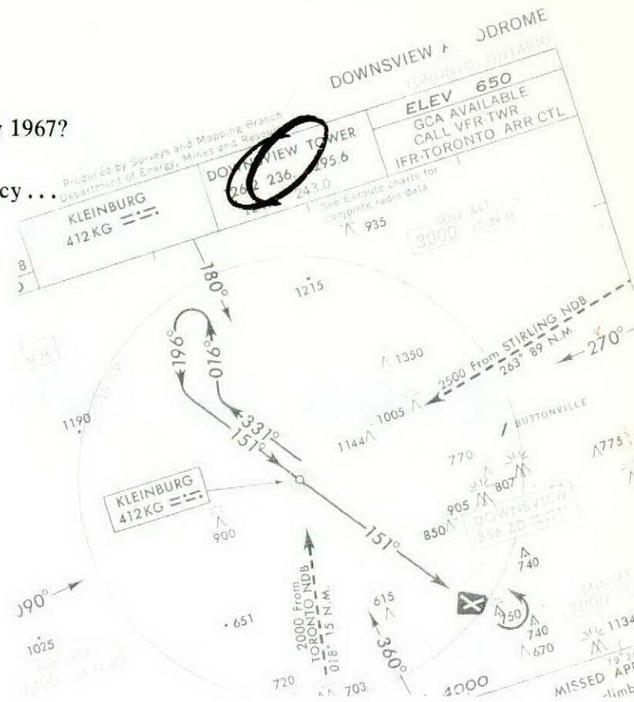
- *fly above bird heights*
- *speed increases damage*
- *birds are night-fliers*
- *visors down*
- *submit those CF218s*

For want of a "6"?

Been into Downsview on a low-level ADF since January 1967? If you have you're probably among the many pilots who failed to notice an error in the Downsview tower frequency . . .



Certainly, 236.6 is well known as a tower common but suppose you're inexperienced, at a strange base (where there's likely to be an oddball frequency requirement), and going visual after overshooting GCA at night? These were the ingredients when a Tracker overshot an instrument approach and while on runway procedure, crashed – never having contacted the tower.

We can only ask (inasmuch as the wrong frequency was found dialed into the radio) whether the pilot first made an attempt on 236.0 on seeing **236.** on the letdown sheet. It is, of course, speculation that this minor proofreading error may have added that little extra element of confusion which contributed to that disaster in which four were killed.

We're putting this point across as strongly as possible to suggest that all of us have an interest in keeping these letdown sheets *free of error* by timely use of the NOTUN.

Writing up an error *could* save someone's life.

1000-hr Pilots Congratulated

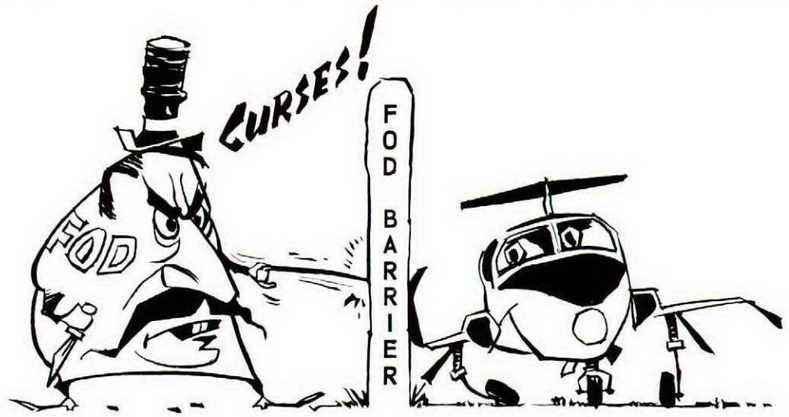
MAJ D.M. MYLES Sabres at 1 Wing, 1954-56; Stns Penhold and Saskatoon, 1957-62; CF104s 4 Wing, 1963-68.

