FLIGHT COMMENT

NOVEMBER • DECEMBER
1973

Winter woes—part VII

Comments

Some concern has been expressed regarding the possible adverse effects of pocket electronic calculators on airborne electronics systems.

Pan American and United Airlines conducted both ground and airborne tests. No interference could be detected with the avionics system but the ADF exhibited interference when the calculator was held within five feet of the loop antenna and the ADF receiver was tuned to the maximum emission frequency of the calculator. This interference was only present when the calculator was outside the fuselage. No interference was detected when the calculator was within the aircraft – including the cockpit area. Aircraft tested were the B707, B727, DC8 and DC10.

A Department of Communications report shows that interference with ADF equipment could occur if the calculator is operated in close proximity to the ADF antenna or close to unshielded leads or terminals when the ADF receiver is tuned to the frequency of the spurious emissions (200 to 400 KH_Z band). Tests were conducted on a Bell 47G2 helicopter stationary on the ground. Inside the cockpit erratic radio compass headings were obtained by holding the calculator between the floor and plastic windshield and one foot or less from the loop antenna cable and also with the calculator held within six inches of the equipment rack.

To ensure that the requirements of Mil-Std-461A, "Electromagnetic Interference Characteristics Requirements for Equipment", are not being contravened, NDHQ/DAASE is raising a project with DGQA to conduct EMI measurements to Mil-Std-461A on a selected sample of portable calculators. The results will be publicized as soon as they are available.

At a recent conference on "The Use of Medication and Drugs in Flying Personnel", the Nato Advisory Group for Aerospace Research and Development noted that "coffee pharmacologically, affects principally the central nervous system and heart muscle. In moderate doses caffeine acts to increase performance levels and to lessen the effects of fatigue. It is recommended that the intake of coffee be limited to approximately 3 to 4 cups per day".

The *Flight Comment* feature, ROTORWASH, is prepared by DFS helicopter investigators, Capt R.A. Hall and Capt P. Armstrong. (Tel. 613-992-1979)

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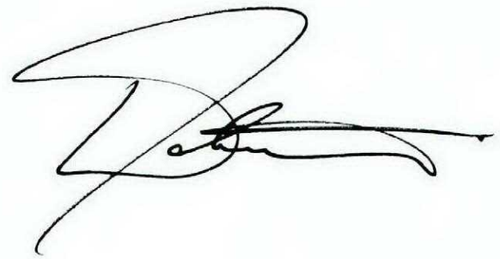
No Qualification Allowed!

"The aim of the flight safety program is to prevent accidental losses of aviation resources". Just in case there is any doubt this is amplified further by the Chief of the Defence Staff when he states "Hazards which could decrease a Command's operational effectiveness through loss of personnel and equipment must be recognized and positive action taken to eliminate them". These words express the aim clearly; why then do some people attempt to qualify it to suit the circumstances of a particular task or operation?

Oversimplified and to a degree overstated, it appears that some people are still not convinced that accident prevention is even more important during real operations than during normal routine. Worse, some look upon an active prevention program as an impediment to getting the job done. The urgency associated with an operational situation, coupled with the unknown, invariably increases the degree of risk. This is often ignored and positive action to eliminate hazards is replaced by an infinitely flexible attitude.

Whether you agree with this theory or not is unimportant. It is important however that we recognize and counter the tendency to change values when the pressure is on. Any "press on rewardless" attitude must be resisted from the beginning or we will find the aim qualified beyond recognition and usefulness.



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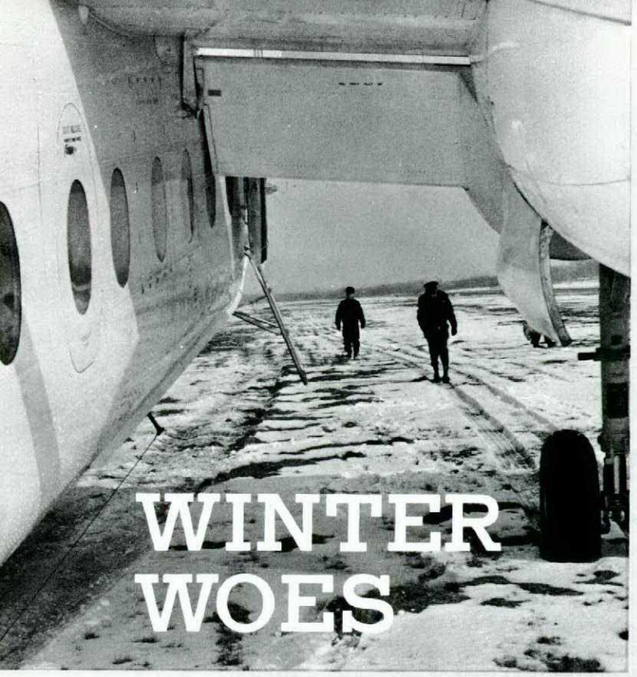


WINTER WOES

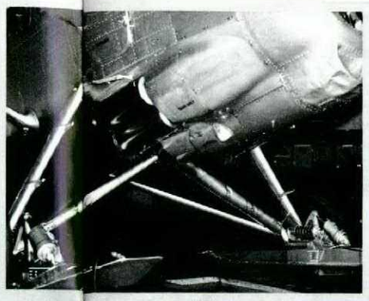
(an annual feature—No. 7 in the series)

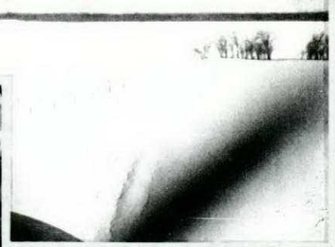
This is the seventh appearance of Winter Woes as an annual feature in *Flight Comment*. With minor changes, the incidents and accidents of former years are repeated with disheartening regularity. Although the hazards of winter operation are well-known and well-advertized, the element of repetition stays with us. Whiteout, slippery ramps, icy runways and other environmental conditions continue to plague the unwary. *"A little extra effort"* is a phrase which has become something of a cliché. However, in our severe northern climate, following the intent of that little cliché may well prove to be a life-saver.

Last winter's record shows that.....

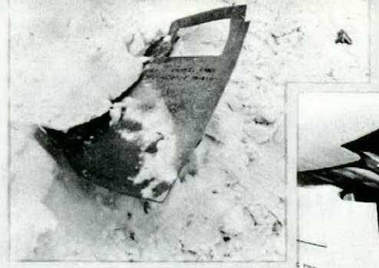
- Landing short was in vogue. Poor planning, combined with typical winter weather, led to a rash of undershoots.
- Helicopters still suffer from the illusion that they can safely fly under all kinds of weather.
- Extra care when towing on wet or icy ramps is the only way to prevent unwanted meetings between aircraft, mules and baggage carts.
- There were no fatalities attributable to whiteout or pressing on into snow showers.
- Helicopters continue to fall foul of obstructions hidden beneath the snow; stub wings and fuselages receive most of the stab wounds.
- Helicopters can be severely damaged by high winds if the rotor blades are not properly tied down.
- Private automobiles were back again after a year's rest; one attacked a parked Tutor.
- Otters avoided the "thin ice-capades" again but starred in other "winter follies".

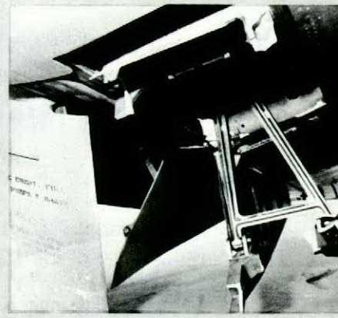
	WINTER INCIDENTS		WINTER ACCIDENTS	
	71-72	72-73	71-72	72-73
SNOW ON INFIELD	1	0	0	0
RESTRICTED VISIBILITY – HEAVY SNOW AND WHITEOUT	5	6	2	1
SNOW/ICE/SLUSH – RUNWAYS TAXIWAYS AND RAMPS	18	18	0	0
ICING – AIRFRAME, ENGINE LANDING GEAR, FLIGHT CONTROLS AND INSTRUMENTS	29	22	1	1



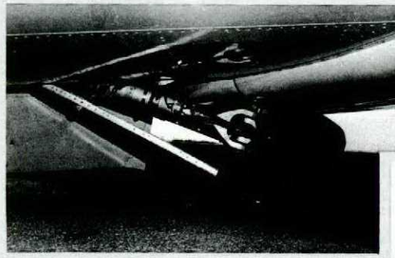


An Otter, a snow-covered field and a barbed-wire fence. Put them all together, make the snow surface wet and sticky, throw in an unexpected wind change, attempt to takeoff and...



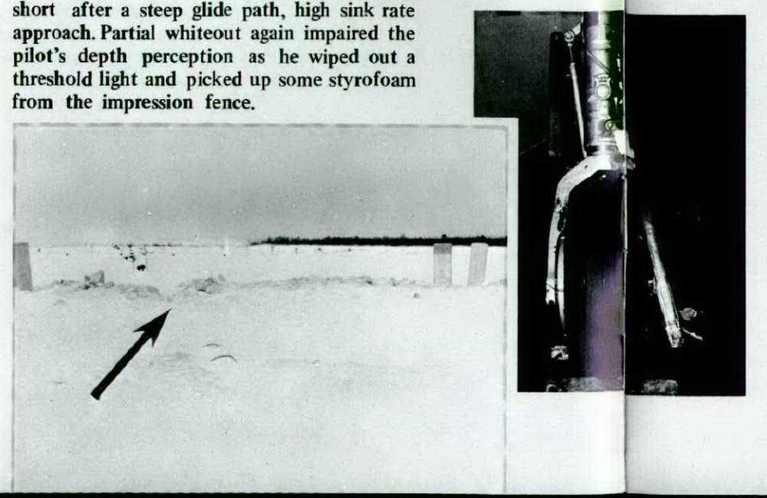


This T33 speedbrake contacted the last approach light leading up to the runway. The aircraft touched down 100 ft short of the threshold. Low airspeed combined with ice on the under-surface of the wings and tail caused this one to drop in short.



The cockpit indications showed three wheels down and locked. After a smooth touchdown the left wing began to drop and the left landing gear folded. A corroded downlock switch contained moisture which had frozen, preventing the switch from returning to the off position.

Not to be outdone, another CF 101 landed short after a steep glide path, high sink rate approach. Partial whiteout again impaired the pilot's depth perception as he wiped out a threshold light and picked up some styrofoam from the impression fence.



The weather conditions were marginal and the braking action was reported as "poor to nil", so the CF100 landed. The braking action report was found to be accurate and the Clunk refused to slow down. The pilot then raised the landing gear on his overweight aircraft as it approached the end of the runway. Only the right main gear retracted and the aircraft ground looped 70 ft off the end.

Voodoos got into the act with a bang last winter. The impression fence on the left was hit when the No. 2 in a formation dropped low on the lead. Falling snow and partial whiteout contributed to this off-runway touchdown.

Non-Crashworthy Fuel Kits

...don't compromise the compromise

The CH135 "Twin Huey" came into service with the Canadian Forces in May '71. This was the first new CF aircraft with a crashworthy fuel system (CWFS) installed by the manufacturer at the time of purchase. Since that time the "N" models have logged thousands of hours; three have been destroyed. The crashworthy system has proved extremely effective in reducing the post-crash fire hazard. In fact, since the US Army began a retro-fit program on its UH-1 aircraft no thermal injuries or fatalities have been sustained in survivable aircraft mishaps.