MAJ K. McCRIMMON RMC graduate in 1953; Sabres at 4 Wing 1954-57; CF100s at St Hubert, 1957-59; CF104s at 4 Wing, 1963-68.

CAPT J.F.M. OUELLET Canadian Army, four years in 22nd Regiment including tour in Korea as sgt in a mortar platoon; RCAF ME tech for three years and re-mustered to pilot; CF100s at North Bay; tour on Dew Line at GCI site; CF104s at 4 Wing, 1965-68.

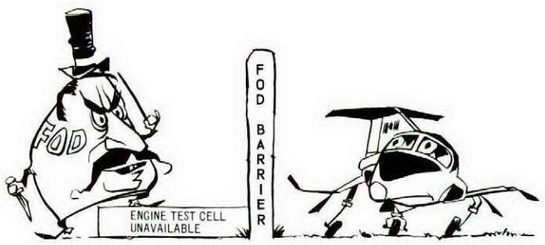
CAPT KRAHN 1000 hours in CF100s; 1500 instructional hours on T33s; CF104s at 4 Wing, 1965-68.

Col C. Allison (right) congratulates (l to r) Capt Ouellet, Maj Myles, Maj McCrimmon, and Capt Krahn (inset).

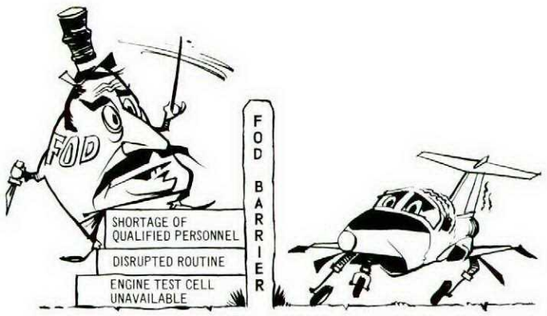


One step, two step . . .

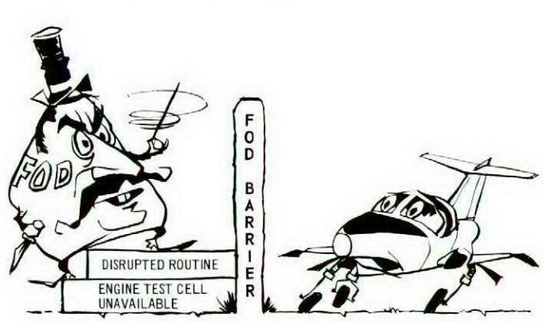
ONE STEP *The engine test cell was temporarily unavailable during renovations, so it was necessary to test-run the engine in an airframe – a stub pipe being used in lieu of the tailpipe and aft section.*



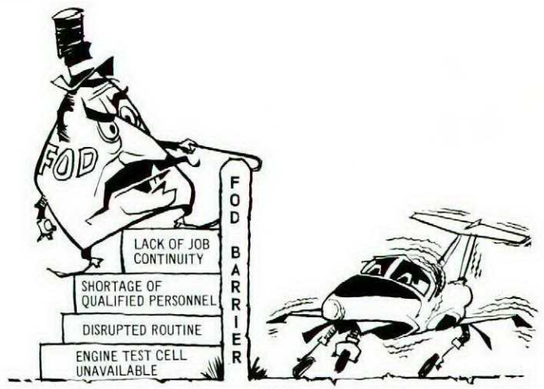
STEP THREE *Sick parade, leave, and a recent rotation of technicians between sections, meant that there were only two technicians on duty qualified to carry out post-inspection engine run-ups. These two technicians had to be taken off another job to run up the engine; they were therefore, not previously involved in the inspection of either the engine or the airframe...*



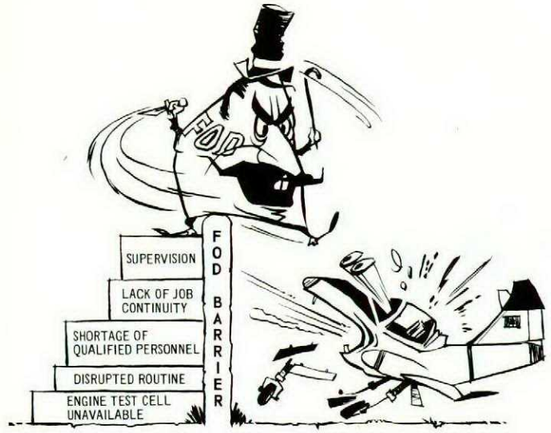
TWO STEP *The hangar floor was being painted, necessitating moving the aircraft, engines, parts and equipment from one side of the hangar to the other – and back again when the floor was finished. Work continued during this shuttling. The engine was installed in an airframe and readied for the run-up.*

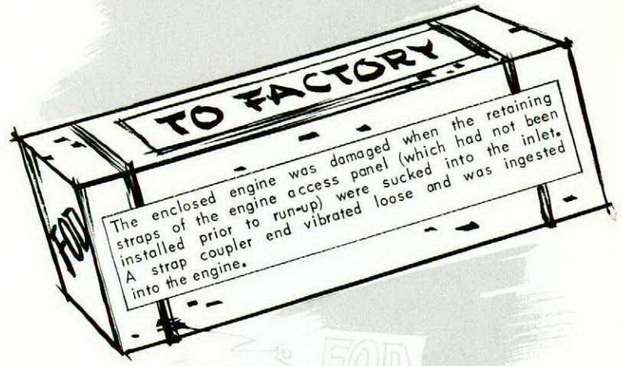


STEP FOUR



STEP FIVE *Throughout, supervisors could have exercised increased surveillance of the work considering the potential created by the unusual circumstances.*





CLOSE CALL · OPERATIONAL HAZARD · SAFETY SUGGESTION

SAFETY COMMENT

T33 Chute Timer

A periodic inspection of a T33 parachute brought to light a broken witness wire in the timing mechanism. The timer – which is set to fire at three seconds – in this case fired in 1.5 seconds. Someone had inadvertently pulled the connector assembly from the end of the lanyard and hearing the timer buzzing, had pushed it back in. The buzzing stopped and the timer did not fire.

Pushing it back in does not reset it to zero. The firing time of the mechanism is reduced by the elapsed cycling time – and could cause premature chute deployment on ejection and possible entanglement with the seat.

At this base, T33 parachutes are signed out for each flight and are inspected on return. But this external inspection will not reveal whether the connector has been pulled and replaced.

A possible fix might be using a witness wire of .015 copper between the connector assembly and the arming cable housing. The pull required to separate the two remains at 17 lbs, and the connector assembly can still rotate on the arming cable housing.

FOD from vehicles

Several bolts and other items with FOD potential have been found on the tarmac in recent weeks... most likely dropped from equipment operating on the tarmac, truck cabs, sweepers, etc.

– FOD Prevention Committee

From the AIB

Seat cushion saves pilot's . . . life

The pilot – with one passenger aboard – is practising autorotative descents with power recovery in a CH112 Nomad. It's a grey day and the ice on Lake Watopanah is covered with a few inches of snow. The rate of descent is about 2000 fpm, airspeed just under 60 knots, collective pitch lever full down. Then, WHAM!!!

Striking the ice the bird bounced, fell over on to one side, and beat itself to death. Spilled fuel ignited, reducing the wreck to a smoking mess. The occupants by good fortune (and very good management) were not incapacitated and were able to escape long before the fire engulfed the aircraft. It's the fire that follows a crash of this sort which usually causes the tragedy. A pilot although alive, if unable to move is doomed.

The timely exit of these two men was encouraging confirmation that a seat cushion designed at CFIAM did its job. The cushion, which consists of an upper layer of soft material for comfort and a lower layer of crushable cellular material for energy absorption, is designed to decelerate the body over a period of time – although it's less than a second.

It is likely that the pilots were subjected to 35G momentarily but the crushable seat cushions were able to absorb that impact to the extent that the two men emerging from the crash had not even a sore back to complain about.