Nearly two years ago a USAAVS bulletin asked the following question:

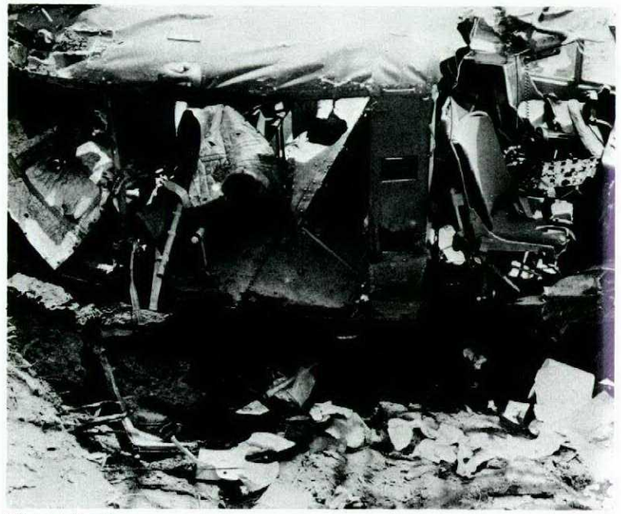
> "With such a magnificent fuel system in our aircraft, why then must we compromise the safety of the occupants and jeopardize the crashworthy fuel system by placing inside the aircraft non-crashworthy auxiliary fuel kits to extend the cruising range? "

The question is still valid today when CF squadrons utilize these 125 gallon fuel bladders which mount internally in the left and right rear cargo compartments. These bladders, when full of fuel, do more than just negate the value of the CWFS; their presence in an aircraft represents a retrograde step in fuel system development.

Obviously situations arise where two hours fuel is insufficient for mission requirements. For example, Base Rescue Flights using the CH135 would be hard-pressed to provide a realistic service without installing the range extension kit. Similarly, IFR flight plans for actual conditions may require extra fuel to meet CFP 100 criteria. However, with continual use, there is a danger that the kit will eventually be looked upon as an integral part of the aircraft fuel system. Rather than spend the extra time on careful pre-flight planning the captain may be tempted to just fill up the aux tank. There may be conditions other than SAR and IFR where the aircraft captain feels that he needs a few extra gallons. Unfortunately, the distinction between *extra* fuel and *enough* fuel soon becomes rather vague; the compromise becomes a convenience. Every time the non-crashworthy kit is used, the safety potential of the flight is degraded.

If range is a factor then the mission commander should consider a possible route change to provide additional refuelling stops. If this cannot be done because of the "time" element then the next question he must ask himself is . . .does the urgency of the mission justify the risk?

The US Army has recognized the need for a crashworthy auxiliary fuel system and bids are out for prototype development. This system will have two 75 gallon tanks mounted in the crew wells similar to the present ferry tanks. Until we achieve something along the same lines the present aux tanks should be used only when absolutely necessary. If the kit isn't essential for the mission, don't use it. *Minimize*, and don't compromise the compromise.



This is bad . . . .

. . . .but this is worse

On the Dials

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

Random Tacan

You are proceeding southwards, downhill on an en route descent into the Moose Jaw airport for a radar approach. Terminal control has just switched you over to your radar controller. The weather is 400 ft overcast and 2 miles in blowing snow. You attempt contact – to no avail – you have complete communications failure. What do you do now? Easy, you say; unless otherwise advised proceed via last assigned route and altitude to the initial approach fix and complete a Tacan letdown at time of arrival, estimated time of arrival last acknowledged, or last expected approach time – whichever is the later, squawking 7600. Great! You've got it all figured out. But there is one item that could affect the end result of the trip. The IAF at Moose Jaw is 25 nm southwest of your position, so, following the above procedure you have added approximately 60 miles to your trip.

Now let's back track a little to the point in space where you accepted your initial clearance to begin your descent. You could have requested clearance, in the event of a loss of communications, to proceed via present position direct to the final approach fix to complete a Random Tacan approach.

What is a Random Tacan? According to CFP 148 it is a nonstandard Tacan approach that positions the aircraft at the final approach fix by other than a standard type of approach. If no altitude is specified, the aircraft is to maintain an altitude at or above the quadrantal altitude depicted on the approach chart until the final approach radial is intercepted.

If you are receiving radar vectors to the final approach fix from MOT air traffic control, the same random procedure could be obtained by simply stating that that is what you are going to do in the event of communications failure. It could save you up to 15 minutes extra flying time in a situation where the pucker factor is already reasonably high.

So far we have discussed Random Tacan only as a radio fail procedure but it is also used as a letdown aid in several commands. It can be used quite efficiently to recover a large number of aircraft or to aid a controller in descending en route aircraft when he does not have RAPCON type radar.

The controller has several options open to him. He can clear you to the airport via the FAF if the traffic is light or he can clear you inbound on a radial to arc on a specified DME to the final approach radial and also have you report crossing certain radials. This latter procedure is the best from his point of view as he is aware of your approximate position at all times.

So, if in doubt about what to do, spell it out to the controller and chances are he will approve it and thereby save you many miles of extra travel and many pounds of needed fuel.

Murphied Messages

Most will agree that there is a certain art involved in message writing. Having mastered it however, the drafter still can't be sure how his message will look at the other end, for he is harassed by those same gremlins who bedevil typographers. Not unsimilar are the problems that confront those tasked with recording minutes of committee meetings, conferences and so on. Herewith the latest examples to come to our attention. If you have any you would like to share with our readers, send them along.

"When pilot lowered gear at 2560 kts, he felt a double thump."

"The aircraft struck a single strand uncoated sixteenth inch dia rusty black electric wire. The wire was used to carry a tricle charge to an electric cow . . . fence."

"At 1.5 DME climb to 50000 before turning to radial 2000 at 15 DME."

"On lift off from a touch and go the aircraft hit 2 gulls on the nose."

"No. 3 operator developed a headache and became nauseous."

"A recent accident where the long range fuel tank was purchased by the Fosdick reversed this former decision."

"A transportation directive on rotating warning lights has been prepared and is being stuffed at NDHQ."

"They reported that they had ordered a Frink Sander but Frink didn't know anything about it."

"The status of the proposed anti-skit system is to be further investigated."

Good Show

Capt G.R. Dunsby

Capt J.U.J. Montplaisir

CAPT N. DUMONTET

Capt Dumontet was leading a two-plane formation of T33 aircraft. After completing a radar low approach the formation entered the traffic pattern for a break and landing. While downwind Capt Dumontet's engine flamed out. An emergency relight was attempted and the aircraft was turned towards the base. Approximately ten seconds later the engine relit and the aircraft was positioned at low key. As final key was reached the engine flamed out once more but Capt Dumontet was in a position to land without further incident.

Post flight inspection revealed that one engine driven pump had seized and failure of the second was imminent.

The skill and speed which Capt Dumontet displayed in reacting to a critical emergency at low altitude are witness to his high degree of professionalism.

CAPT J.U.J. MONTPLAISIR

Capt Montplaisir is a flying instructor on the CH136 Kiowa aircraft.

During an instructional trip in the training area, his student was practising autorotations to power recovery. The student entered autorotation, inadvertently depressed the flight idle button and shut the engine off. The master caution light came on and Capt Montplaisir took control. Noting that the DC generator warning light was on, he asked the student to reset the generator switch. At the same time he noticed that the N2 needle was winding down. The engine-out light then came on. Capt Montplaisir transmitted a MayDay call and carried out a successful autorotation into a plowed field. The aircraft was undamaged.

Capt Montplaisir's quick reaction and professional flying in a hazardous situation prevented damage to the aircraft and injury to himself and his student.

CAPT G.R. DUNSBY

Capt Dunsby was a passenger on a Tracker during a training flight. An electrical fire occurred on board and Capt Dunsby was the first to detect the fumes. He immediately notified the pilot and then went aft into the electronics compartment. Although the area was full of thick acrid smoke, Capt Dunsby determined that the AN/ARC 27 UHF transceiver was the source of the fire. He quickly disconnected the cannon plugs; the fire stopped and the smoke cleared.

Capt Dunsby also removed baggage belonging to a second passenger from the compartment and prepared the cabin fire extinguisher for use. These actions were all carried out before the electrical fire check list could be completed.

Because of Capt Dunsby's alertness and quick action, a potentially dangerous situation was brought under control. The aircraft proceeded to its destination without further incident.

WO N.C. ROBERTSON

WO Robertson was the flight engineer on a Hercules scheduled for departure to Lahr. As a result of his actions a probable disaster was averted.

The aircraft had been certified serviceable after completion of the primary inspection. However, during his preflight inspection of the inboard portion of the upper wing, WO Robertson found a crack from the centre stress panel extending forward approximately 12 inches. He immediately reported his discovery and as a result of the damage, the aircraft was considered unserviceable beyond the repair capability of the base facilities. The aircraft was returned to the civilian contractor for a new wing stress panel.

This failure could very easily have been undetected. The nature of the crack was such that it was only visible when the wing was loaded with fuel and then viewed from a certain direction. WO Robertson's diligent inspection on a routine preflight is evidence of his professional approach as a flight engineer.

MCPL J.S. LACROIX

MCpl Lacroix completed a normal AB check on a Falcon aircraft, including a thorough examination of the wheels, which were found to be in good condition. The brakes were warm but not overheated.

The aircraft was refuelled and prepared for loading of passengers. MCpl Lacroix was standing near the tail of the aircraft waiting for a replacement GPU when he heard a slight snapping noise. This noise is not unusual when Falcon brakes are cooling. Just prior to boarding of passengers, MCpl Lacroix, following his own personal procedure, made a last minute external inspection of the Falcon and noticed that a crack had become visible in the outer rim of the starboard outer wheel. The snapping noise which MCpl Lacroix heard was undoubtedly the wheel cracking. MCpl Lacroix immediately notified the aircraft commander and the flight was delayed until the wheel was replaced. The nature of the crack was such that the wheel might not have withstood the stresses of takeoff.

MCpl Lacroix's thorough inspection and willingness to do a little extra work undoubtedly prevented what may have been a serious accident.

CPL G.L. GERVAIS

Cpl Gervais was a member of a tow crew moving a CF104 into a hangar for maintenance work. As the aircraft was being towed, Cpl Gervais heard a very unusual noise coming from the left main wheel. He immediately advised his supervisor.

Subsequent investigation revealed that one of the wheel brake alignment keys had broken loose, causing damage to the two outboard guide blocks and removing the inner guide block completely. This allowed a segment of the disc brake pucks to come loose causing the unusual noise.

Cpl Gervais has again demonstrated the care and attention with which he carries out his duties.

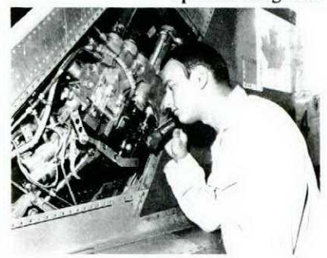
WO N.C. Robertson

MCpl J.S. Lacroix

Cpl F.J. Fortin

Cpl G.L. Gervais

Cpl J.R. Bergeron



CPL J.R. BERGERON

While carrying out the survey phase of a No. 3 check on a CF104D, Cpl Bergeron noticed that the hydraulic system return lines to the Rudder Servo were chafing.

Cpl Bergeron then carried out a comparison check on another CF104D and discovered the following conditions:

- No. 1 hydraulic return line was attached to the No. 2 system return line;
- No. 2 return line was attached to No. 1 line;
- No. 1 hydraulic pressure line was attached to the No. 2 pressure line; and
- No. 2 hydraulic pressure line was attached to the No. 1 pressure line.

A complete check of the CF104 fleet was carried out following the discovery and a UCR was raised.

This problem could only have been discovered by an interested, alert technician of Cpl Bergeron's calibre and indicates a high degree of professionalism.

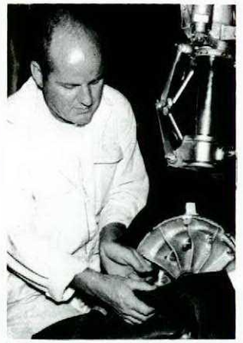
CPL F.J. FORTIN

Cpl F.J. Fortin was the Duty Air Traffic Control Assistant at CFB Trenton when a USAF T33, based at Niagara Falls, N.Y., arrived for some practice instrument approaches. During the initial practice approach, a high level Tacan procedure to runway 24, the pilot reported that he was experiencing vibrations of an unknown nature. The pilot continued the instrument letdown, executed a low approach and requested a high level return to Niagara Falls.