This improvement is one of many now taking place in research labs; aircraft seats of every species are being designed with impact absorption in mind. The new Yukon seat, for example, is designed so that the whole seat structure will decelerate the passenger during its inevitable structural failure in a crash. Too often, passengers did not survive the initial impact or were so incapacitated that they could not escape the flames.

Next on the list, of course, is fuel that won't burn, or tanks that won't rupture – and they're both on their way.

Fit to fly?

The Base Surgeon reported on a recent physiological incident involving a pilot returning to flying duties before receiving medical clearance. He stressed the need for seeking medical attention and clearance to return to flying following medication or illness.

– Flight Safety Committee

More thrust on a dry day

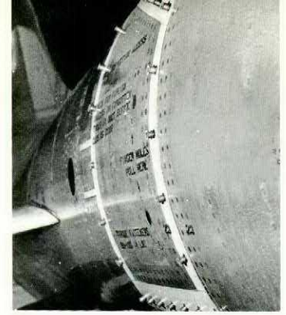
Occasionally we find pilots having the misconception that moist air is heavier than dry air. Actually, an engine produces more thrust on a dry day...

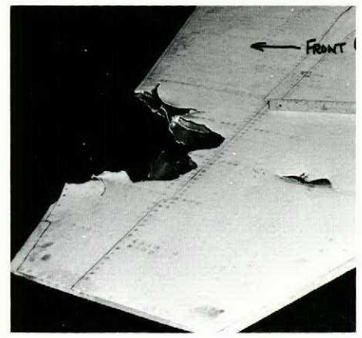
Avogadro's Law states that equal volumes of gases contain the same number of molecules when at the same temperature and pressure. The weight of air is the sum of the molecular weights of the different gases which make up the air. Since water vapour is nearly one half the weight of the air's prime constituents – nitrogen and oxygen – a given volume of air will contain less oxygen and nitrogen and therefore be lighter.

– Flight Safety Foundation

Gen from Two-Ten

LEARN FROM OTHERS' MISTAKES—you'll not live long enough to make them all yourself!





CF104, UNBUTTONED DOOR After reaching 400 knots shortly after takeoff the pilot felt a heavy blow as if from a large birdstrike. Everything was normal on the dials, but a visual check in the air revealed that the port engine air intake inspection door was missing. No control difficulty was experienced; after burning off fuel the pilot made a safe landing.

That morning, an SI for inspecting IGVs – a job requiring opening the engine intake duct doors – was proceeding under "a sense of pressure to meet the program schedule". In a climate of haste this repetitious job ultimately produced one oversight – a door was left unbuttoned. Then, as so often happens, the whole thing snowballed.

The door stop (which would normally hold open the unbuttoned door) was found siezed from lack of lubrication. The closed door, from then on, went unnoticed. The pilot on his walkaround didn't see the extended fasteners either (see photo).

This sort of thing has a painfully familiar ring; the discouraging aspect is that one simple human error could have gone unnoticed by so many persons.

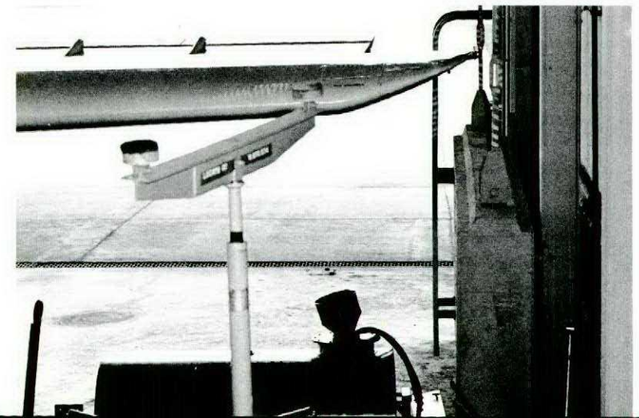
YUKON, STRUCK HELICOPTER The pilot was taxying into a tight spot that night – to his left a hangar and to the right a small helicopter which had been parked uncomfortably close. The captain wisely called for marshalling assistance; one of the three marshallers actually climbed up on the helicopter and signalled the aircraft to move forward. This marshaller hoped that the wing would pass – admittedly very closely – over the rotor hub and attempted to give the captain visual indications of this clearance. With only a few feet to go it became obvious that there was no clearance...

But how do you signal a stop (crossing the wands) with only one wand? The answer's in the photograph – you don't. This wand was checked out with new batteries and a new bulb and found intermittent – a condition it had been in for some time. If ever there was a need for a serviceable flashlight (value: a few bucks) it was in the moment just before the hapless marshaller leapt nimbly to safety. The pilot unwisely accepted one-wand signals, thereby adding the remaining ingredient to the accident.

A senior officer commented that "...a high risk factor in the loading ramp and taxi area should have increased vigilance and made crews and supervisors more aware of the importance of such things as correct marshalling procedures. Instead, it seems to have had a reverse effect and lowered the standard. The deviation from correct marshalling procedures...resulted in a costly accident."

ARGUS, TOWED OFF LINE With the wheels approximately 24 inches off the towing line there was a likelihood that the aircraft wingtip would strike something. The required maneuver (described as "unfamiliar") necessitated a max-rate turn to follow the line, but now the aircraft was out of position. The wingman, noting the impending collision, called for brakes but the inevitable rivetting gun and ground power unit commenced a shout-deadening racket.

With the wheels approximately



24 inches off the towing line there was a likelihood that the aircraft wingtip would strike something. The required maneuver (described as "unfamiliar") necessitated a max-rate turn to follow the line, but now the aircraft was out of position. The wingman, noting the impending collision, called for brakes but the inevitable rivetting gun and ground power unit commenced a shout-deadening racket.

The men on this crew seldom move aircraft and the unfamiliar maneuver they were performing was an invitation to an error in judgement.

Under these circumstances, relying on voice signals from a wingman is asking for trouble – and there's a fair clutch of these on file in the statistic section to prove it.

OTTER, HEAVY LANDING With flaps partly down and power reduced the aircraft was flown toward the grass strip for a practice forced landing. Not having performed the required check on the flap lever (also unnoticed by the co-pilot), the pilot accidently *raised* flaps instead of lowering them. The aircraft sank rapidly to the ground 80 feet below, causing B category damage.

The pilot claimed he was distracted by other traffic on the runway, hence had pumped the flaps without noticing that he was raising them – at least, until too late.

The relative simplicity of the Otter makes this oversight hard to understand; although when flown without checks, any aircraft becomes lethal.

ARGUS, U/S CAP MISSED After takeoff, heavy venting of fuel was seen coming from a filler cap between the engines. Aborting the mission, the pilot jettisoned fuel and landed. A damaged filler cap of old design and with weak springs had cost us an interrupted mission and more than 3000 gallons of fuel.

The cap was in such poor shape that it's difficult to see why it had been allowed to stay around – and become such an expensive component.

CHSS2, SEA CRASH On returning from a four-hour night training mission the pilot flew several controlled low approaches and on completing the final run-in was directed to perform a standard missed approach prior to entering the pattern for final recovery. The pilot was ordered to maintain a heading for radar contact; once located he was set up in a holding pattern to ensure separation.

A few minutes later the Sea King disappeared from the radar screen and there was no radio response. Another pilot nearby reported that the rotating lights and its reflection in the water had merged and gone.

Moments later red flares were seen in the water. A nearby helicopter was vectored to this position but attempts to recover the survivors were unsuccessful because the rotor downwash was so severe. Only the pilot and co-pilot survived; the two crewmen were lost.