During the missed approach procedure Cpl Fortin noticed what appeared to be a loose panel and advised the controller. The pilot was requested to do an additional low approach for a visual check of his aircraft. Unfortunately, the low approach was too far from the tower for the controllers to ascertain any aircraft problems. Cpl Fortin advised the controller that the aircraft should bank to the left to display the suspected area more clearly. The captain of the aircraft was requested to comply with these instructions and to carry out an additional low pass. This time it was confirmed that a large panel, the

GOOD SHOW

Cpl T.R. Towers



Cpl M.R. Hickey

Cpl J.F. Quenneville

Cpl J.L.B. Plamondon

right hand engine access panel, was loose and vibrating against the side of the aircraft. The pilot was advised and he landed his aircraft immediately without incurring any difficulties.

Cpl Fortin is commended for his alertness and determination in seeing a hazardous flight condition completely investigated.

CPL T.R. TOWERS

While carrying out a Primary Inspection on a T33 aircraft, Cpl Towers observed the end of a metal object protruding from the trailing edge wing root fillet in the port flap area. The foreign object was a metal rod (a type of tool not used in the Canadian Forces) approximately 12 inches in length. The condition of the rod indicated that it had been lodged in this location for a considerable period of time. The cavernous nature of the wing root area had allowed the rod to exist in obscurity long enough for it to acquire several coats of zinc chromate. The layers of paint provided perfect camouflage and the rod blended in with the airframe background.

Cpl Towers is an IE Technician and is not therefore responsible for the area involved. The conscientious manner in which he carried out this inspection bears witness to his alertness and attention to duty.

CPL J.L.B. PLAMONDON

While employed in the CF101 Engine Bay as NCO in charge of the Starter and Afterburner Shop, Cpl Plamondon volunteered to assist an engine build-up crew perform an engine oil system flush.

During the course of the flush Cpl Plamondon decided to go a step further than required and with the use of a special tool removed the main gearbox scavenge oil suction pump strainer to inspect it for contamination. Not finding any contamination, he partially reinstalled the strainer to control drainage from the gearbox and continued with the flush. Once again, he decided to inspect the strainer and this time found two small pieces of metal. A visual inspection through the strainer hole in the gearbox failed to determine the origin of the metal. He then put his finger inside the gearbox through the strainer hole and was able to locate and remove a 5/16" X 3/4" bolt and more pieces of metal which were loose in the gearbox.

Further investigation of the gearbox revealed three bolts which were missing from the accessory drive front bearing liner, eleven bolts loose from various places in the gearbox, three key washers, one lockring and severe scoring of both the gearbox interior and the gear teeth.

Cpl Plamondon's professional attitude, determination and perseverance prevented the possible development of a very serious and costly failure.

CPL M.R. HICKEY

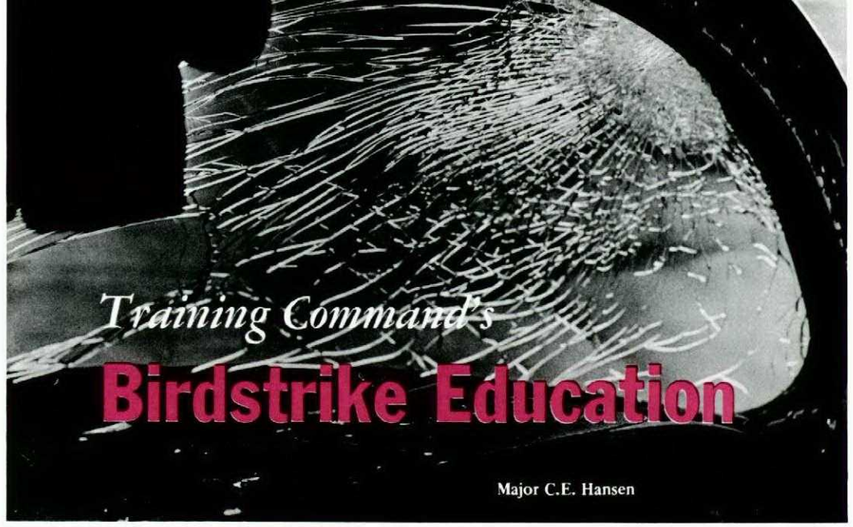
While performing a Primary Inspection on a transient T33 aircraft, Cpl Hickey found that the metal lining on the port wheel inner tube valve system was sheared. This unsatisfactory condition, had it gone undetected, could have resulted in a loss of tire pressure during the next flight with a subsequent air accident on landing.

The valve stem lining involved is not readily visible. Only Cpl Hickey's meticulous examination of the wheel and his conscientious approach to the task at hand prevented the development of a serious situation.

CPL J.F. QUENNEVILLE

Cpl Quenneville, an aero engine technician, was performing a Primary Inspection on the engine of a Dakota aircraft when he noticed a slight blow-back of oil on the accessory cowlings. A close inspection of the engine revealed that the oil leak originated at the base of No. 2 cylinder where one of the back cylinder hold-down bolts had sheared.

Cpl Quenneville's attentiveness and thorough workmanship averted a possible inflight emergency and he is commended for his attention to duty.



Training Command's Birdstrike Education

Major C.E. Hansen

Dr. V.E.F. Solman, chairman of the National Research Council of Canada/Associate Committee on Bird Hazards to Aircraft illustrates the birdstrike hazard.

The birdstrike hazard to aircraft is a continuing problem; however, we should not consider the situation as beyond human control. Experience has shown that the birdstrike rate and the resulting damage can be reduced through appropriate airport maintenance and flight planning practices. This can only be achieved by educating all personnel involved in aviation in the whys and wherefores of birdstrikes.

Dr. V.E.F. Solman and inspection team at CFB Moose Jaw view the scene of a recent birdstrike.

Recognizing this fact, Training Command decided to ask for assistance from the experts. As a result, Dr. V.E.F. Solman, an internationally known expert on the birdstrike hazard, and the present chairman of the National Research Council of Canada/Associate Committee on Bird Hazards to Aircraft, was kind enough to accept the challenge. This consisted of a visit to CFBs Cold Lake, Moose Jaw and Winnipeg where he conducted a survey of bird habitats on the airfield and then presented an educational talk on the subject to all available aircrew and grounds maintenance personnel.

Birdstrikes are considered as a two part problem: one is related to strikes that occur on or near airports and the other to those that occur during the en route phase of flight. The problems in each area are generally different and require different solutions; but the solutions are not easy. There is a need for constant vigilance and work because birds are very adaptable to new situations.

THE AIRPORT PROBLEM

Birds are attracted to an airport and indeed to any location by the availability of food, shelter and water – deny these and part of the problem will be eliminated. This initial move must then be followed up by an appropriate maintenance program coupled with constant harassing of the birds that still insist on returning to the airport.

THE EN ROUTE PROBLEM

The only effective method of reducing the birdstrike hazard in the en route phase of flight is to avoid flying through airspace known to contain large number of birds. This is easier said than done but the following rules will help:

- On low level operations airspeed should be reduced during bird migratory seasons. The force exerted by a four-pound bird struck at 600 knots can be as high as 57 tons while at 300 knots this force would be reduced by factor four to about 14 tons.
- During periods of high migratory activity, decrease airspeeds and increase rates of climb or descent during terminal flying. While en route, fly as much of the trip as possible above 10,000 feet MSL.
- Knowing where the primary migration routes are and when they are active can be a valuable aid to flight planning. However, the exact time of migration activities will vary from year to year depending on the weather. Keep in mind that migration activity usually increases at night. Bird migration forecasting services can provide valuable information in this area. ATC radar observations can also furnish information on current bird movements.
- Aircrew should use helmets and visors if there is a birdstrike risk. While low level, keep the visor down.
- There are indications that increasing aircraft conspicuousness through the use of lights may result in fewer birdstrikes. The use of landing lights is recommended whenever practicable for all flights below 10,000 feet MSL.
- *If AOIs permit*, keep your windscreen defrosters on. Tests have shown that a warm windscreen is more flexible and is therefore better able to withstand a bird impact.
- NOTAMS should be used to warn of local bird hazards.

THE IMAGE

What? Fighter pilots leading a prohibition parade? Not likely, since the "eat, drink and fly hard" image came into being during the flying circus days and seems to be as much a part of the tradition as the flowing scarf.

Anyone who has been around the fighter business for a long time has seen a lot of people working very hard to live up to that image. Midnight parties and sunrise takeoffs have been common in the past, despite the regulations. And though the image persists, all the conditions surrounding it changed until the image has become obsolete. How many flowing scarves have you seen lately?

The prohibitioners fought the sale of alcohol on the platform of sin and social ills, but several years of speakeasy society more or less convinced the public that morality couldn't be legislated, and the question on drinking would have to be settled on a personal basis.

This personal approach to drinking may be based on logic, for those who will face logic. And the logic for the crewmember is rather clear. His is a position that exercises control of life and death. His performance depends on the speed of his thoughts, the accuracy of his judgement, the keenness of his vision, and the fine co-ordination of body and mind. When he is not at peak performance in all these areas he has no business in the cockpit.

Beyond the debatable questions of morality and the undeniable social ills that result from heavy drinking, there is the health factor. The cycle of drinking, hangover and aspirin often leads to ulcers, as well as to liver ailments and to general physical and mental debilitation. Recent studies have indicated that alcohol consumption is also connected to a variety of other physical disorders that can and do lead to grounding and the loss of the extra challenge and income that go with flight duty. The aircrew member can't afford the results of heavy or injudicious drinking.

Why has the old hell-bent-for-leather image persisted so long? Perhaps, like most myths, it was fiction to begin with and is the romanticized picture of a common daydream. Perhaps it became necessary to work very hard to perpetuate it simply because it was so inconsistent with the real requirements of the work. The First World War flying heroes rarely fit the image. Study them carefully in factual histories and you'll generally find intense, calculating, self-disciplined men who were reasonably moderate in their personal habits. Even the scarf was a purely practical item used for warmth in open cockpits and to wipe goggles clean of oil sprayed back by leaking engines. It was the public, not the aviators, who made it a symbol. The same thing holds true with the competent World War II pilots. Since the newsman and the fiction writer desired characters whose ground exploits could make copy as exciting as the stories of their victories in the air, they didn't hesitate to create those exploits.

This is not to say that heavy drinking didn't exist or that there were no competent individuals in either war who drank to excess. These have been found in every profession and in every arm of the service. However, in time of war heavy drinking often follows the person who cannot master or control his frustrations, his loneliness, or his fear. He is hardly the stuff that makes either heroes or successful combat team members.

In peacetime excessive drinking is often related to fears of a different kind (fears of people, of facing past failures, or of failing present or future responsibilities) and to a variety of frustrations. Sometimes, heavy drinking among pilots is an attempt to live up to the false image of his predecessors.

Operations officers, squadron commanders and senior wing staff personnel have occasionally helped to perpetuate that false image. Too frequently the new squadron commander or ops officer has tried to show that he's the youngest and greatest fighter pilot of them all, both at 20,000 feet and at the bar. Too often, when the official hat is off, the wing staff officer climbs on the same train, dragging the young pilot along. At a flight school graduation party several years ago 85 men just beginning their flying careers watched a very senior officer become so inebriated that he played leapfrog across the dance floor with the cadets. He ended up in a heap against the bar and had to be carried out and tucked away. All in the tradition. On many occasions in past years officers have winked while crewmembers under the influence have damaged clubs and lounges . . . all in the tradition. And who can estimate the number of automobile accidents and aircraft incidents resulting from drinking contests . . . all in the tradition?

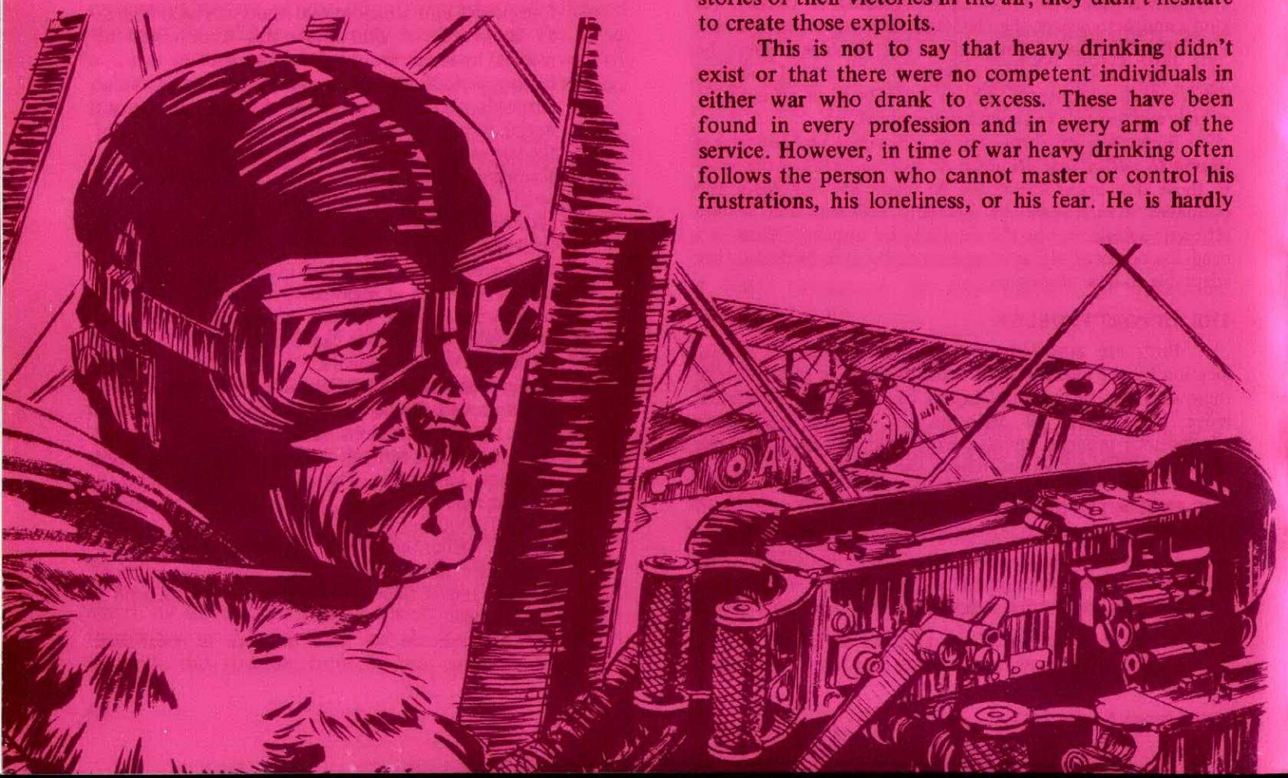
What tradition? What image? That whole thing is dead. It's dead because it's obsolete, if it ever existed at all. Certainly, it can't exist now alongside multimillion-dollar aircraft, saturated airspace, multimission equipment, multirole units, multifaceted competition, tightened budgets, complex social conditions, and the desperate need for true professionalism. Who's ever heard of a hell-raising, hard-drinking astronaut? And so this is another point of logic. The image is dead. Let's bury it.

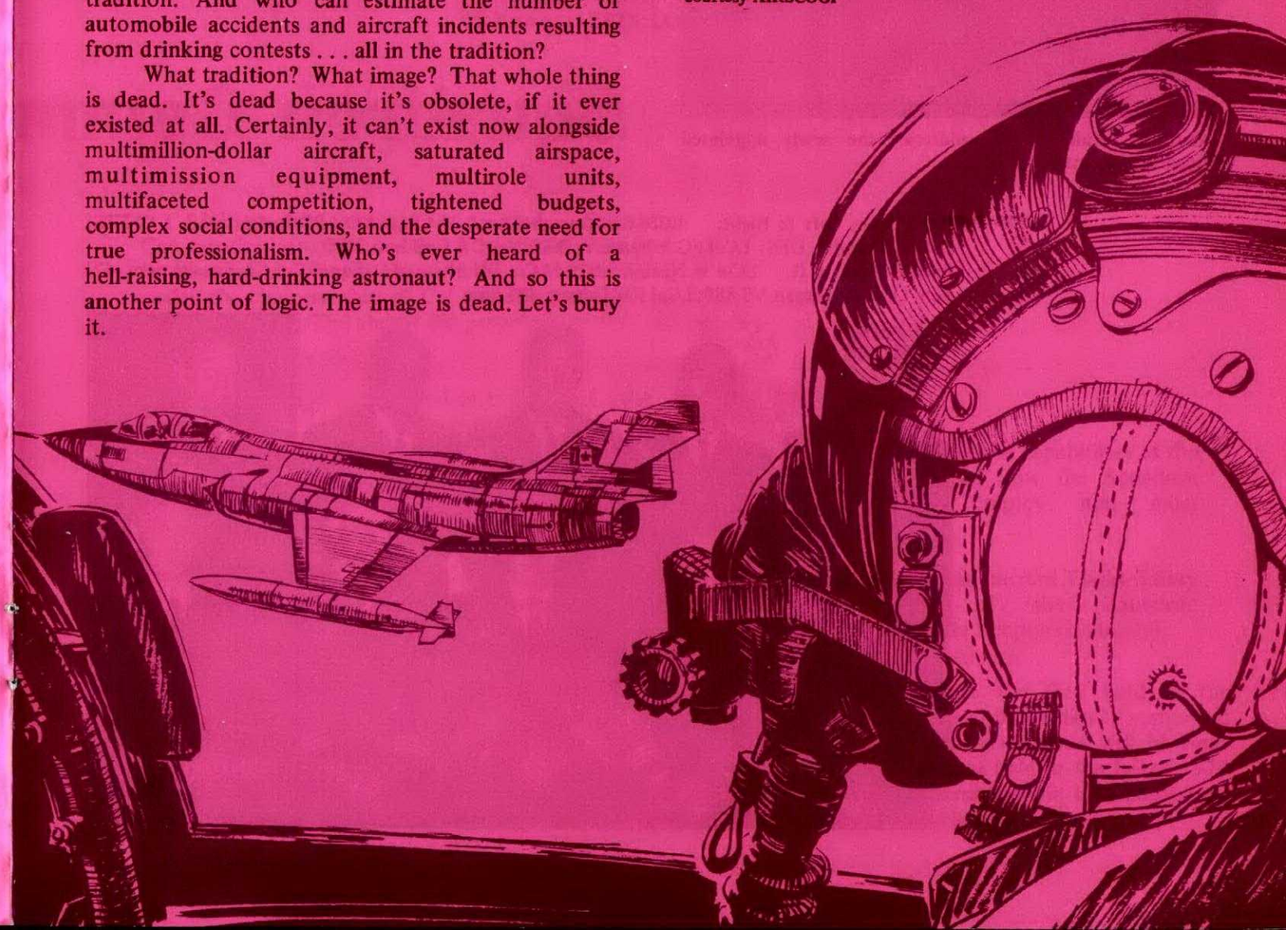
To drink or not to drink has been rightfully made a personal choice. However, the quantity one drinks as well as the time one drinks is not so purely personal. These are factors that have a large influence on a person's job performance, and they are therefore intermeshed in his obligations to the country, the Service, and his fellow workers. In the long run it should be apparent that it is illogical to abuse our right to fly by abusing our right to drink. When each of us in motivated, not by the regulation, but by a personal sense of responsibility, the new image of professionalism will finally lay the good-time boy to rest.

The 8-hour rule is a fundamental but imperfect recognition of this fact. In reality, any alcohol consumption that lessens our work performance ignores the obligation to our profession. And the hangover has probably caused far more accidents than has inebriation. Of course, one leads to the other, and it is prior to taking the first drink that the crewmember or worker must consider his responsibilities for the coming day.

No, fighter pilots will probably never lead the prohibition parade, but they should never again be the personification of its target.

courtesy AIRSCOOP





LGen AC Hull, VCDS, addresses the newly appointed Squadron Commanders.

LCol PD Ledgerwood, 1 CFFTS Cold Lake, discusses aspects of the T33 operation with Maj WG Willson of DFS and Capt FC Brewer, NDHQ/DGAM.

Front Row, Left to Right: LCol LA Ashley, 406 Sqn; LCol DM McNaughton, 427 Sqn; Col RD Schultz, DFS; LCol LM Wright, 444 Sqn; LCol RD Russell, 430 Sqn; LCol JR Chisholm, 403 Sqn.
Back Row, L to R: LCol GEC McArthur, 3 CFFTS; LCol SF Popham, 416 Sqn; LCol RW Fentiman, 408 Sqn; LCol D Broadbent, 425 Sqn; LCol RL Mortimer, 442 Sqn; LCol CD Young, 2 CFFTS; LCol RD Nurse, 426 Sqn.

Squadron Commanders Flight Safety Seminar

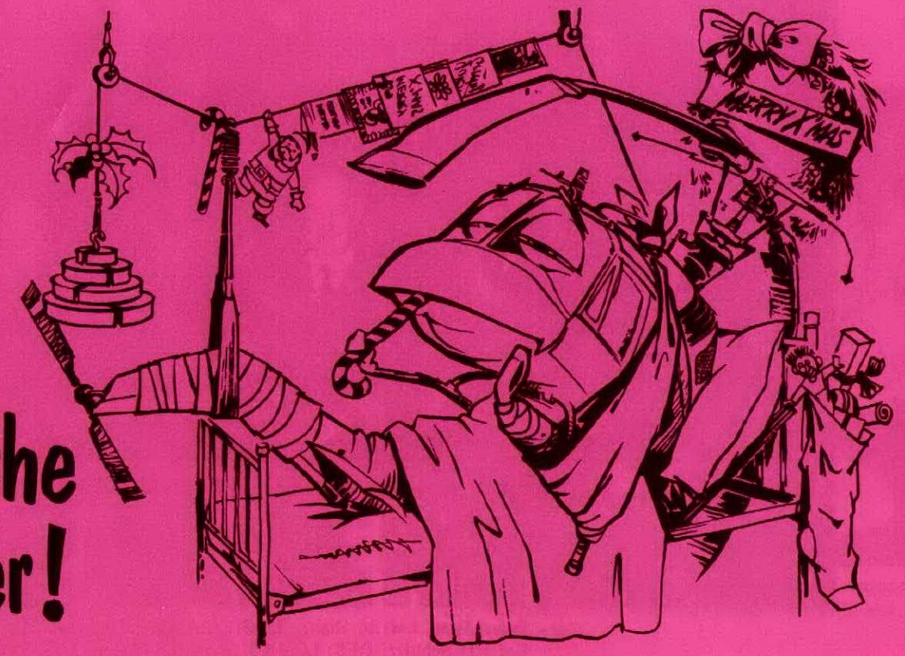
Front Row, Left to Right: LCol GE Younghusband, 434 Sqn; LCol PD Ledgerwood, 1 CFFTS; Col RD Schultz, DFS; LCol FG Villeneuve, DFS; Maj DA Davidson, DFS.
Back Row, L to R: LCol W Niemy, AETE; LCol DH Myles, 441 Sqn; LCol GL Fitzsimmons, 421 Sqn; LCol JW Stegan, VS 880; LCol RW Palmer, 435 Sqn.