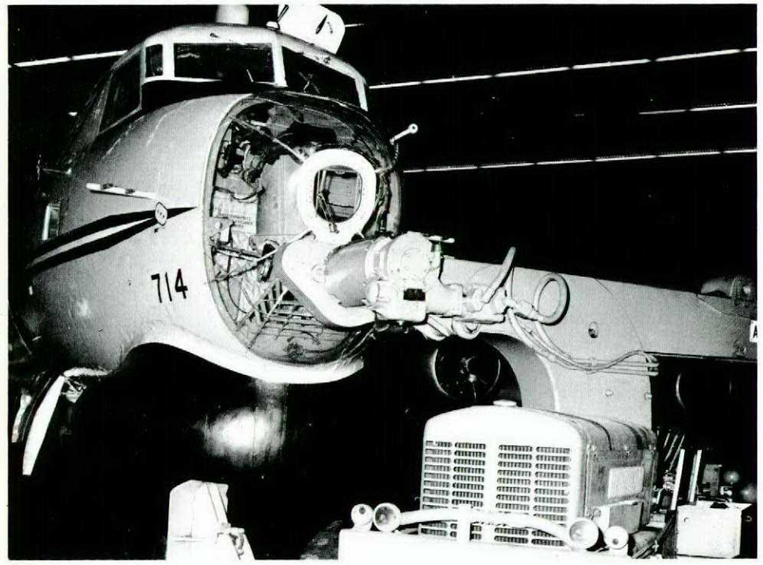
The survivors told a story of a sudden, unexpected impact with the water; "I think I was still straight and level and on the verge of commencing the left turn... At that point, I received a stunning blow to the head and I don't know anything from there until I woke up in the water..." The co-pilot observed that the night "...was extremely black..." and that he too had been unaware of the impending crash; "...I thought we had had a mid-air or struck something at altitude... I have no indication of what actually occurred... I felt the instruments were reliable...We were at altitude; I had no feeling of being near the water and I had no feeling that there was other aircraft or ships or objects in the area."

The pilot recalled, "After coming to the surface and prior to swimming over to where the co-pilot was in his liferaft, my first and immediate thought was it had to be a mid-air collision. That's the only thing it could possibly have been..."

Later, the pilot summed up his experience by stating that the cause of the accident might have been "...perhaps something cumulative..." He explained that during the flight he'd experienced some minor aircraft control problems related to the auto-pilot function. In that extremely dark night he was concerned at the time about establishing the position of another aircraft he knew to be in the vicinity. In fact, it was "...a whole bunch of things which are possibly on your mind..."

If the pilot were indeed flying a left turn, thinking he were straight and level the small amount of G imparted by the turn would give a false impression of climbing. In this configuration they could actually have been descending yet experiencing the feeling of maintaining safe clearance above the water.

The cause of the accident was assessed as disorientation. This points most strongly for at least one pilot to be fully occupied with monitoring the instruments. In an environment such as this a moment's inattention can be fatal; only the proximity to the carrier made quick rescue possible. Being without a crash position indicator – badly needed for this kind of operation – the aircraft and crew could well have disappeared without a trace.



ARGUS, CRANESTRIKE "There wasn't anyone around at the time..." said the crane driver who was attempting to maneuver his large awkward vehicle in cramped quarters. The driver described the difficulty he encountered when driving the vehicle over an external power cable bundle. He stated that the crane would surge ahead each time he'd feed the gas to drive over the obstruction. The surge, he claimed, resulted in the crane boom end smashing the nose windscreen – an expensive piece of damage.

Although experienced and competent, this driver unwisely continued maneuvering his vehicle without a lookout. The supervisors once tolerated this practice but no longer – the local technical order will be revised to make this lookout mandatory.

Thunderstorms

The Base Commander suggested that all sections should review their required actions in the event of a severe weather warning. The thunderstorm season is here...

- Flight Safety Committee

Grass attracts birds. . .

The airfield bird population has increased to a serious level with the presence of crows, hawks and small flocking birds of the starling type... long grass and weeds in the infield area were attracting the smaller birds... It was decided that airfield hay contracts be cancelled...

- Flight Safety Committee

Wanted: FOD-free tires

The vehicles used on the ramp all seem to be equipped with fine-tread tires which pick up stones and carry them to the aircraft maneouvring surface.