Nineteen newly appointed Squadron Commanders attended one-day Flight Safety seminars in September. The seminars were held at NDHQ under the chairmanship of Col RD Schultz, Director of Flight Safety. The aim of the program:

- to promote an understanding of the principles of a systematic approach to accident prevention;
- to identify and discuss the most important elements of the Canadian Forces accident prevention program;
- to highlight the importance of supervision in accident prevention;
- to outline the training and capabilities of the FSO and recommend how the Squadron Commander can employ him most productively; and
- to detail the past and current Flight Safety problem areas of the Squadron Commander's specific weapons system(s).

These seminars were the first held in the Canadian Forces and were enthusiastically supported by those attending. Some refinements will be made before the next meetings are held in the fall of 1974 but it appears that the seminars will be a continuing program for the foreseeable future.

Under the Weather!



...sick helicopter tells all

"I wouldn't mind so much if I was a high time bird – but I'm not. I was one of the last to come out of Fort Worth. It seems so long ago now but it's only been two years. Just think about that. Two short years to change from a shiny, new, green twin-Huey standing proudly on the ramp in the Texas sun to an old, worn-out, banged-up CH135 shivering here in a maintenance hangar – what a career and what a way to spend Xmas! !

At first I was really looking forward to coming across the border. After all, my engines were brand new and built in Montreal – I even felt part Canadian. I had been told I was destined for a Tac Hel Sqn and I was pretty excited; little did I know what I was letting myself in for. Of course, if I'd had my rotor head *really* screwed on, I would have been a little wary from the day I got picked up. The two pilots seemed friendly enough but, come what may, they were determined to spend the night at Scott AFB. Now I used to be a little weak in my oil cooler fan area and sure enough, 150 miles out of St Louis, the blower shear pin broke and my No. 1 oil temp. just soared. Eventually, they shut down my engine – but pressed on, and then *terrified* me with an end run around a 60 mile squall line! We finally made it to Scott on one engine and I'd had my first taste of flying under the weather.

Instead of going direct to a Tac Sqn I went into storage. Eventually, I quite got to like it there. You know how it is, if you don't fly for a while, you get to the point where you don't want to fly. I made friends with some *really* old CF100s and a couple of Tutors. When the hangar doors were open we could talk to a Sabre who was parked outside. War Stories! You should have heard that old bird chatter. It was always Air Div. this and Air Div. that (though one of the Clunks told me later that he'd never been out of the STU at Chatham).

From time to time other Hueys, now called CH135s, would drop in and whilst the pilots were having coffee they'd tell me about all the wonderful flying I was missing. Field operations sounded like lots of fun and I even heard that we were flying in cloud, in actual instrument conditions.

Eventually my chance came and off I flew, complete with all the new mods, to my new home. Everyone wanted to fly *me* the new bird. I had thought that helicopter pilots were pretty much the same – just like Hueys off the assembly line. But not so! In the first few weeks I must have flown with every pilot on the squadron. Most of them treated me well but there were a few who made me shake in my skids and pucker my tailpipe whenever I saw them coming at me across the ramp.

One of the few I'll never forget was really rough on me. No matter what trip we were on, he'd practise autorotations. I'd be flying along on a navigation mission minding my own business and just enjoying the view when he'd suddenly rack my throttles back and slam down my collective! In fact, my first view of the inside of the maintenance hangar came after this autorotation-lover landed me hard on a touchdown and spread my crosstubes.

I was glad when I heard he was posted – but there were others to take his place. For the next year I was misused and abused. All the bad things seemed to happen to me. Other aircraft might suffer minor mishaps like an unserviceable Tacan or ADF or have an occasional tracking problem – but not me! Right from the start I was being written up in the major entries.

After the crosstubes incident I thought the pilots would take it easy on me – but no such luck. In the space of three short weeks I had two thermal runaways. My batteries were blamed, of course, which wasn't really fair. I had tried to warn the crew that my nose was getting hot but they insisted on using my batteries for starts and then not monitoring the loadmeters. Eventually I couldn't stand the heat any longer and just blew my top.

Shortly after this I lost all my transmission fluid through a seal which had been improperly torqued. Now I was being referred to as a 'lemon' – and all I wanted to do was fly and do a good job! It wasn't too long before I was back in the hangar with tail rotor bearing problems; but I didn't feel too bad about that: It was like flu that year – everybody was down with the same thing. Still, I was happy to get back on the line, especially when I heard that a detachment of aircraft was going north and that I was going to be one of the lucky three. This was to be a new experience on two counts. First, I had never been further north than North Bay and second, I had never flown in a Hercules. Although the C130 turned out to be cold and drafty it is a flight I shall always remember – the trip to the North I shall never forget.

For the first few days everything was great. I was flying six or seven hours a day and always with the same crew. The crewchief looked after me well, always took my SOAP samples on time and kept my gearbox topped up to just the right spot. The pilots were particularly careful to make sure that I was properly covered and tied down at night (one of my friends had been caught by a freak high wind which cracked his rotor blades). The arctic tundra was a fascinating place and I was quite happily employed carrying the soldiers back and forth on their northern manoeuvres.

I learned to fly tactically at low level and after hours of slinging, my pick-ups really improved. I had always been a bit nervous about night flying, especially when there were few visual references, but careful practice paid off and I soon became a proficient flier on both day and night operations. I had almost forgotten about my earlier unfortunate experiences and I noticed that the pilots had stopped calling me "the pig of the fleet". Ah! If only life could have carried on like that – but it was not to be. The next incident I had was very nearly my last and here's how it happened.

I had spent the morning carrying supplies and ammunition to B Company which was camped on the lake ice about 60 miles from the airfield. The weather was clear and cold and my pilot was planning a round-robin navigation trip in the afternoon. It was just a training mission and on the way back we were going to stop at B Company's position to pick up three passengers who were due for R and R. Everyone was briefed and I took off in bright afternoon sunshine. The co-pilot was map-reading and had no problem finding the first turning point even though there was very little to navigate by. From the conversation in the cockpit I gathered that he was mainly using the ground contours. We were about 120 miles from base when the weather started to deteriorate – rapidly. Fog was moving inland from the lake and it wasn't long before I felt pressure on my collective. Little by little we descended from 500 ft until the radar altimeter light flashed on at 200 ft AGL. The fog was getting worse and only the shadowy edges of the small lakes gave any visual cues. I was having difficulty keeping level and I noticed that my airspeed was slipping back, 80 – 70 – 60 knots. The friendly chatter in the cockpit had stopped – always a bad sign – and the co-pilot seemed to be lost. He didn't say anything but his finger was moving from place to place on the map and he kept looking out from side to side as if he hoped to see some landmark or check-point. I was getting nervous because my fuel was being used up as fast as my groundspeed was dropping off. The co-pilot eventually mentioned that he wasn't exactly sure of his position and suggested that we turn around and go back. I was all for it but the captain felt bad about the three passengers we were supposed to pick up. He decided to press on a little bit further. By the time we got down to 100 ft and hovering speed I was really scared. The crewchief and the co-pilot weren't saying anything but the captain was accusing the co-pilot of getting us lost; we hovered on. It was impossible to navigate accurately and the captain was relying on his compass heading. When my low level fuel light came on he was finally convinced that we should land and wait for an improvement in the weather: I spent a miserable night on the tundra.

The next day dawned bright and clear and we took off, eager to get home and let everyone know we were safe. We climbed to 5000 ft and soon contacted Sqn Ops. The co-pilot established our position and it was obvious that we couldn't make base with the few pounds of fuel we had left. We called for some drums to be slung out to us and then settled down to wait for help to arrive. You can imagine how I felt when a Vertol turned up slinging five barrels of JP4. It's bad enough running out of fuel but then to be sneered and jeered at by a Voyageur – I've never been so humiliated! We finally got back to base feeling very red-faced. The captain had some explaining to do and I was once again the "pig of the fleet".

That incident ruined the rest of my stay in the north and I knew my bad luck was back again. After two hairy experiences with bad weather I felt it was only a matter of time before I really got caught out – and I was right.

We had been back at base for about a month and a long weekend was coming up. I had been particularly busy training some pilots who were fresh from the OTU and the three day holiday was to be a welcome break from the long hours of tail-twitching in the field. The met man had promised snow for Saturday but the sky turned leaden grey on Friday morning; the flurries started, and flying was cancelled by mid-afternoon. I climbed up on my wheels and rolled happily into the warm hangar. It didn't take long for all the aircrew to disappear and soon there was nothing to be heard but the creaking of skids as

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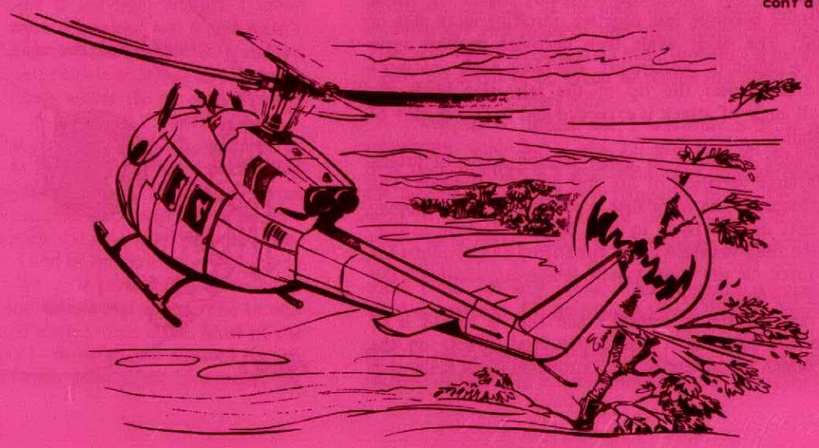
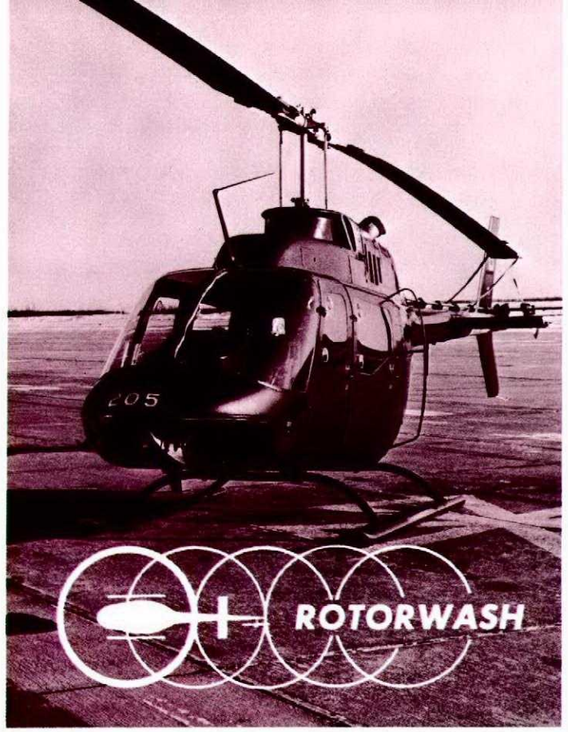




Blade Stall

If the airflow affecting a rotor in forward flight is analysed, there will be large variations in angle of attack on the blade sections along the advancing and retreating blades.

Fig 1 illustrates the variation of the angle of attack of the different blade sections at high forward speed.

There is a region of positive angles of attack resulting in positive lift over the entire advancing blade. Immediately next to the hub of the retreating blade is an area of reverse flow where Vfwd is greater than the rearward velocity due to rotation (V rot).

Then there is an area of negative stall where, although the flow is in the proper direction relative to the blade, the angle of attack exceeds that for negative stall.

Progressing out along the retreating blade, the blade angle of attack becomes less negative, resulting in an area of negative lift. The blade angle then becomes positive again resulting in a region of positive lift. The blade angle continues to increase until near the tip of the retreating blade the positive stall angle of attack is exceeded and the tip section of the blade stalls.