– FOD Committee

Comments to the editor

With advances in the state-of-the-art in trouble-shooting aircraft snags and engineering problems, the Gremlin (like the Dodo), is now extinct and can no longer be used to explain away undetermined cause of accidents/incidents. In this day of the space age and highly sophisticated scientific inspection methods, eg, non-destructive testing, silting index, in-flight maintenance data recorders, and LN3 system, it seems only logical that one of the main links in the chain of trouble-shooting – *the aircrew* – should also be brought abreast of the state-of-the-art and come under the physiological scrutiny of the polygraph (commonly misnamed "lie detector").

During a year considerable expense and man-hours are involved trying to locate snags that do not exist because it often appears that aircrew are prone to (forget?) the true facts pertaining to the problem – particularly if the evidence might be self-incriminating. The anxiety placed on technicians that work on the aircraft cannot be measured, nor can the helplessness experienced by those trying to locate a mythical snag.

Several polygraphs could be placed in strategic locations to be used when interrogating aircrew during the investigation of aircraft accidents/incidents. Medical officers could be trained in their use.

It is pointed out that the writer no longer doubts the integrity of the aircrew; he has, however, met many frustrated trouble-shooters that still harbour some misgivings.

If the Director is of the opinion that this idea has any merit, I would be pleased to submit it as an original suggestion. The instrument may eventually have widespread use in the field of aircraft investigation.

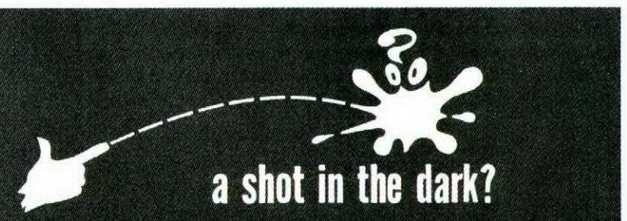
MWO J.W. Brown
CFB Gimli

You're on the right track scientifically, but there's the other aspect of its use – the ethical. Our guess is that pilots just might be hard to convince that it's in everyone's best interest to strap-in for the post-flight interrogation. The problem is the not-so-subtle implication that, as a recent article puts it, "The ordinary concept of lying in which investigative polygraphy is based, is that the liar knows his assertion is a lie, that he lies deliberately and purposefully...". The technician on the other side of the counter might have difficulty discerning changes such as salivation, heart rate, breathing and skin temperature but the article continues, "Some of the grosser physical manifestations of emotional tension are hesitation, stammering, fidgeting, perspiration and reddening of the face." Of course, to be fair (and argumentative) all persons entering "ground checked and found serviceable" might also be exposed to the squiggly-line scrutiny!

In an article "The 104 – No-Stick-in-the-Mud", in the Mar/Apr edition, your writer classified a nozzle failure accompanied by an engine oil low level light illumination as a "minor emergency". We think he's fooling. Would he care to reconsider?

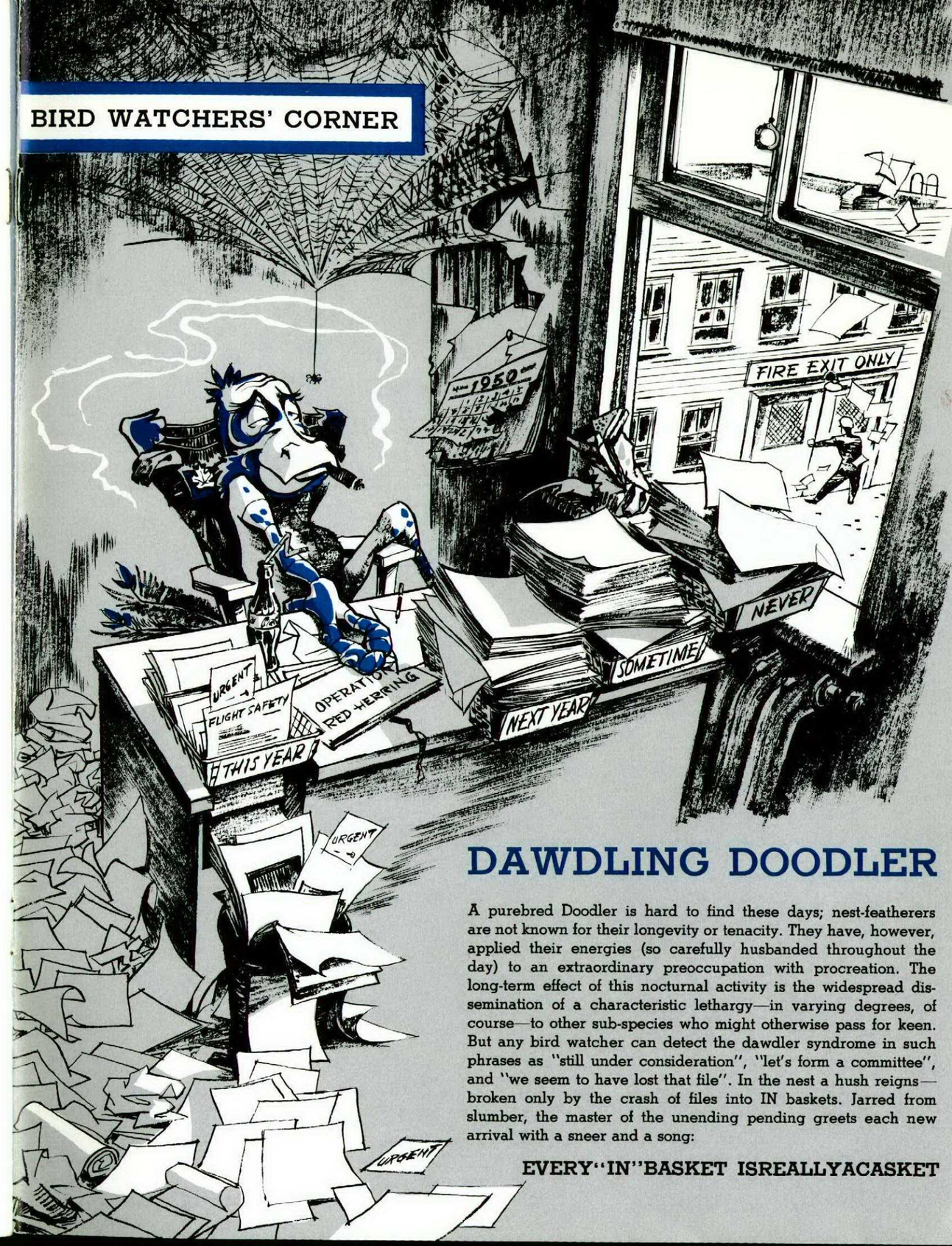
Capt S.A. Schnepf
3 Wing, Zweibrucken

He would.



a shot in the dark?

If it isn't found out, it'll never get fixed. *Anything that doesn't work properly should be set straight. We worry about pilots not recording unserviceabilities. Here's one "frinstance": nosewheel shimmy occurrences might be severe or light, but do you record all of them in the L14?*



DAWDLING DOODLER

A purebred Doodler is hard to find these days; nest-featherers are not known for their longevity or tenacity. They have, however, applied their energies (so carefully husbanded throughout the day) to an extraordinary preoccupation with procreation. The long-term effect of this nocturnal activity is the widespread dissemination of a characteristic lethargy—in varying degrees, of course—to other sub-species who might otherwise pass for keen. But any bird watcher can detect the dawdler syndrome in such phrases as "still under consideration", "let's form a committee", and "we seem to have lost that file". In the nest a hush reigns—broken only by the crash of files into IN baskets. Jarred from slumber, the master of the unending pending greets each new arrival with a sneer and a song:

EVERY"IN"BASKET ISREALLYACASKET

STOP LOOK READ !!!

They have Different Labels