This wide variation in blade section angle of attack results in a large variation of lift and drag co-efficients. The overall lift force on the rotor disc is equalized by the flapping of the blades as discussed in our Sep-Oct feature article. However, the drag variation is not eliminated and accounts for a shaking force on the rotor system which contributes to the vibration of the helicopter.

The area of the retreating blade that is stalled is of interest to the pilot as it has detrimental effects on the helicopter which could lead to uncontrollable flight if the stall progressed. Retreating blade stall results when the angle of attack of the blade section exceeds the stall angle of attack. This condition occurs at the blade tip of the retreating blade since, in order to develop the same lift as the advancing blade, the retreating blade must operate at a greater angle of attack. If blade pitch or forward airspeed is increased, the stalled portion of the rotor disc becomes larger with the stall progressing inboard along the retreating blade. The stall region is generally found in the 8 o'clock to 7 o'clock position relative to the nose of the aircraft.

RECOGNITION OF BLADE STALL

Retreating blade stall can be recognized by rotor roughness, erratic stick forces, vibrations, and stick shake with a frequency determined by the number of blades and the rotor speed. For instance, each blade of a two bladed rotor will stall as it passes through the stall region and create a vibration with two beats per revolution. Blade stall can also be recognized by partial or complete loss of control or a pitch up tendency of the helicopter.

CONDITIONS FAVOURABLE TO BLADE STALL

Any condition that results in high retreating blade angles of attack can produce retreating blade stall:

- high airspeed,
- low rotor RPM,
- high gross weight,
- high density altitude,
- high "G" forces (high load factor),
- turbulence, and
- abrupt control movements.

RECOVERY FROM BLADE STALL

Recovery from a stalled condition can be effected only by decreasing the blade angle of attack below the stall angle. This can be accomplished by one or a combination of the following:

- decrease collective pitch,
- decrease airspeed,
- increase rotor RPM,
- decrease severity of manoeuvre, and
- decrease control movements.

There is always a forward speed at which the retreating blade will stall, and it can be safely stated that most limitations on forward speed are imposed because of this factor.

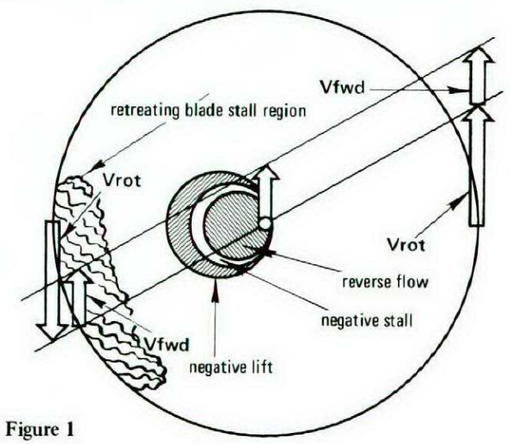
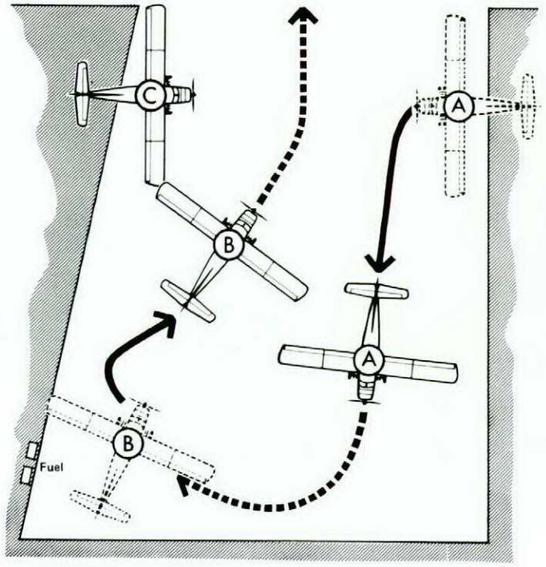


Figure 1

...as easy as ABC

Lack of adequate marshalling assistance continues to be the predominant factor in taxi accidents. The diagram below depicts the sequence of events leading up to a "C" category taxi accident which resulted in damage to two single engine Otter aircraft.

Aircraft "A" was taxied, with marshalling assistance, into the position shown to allow aircraft "B" greater clearance along his intended path past the parked aircraft "C". However, "B" began to taxi without marshalling assistance, became preoccupied with the aircraft "A" moving on his right and allowed his left wing to contact aircraft "C". Had the crews



involved been in radio contact (as required by Sqn orders), they may have at least been aware of each other's intentions and possibly prevented this accident.

Although the parking area was somewhat congested, this occurrence could have been precluded with minimal effort by simply employing a marshaller for both aircraft.

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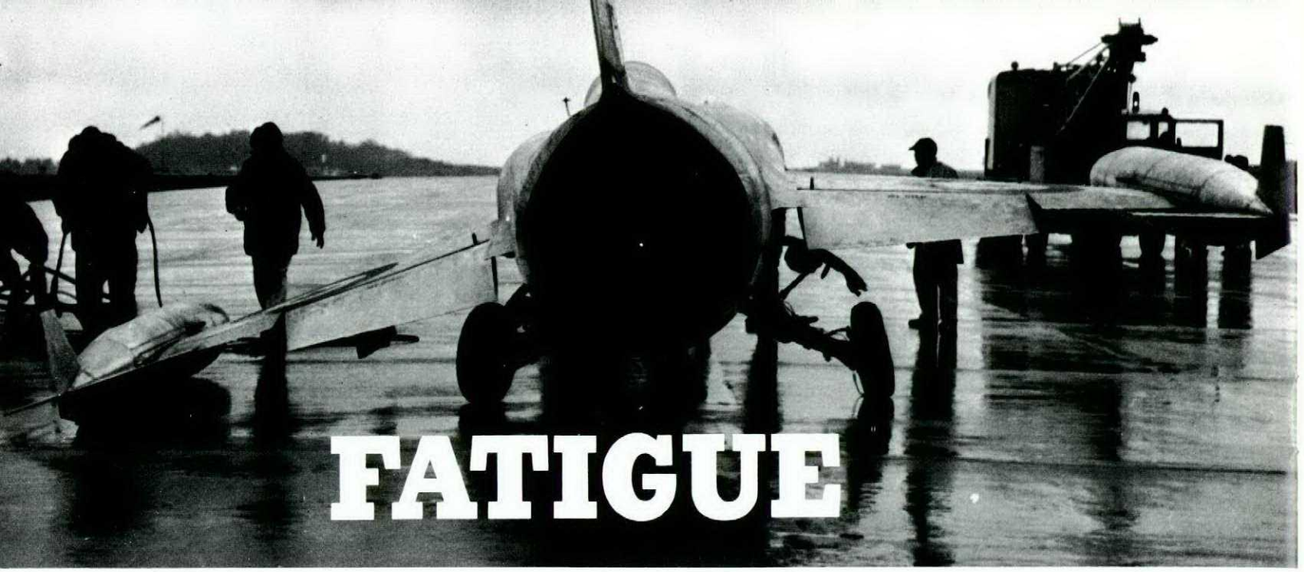
we all settled down to rest. I must have dozed off for a while because I suddenly came to as a blast of cold air and snowflakes whistled in from outside; someone was opening the hangar doors. The next moment, my wheels were being pumped up and I was hustled out onto the ramp. I couldn't believe it! I was going flying – and I could hardly see the end of the helipad. The pilots came running from the blister and climbed in. They were really in a hurry and quickly fired up my engines. From the odd bits of conversation I discovered that a light aircraft was overdue and that we were going to check out a distress signal which a Hercules had pinpointed in our area. The captain was very excited: he was sure he was going to rescue the two people in the light aircraft. I knew search and rescue missions were important but I still wasn't happy about the weather. My rotor wound up to 100% and we took off. Forward visibility seemed best at 300 ft and we were able to maintain 70 to 80 knots where the showers thinned out.

The Hercules, which was circling at altitude, vectored us towards the distress signal. At first we followed a river valley to bypass some heavy showers and then turned off across country into the higher ground. The pilot was forced to slow down and descend as we crossed the first ridge but once over the top the visibility improved and he increased speed, eager to reach the downed aircraft. We were now flying at tree top height as we flashed across the valleys and ridges. The terrain was hilly, heavily wooded and dotted with lakes. Most of the lakes were small and the steady snowfall had covered the ice with a thin white blanket of snow. After about 20 minutes the co-pilot pointed to a ridge up ahead. "Just two miles past that hill", he said, as we swept towards the crest .....

I can't be certain what happened in the next few moments but I remember my cyclic came back sharply and then slammed over to the left. I caught a glimpse of a wide, white expanse which must have been the surface of a big lake. As we banked I couldn't tell where the ground ended and the sky began. We flared and were suddenly right in the middle of a heavy snow shower. My nose came up in the turn and I felt myself sliding sideways. "I've got it", yelled the co-pilot – but it was too late. As he tried to level me off I felt my tail rotor slashing into the tops of the trees. When I woke up I was sitting on the edge of the lake; my tail rotor and boom were smashed off and most of one main rotor blade was missing. The crew wasn't injured at all but I thought I'd never fly again. I fully expected to be taken to pieces and given to the FTTU as a package of training aids.

Well, as it turned out, I was only a B cat and worth recovering. And that's why I'll probably be in here for the next three months. It's given me lots of time to think about all the terrible things that have happened to me. I'm not sure if I want to go back to a Tac Hel Sqn – perhaps that VIP flight would be a better deal. I don't want to spoil your Xmas fun but before you go back to your turkey and hot mince pies could I ask just one favour. Will you take it easy on me in 1974 and perhaps I'll get to spend next Xmas at home?

P.S. In case you were wondering, the light aircraft hadn't crashed. He just ran out of fuel and landed on a lake .....



FATIGUE

...aircraft component failure

Capt I.M. Ross
QETE

Each year many aircraft parts in service on Canadian Forces aircraft fail. A few of these failures cause accidents, others incidents, most merely inconvenience. But they all cost money. The most common diagnosis of the cause of these failures is "metal fatigue". But "fatigue" is really a symptom, not the disease.

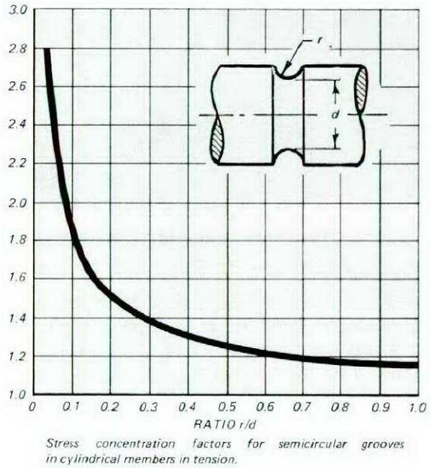
Fatigue is only the mode of propagation of a crack; some other mechanism is generally required to start the crack. This usually takes the form of some kind of "notch" to concentrate the stress. These notches are the disease which leads to fatigue and subsequent failure.

Notches in materials that are subjected to tensile loading have the effect of concentrating the stress in the material at the tip of the notch. This "stress concentration factor" depends on the sharpness of the notch. Figure 1 shows the theoretical dependence of stress concentration factor in notch sharpness, for a bar subjected to a *single* tensile loading.

When notches like these occur in materials that are subjected to cyclic loading, the stress concentration effect of the notch becomes more pronounced. Even at relatively low cyclic stresses, minute cracks will occur at the tip of the notch. After some time, these minute cracks will consolidate into one crack, which acts as a very sharp stress concentration notch. Then, with every load reversal, the crack will propagate a little further. How far it propagates each time depends on the magnitude of the loading.

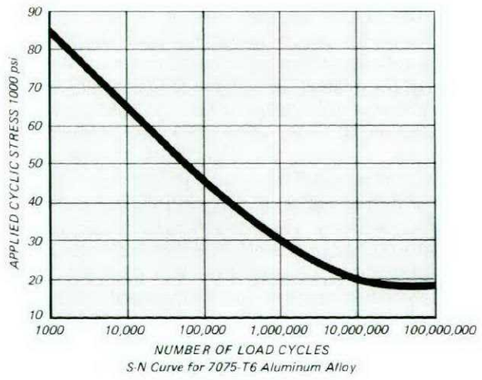
Eventually, the size of the uncracked material becomes too small to support the load, and the part will fail because the remaining material is overloaded.

How long parts will survive before "fatigue" sets in is largely determined by the designer. Figure 2 shows a graph of



Stress concentration factors for semicircular grooves in cylindrical members in tension.

Figure 1



S-N Curve for 7075-T6 Aluminum Alloy

Figure 2

applied cyclic stress vs number of cycles to failure (S-N Curve) for 7075-T6 aluminum alloy. From this it may be seen that repeated cyclic stresses of 60,000 psi may be expected to cause failure in 10,000 cycles. On the other hand, if the part were so designed that the maximum cyclic stress never exceeded about 18,000 psi, the part should survive almost indefinitely.

Now, the S-N curve is for unnotched specimens. If a designer decided a part had to survive one million cycles, he might build it out of 7075-T6 alloy so that its average stress was 30,000 psi. But, if a very small notch were to be put into the part – say because it was scratched by some tool – the notch would have the effect of concentrating the stress locally to a value perhaps 2½ times the average. The fatigue limit for this part would then be the same as for an unnotched part at 75,000 psi – only about 2000 cycles. Obviously such a scratched part would fail prematurely, to the chagrin of all concerned.

Besides "scratches" as mentioned above, there are other causes of notches that provide local stress concentration factors. One cause, built right in at the design or manufacturing stage, is sharp fillet radii. Another, often a legacy of the manufacturing process, is the presence of machining marks in the part. Last, but certainly not least, is the corrosion pitting that occurs in everyday service. When combined with fillets, machine marks and scratches, corrosion is a sure-fire way to get the local stress so high that fatigue cracks are off and running. One common cause of corrosion on aircraft wheels is the soap solution used to lubricate the bead area for tire installation (now under investigation at NDHQ).

So much for the necessary background and theory. Now let's look at a typical case of a wheel failure on one of our aircraft. Figure 3 shows the crack as it appears when inspected with a fluorescent liquid penetrant under ultra-violet light. Note that it is in a fillet radius and that machining marks parallel the crack. Figure 4 shows the crack opened out for examination of the fracture face. The fracture face shows the classic features of fatigue in an aluminum alloy – radial "rill" markings and semicircular "beach marks" or crack arrest lines. Figure 5 is a photograph taken in the Scanning Electron Microscope at 100X magnification, and shows that one of many initiation sites for this crack is a corrosion pit.

What can we do about fatigue? We in DND cannot usually control the design of aircraft parts, but we can keep an eye open for grooves, fillets, machine marks and other "notches" which may cause fatigue cracking to set in.

Of course, we must never allow scratches on an aircraft part. If they are found, they must be polished out in accordance with applicable CFTOs.

And chase that demon, corrosion. Always be sure that parts are treated as specified; painted if so indicated. This is important on all aircraft, not just on those in a maritime environment.

And just because some of our airplanes are ancient and venerable birds does not mean they are immune; rather the opposite. Every flight will bring it further along the N-axis of the S-N curve; ever more likely to have some fatigue cracks progress to the visible level.

So next time you see a cracked part that failed by "fatigue", think about it. Was it a preventable failure? Did the crack start at a scratch made through carelessness? Was corrosion evident that had been ignored? Usually the answer to these questions is *yes*.

Think about that.

Figure 3 **The appearance of a defect indication in an aircraft wheel using fluorescent liquid penetrant and ultra-violet light.**

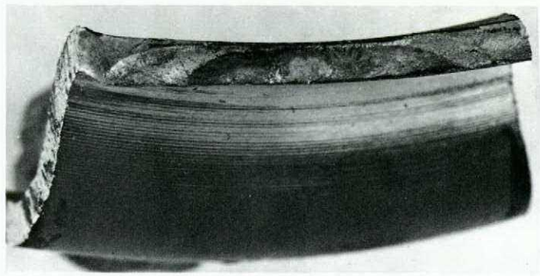


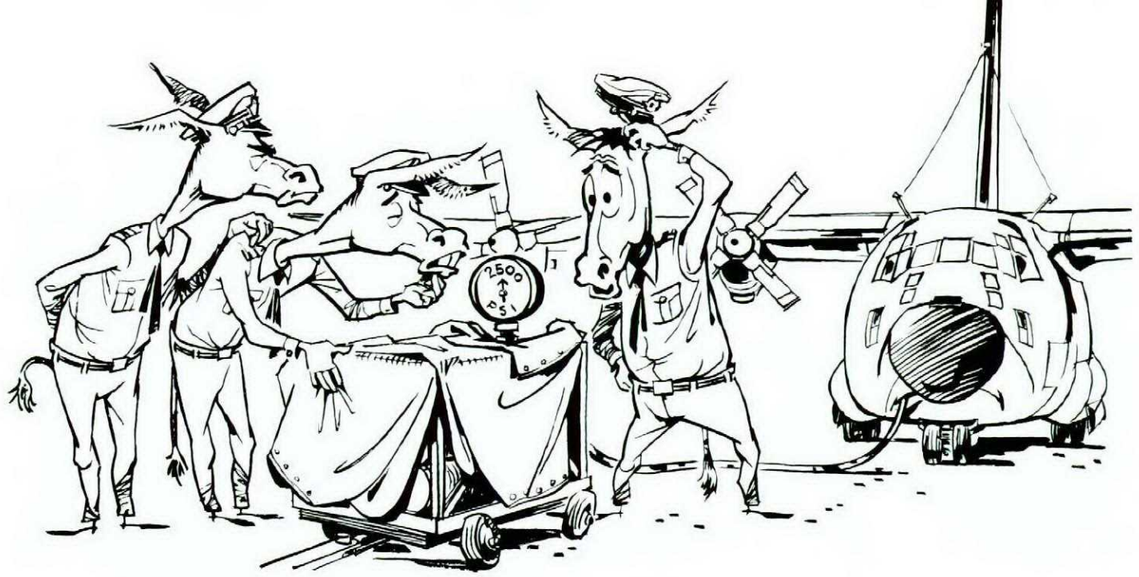
Figure 4 **A view of the defect after cutting to the crack and breaking open.**

Figure 5 **A Scanning Electron Microscope view of the crack initiation site at 100X magnification. Corrosion products in scratches and machining marks are visible. Radial rill marks can be seen running from a corrosion pit.**

Captain Ross was born in South Africa, where he completed high school and part of his university training. He came to Canada in 1963, and finished his B.Sc. in mechanical engineering at the University of Alberta in 1967 under ROTP.

After graduation he served with 408 Tac Sqn, 429 T Sqn (CAFMTO), 450 (T) Hel Sqn and 2 AFMS as a maintenance officer.

Before taking up his present position as Failure Analysis Engineer at QETE, Hull, Capt Ross completed a Master of Engineering degree at RMC Kingston.



ASS [U(ME)]

U ASSUME and I ASSUME will make an ASS out of U and ME.

The above non-mathematical equation was passed on to me by a very enlightened friend who had learned it the hard way.

He was the senior flight engineer on a flight which was scheduled to refuel at a USAF base after a very enjoyable and expensive stay south of the border. Yes, the trip had been to one of the more exciting places in the world. The crew prepared the aircraft for the long flight home and since the oxygen system required replenishing ordered the oxygen cart through Base Ops.

When the oxygen cart arrived it was the standard storage bottle type with a self-contained pressure gauge. It was connected to the aircraft oxygen replenishment system and the valve was opened. There was no delivery. The gauge on the oxygen cart indicated 2500 psi and the aircraft gauge read 600 psi. There was no drop on the cart gauge to indicate delivery nor was any rise noted on the aircraft system gauge. The oxygen simply wasn't flowing. The servicing technician who had delivered the cart informed my friend "Sarge, you sure got trouble with your airplane."

By this time the rest of the crew had arrived, and when told of the situation, volunteered to help. Engineering Orders were consulted and the aircraft oxygen system was checked. The crew members made suggestions: the non return valve on the delivery line was stuck closed; there was a restriction in the line and so on. All were checked and all proved to be incorrect. This, of course, took time and the aircraft captain, faced with a long flight home and the responsibility of remaining within the crew time limitations, declared a 24 hour delay. Messages were sent. The reason for the delay was an unserviceable aircraft oxygen system.

Meanwhile, the line servicing crew had changed shifts and the shift NCO was a grizzled master sergeant who had been around for a long time. He arrived at the aircraft and asked what the trouble was. When informed, he asked if another cart had been tried. It hadn't. With that, he walked over to the delivery cart and rapped the gauge with his clipboard. The needle fell to zero – the cart was empty. Small wonder there wasn't any delivery – there wasn't anything to deliver. The gauge had been stuck at 2500. Another cart was obtained and the system replenished. The master sergeant then passed on the title quotation to my friend with the extra advice. "Son, you never assume anything around an aircraft – you always check and double check everything".

Humorous? Ridiculous? Unprofessional? Perhaps, when the incident is viewed with the advantage of hindsight. Yet all the people involved were very experienced. What had happened? Did the cart attendant plant the first seed with his statement "You sure got trouble with your airplane". Certainly everyone involved *assumed* that the cart contained 2500 psi – until a master sergeant arrived who had learned not to *assume* anything.

Capt C.A. Lagroix

Aluminum Undercast

Ever wondered exactly how large the Boeing 747 is? The crew of a Canadian aircraft were flying at 53N 20W on a clear night at FL 370 with all quiet, when suddenly both radio altimeter pointers went to 1900' and all MDA lights came on for about 5 seconds. The crew all immediately looked out to check that the Atlantic was still well below and a few moments later a Boeing 747 at FL 350 appeared, as it overtook them eastbound.

Flight Safety Facts and Analysis

New Look on the hangar line

Capt D.E. Street
NDHQ/DAMR

In February of this year the National Defence Committee on Dress and Clothing (NDCDC) formed a working group to tackle the problem of environmental clothing for tradesmen.

The group was tasked to review the environmental clothing now available and to make suitable recommendations for the development of new, rational scales of issue. The NDCDC is concerned with clothing for the whole of the Canadian Forces and the old method of establishing scales for each individual shop or trade requirement is being discontinued. The submissions prepared by this working group will provide a scale of issue for each of the CF trades for use under all climatic conditions.

The members of this working group were selected to provide representation from the air, land and sea elements. The air element trades were represented by the staff of the Directorate of Aircraft Maintenance Resources (DAMR).

Over the years bases have been striving to obtain suitable equipment to meet their own particular requirements using the Material Authorization Change Request (MACR). Each request is considered on its own merit and the results do not always appear satisfactory or consistent to the user. This study provided the opportunity to take all these previous requests into account and attempt to provide scales that really meet the needs of the tradesmen. Some of the items which were the subject of MACRs and which posed most of our problems are listed below and hopefully will be part of the new scale:

- balaclavas
- white coveralls
- sunglasses
- suitable mitten combinations
- intermediate weight jackets and
- parkas, which could be made available on the basis of need rather than by an arbitrary decision based on mean temperature.

Another problem that had to be resolved was to decide which characteristics of each garment should be given the highest priority when specifying the design. For instance, it may be desirable for coveralls to be moisture proof so they won't absorb POL but if that means they will become like a sauna to work in no one will be happy with the coverall. In any event, it was necessary to look for the best compromise between the various qualities. Some of the points which have been considered and assigned relative priorities: comfort, size, colour, propensity to static electricity, resistance to shrinkage when laundered, durability, permeability and of course, the one we all recognize, relative cost. During these considerations it was also obvious that the overriding factor must be to provide a garment that would win user acceptance.

These tasks have been completed and recommended scales of environmental clothing for all aircraft technicians have been prepared and submitted to DMatA for review and subsequent submission to NDCDC. Probably some time will elapse before the recommended items show up on the hangar line. However the wheels of progress are turning and hopefully something will be done in time to alleviate some of our winter clothing problems.

Short Circuit Chaff

A recent incident message told a tale of smoke in the rear cockpit of a T33. The initial investigation, which consisted of a complete visual and functional check of the electrical and communications equipment, failed to discover the cause of the smoke. Then, during a check of the wiring, technicians found a few strands of chaff (tinfoil strip) in the area where the smoke had been noticed. Further investigation revealed that the rear seat had been removed from the aircraft on the last inspection. One of the chaff dispensers showed signs of a recent repair. It appears that all the chaff was not cleaned out of the rear cockpit after the inspection and some of the free floating tinfoil fod had short-circuited electrical contacts, destroying the chaff and causing the mysterious smoke.

Gen from Two-Ten

CF104 SPEARS MULE The mule was towing a CF104 along a taxiway which had recently been asphalted. Unfortunately the surfacing had not been completed and there were two one inch drop offs where the asphalt paving ended. As the tractor passed over the first rounded drop the shear pin on the tow bar broke. The Starfighter rolled on until its pitot boom struck the safety plate on the towing tractor. The pitot head and right vane were torn off and damage also occurred to the underside of the aircraft. Following the impact, the mule driver and lookout abandoned the vehicle which finally came to a halt against a guard shack. The aircraft travelled approximately 80 ft from the time the tow bar broke until it was finally braked to a stop.

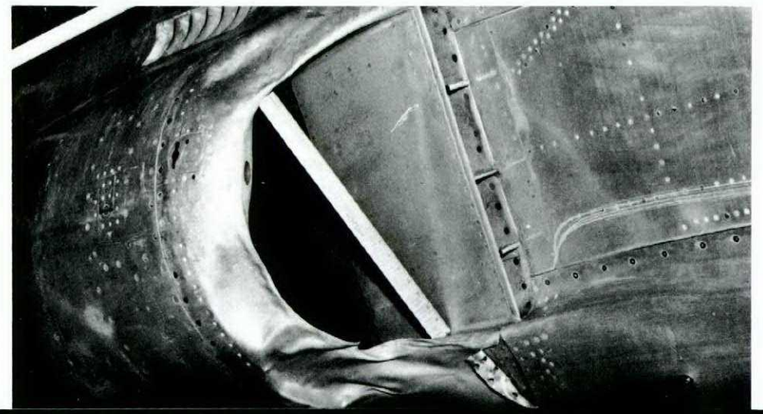
In this instance the NCO in charge of the towing operation was in the cockpit of the aircraft, riding the brakes. He was not in a position where he could adequately direct the operation. Again, the mule's speed was excessive for the conditions and the driver did not reduce his speed in time to safely cross the bump.

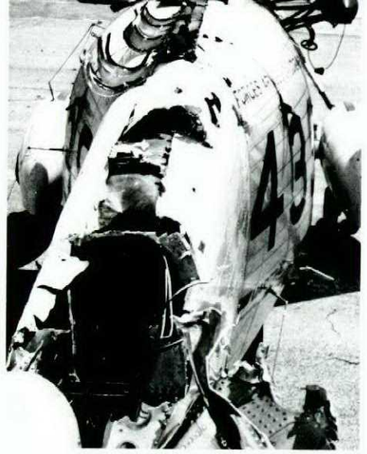
CF 104, CRASHES INTO SEA The detachment of five Starfighters was temporarily based at Bodo, Norway, conducting tactical and ACM training. Lead briefed a section of three for a mission which was to terminate with a tactical break and landing. The weather was excellent and the flight proceeded normally until the pilot in Number 2 experienced a momentary dizziness after an abrupt recovery from a manoeuvre. He checked his oxygen system and found it fully serviceable. He decided, however, to return to base, refusing lead's offer to accompany him.

Lead and Number 3 continued the exercise, then returned to Bodo and after calling initial had to make one left orbit for traffic separation, following which they performed the tactical break. Lead called turning base with his gear down and was then seen to roll hard right, pitch up, roll through the inverted position and then roll left in an increasingly nose down attitude. The pilot ejected and the seat cleared the aircraft but struck the water as separation was taking place. The pilot was killed.

The aircraft wreckage was recovered and the subsequent investigation determined that the pilot was in a tight downwind position and while on final turn induced an accelerated stall and pitch up from which he was unable to recover.

T33, TREE STRIKE A student pilot was in the front seat of a T33 with his instructor in the back for a formation training trip. The lead aircraft of the two-plane section was flown by two staff instructor pilots. The mission was briefed and the formation climbed out into the area. After 50 minutes of upper air work the formation turned towards the base and penetrated in echelon right through a hole in the clouds. As the student was having difficulty maintaining position because of turbulence in the lower levels the instructor took control. The descent continued and the formation flew across a lake, banking to the right in a gradual climb over a small island. Shortly afterwards, the wingman moved out of position and requested a visual check of his aircraft. He had felt a "thump" and there was a "pine" smell in the cockpit. The lead's inspection revealed that the Number 2 aircraft was damaged on the lower portion of the right intake. After a controllability check, the section returned to base and landed. Number 2 had struck the top of a coniferous tree as the formation crossed the island. Enough said?

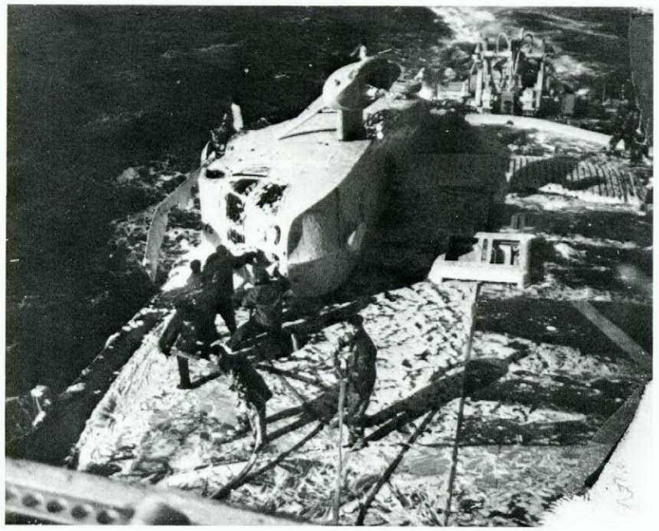




SEA KING, TAIL CHOP

The Sea King was on a training flight at a US naval air station. After a number of run-on landings the crew decided to practise autorotations. Six autos were performed uneventfully. The seventh autorotation, however, was the final one. The aircraft entered the manoeuvre at 1300 ft MSL, made a 90° turn and rolled out on runway heading at 800 ft MSL with an airspeed of 60 kts. The descent was continued towards the runway to 175 ft AGL where the pilot initiated a 20° flare. This nose-up attitude was maintained momentarily until the pilot, judging that the groundspeed and rate of descent were still too high, applied aft cyclic at a height of approximately 70 to 80 ft AGL. This aft cyclic movement was made very rapidly and a loud noise was heard. The pilot levelled the aircraft, which was yawing severely. He noticed large pieces of flying debris and immediately landed.

Investigation revealed that a main rotor blade had struck the tail cone. The combination of low main rotor RPM, low coning angle of the main rotor blades and high flare angle required only the rapid and excessive aft cyclic movement at the bottom of the flare to cause abnormal flexing of the rotor blades.



SEA KING, ROLLOVER After completing a mission which included a bell-mouth hauldown landing and a free deck landing on two other ships the Sea King returned to HMCS Fraser. Following the hauldown recovery in Fraser, the aircraft was trapped and disengagement procedure was commenced. The crew commander had just brought No 1 engine to ground idle when he heard a loud cracking sound aft of the cockpit. The helicopter then fell over on its right side as the starboard stub-wing separated from the fuselage. Both engines were secured and the rotor brake applied. The blades were turning, however, as the helicopter rolled. The disintegrating rotor wiped out the safety net and support stanchions. Flying debris also penetrated the hangar door. The crew escaped without injury through the port entrance door and the emergency escape window. The helicopter suffered "B" category damage.

Only the immediate response of flight deck personnel and the Fraser's ship's company prevented a possible disaster.

Investigation revealed that the front and rear starboard stub-wing fitting assemblies had failed due to one or more overloads. This problem should be overcome by the present Sea King modification program which provides for strengthening of the sponson and stub-wing area.

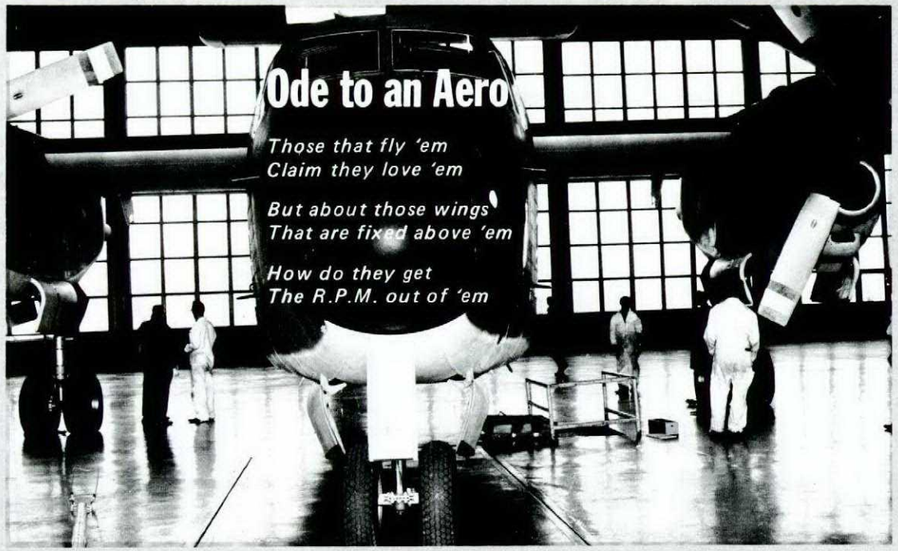
Comments to the editor

AERO ODE

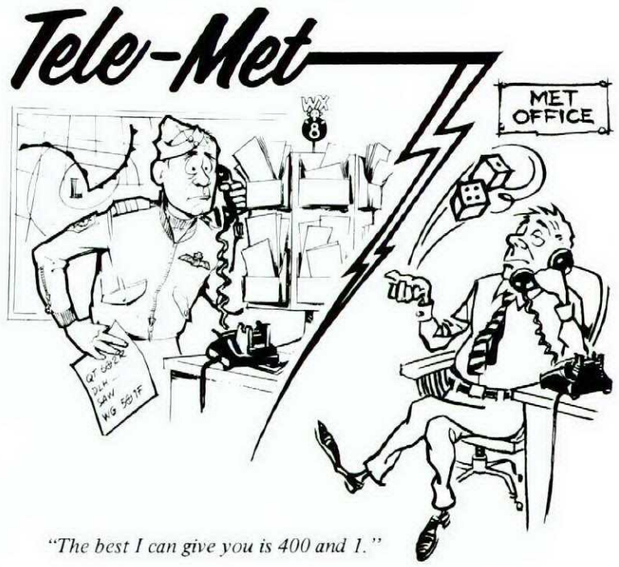
Being avid readers of "Flight Comment", may we at the Helicopter base at Torbay, Newfoundland offer a sequel to your poem "Ode to A helicopter" (May-June '73).

J.C. MacDonald
Helicopter Section
MOT
St John's Nfld

You certainly may and your retaliatory refrain is printed below.

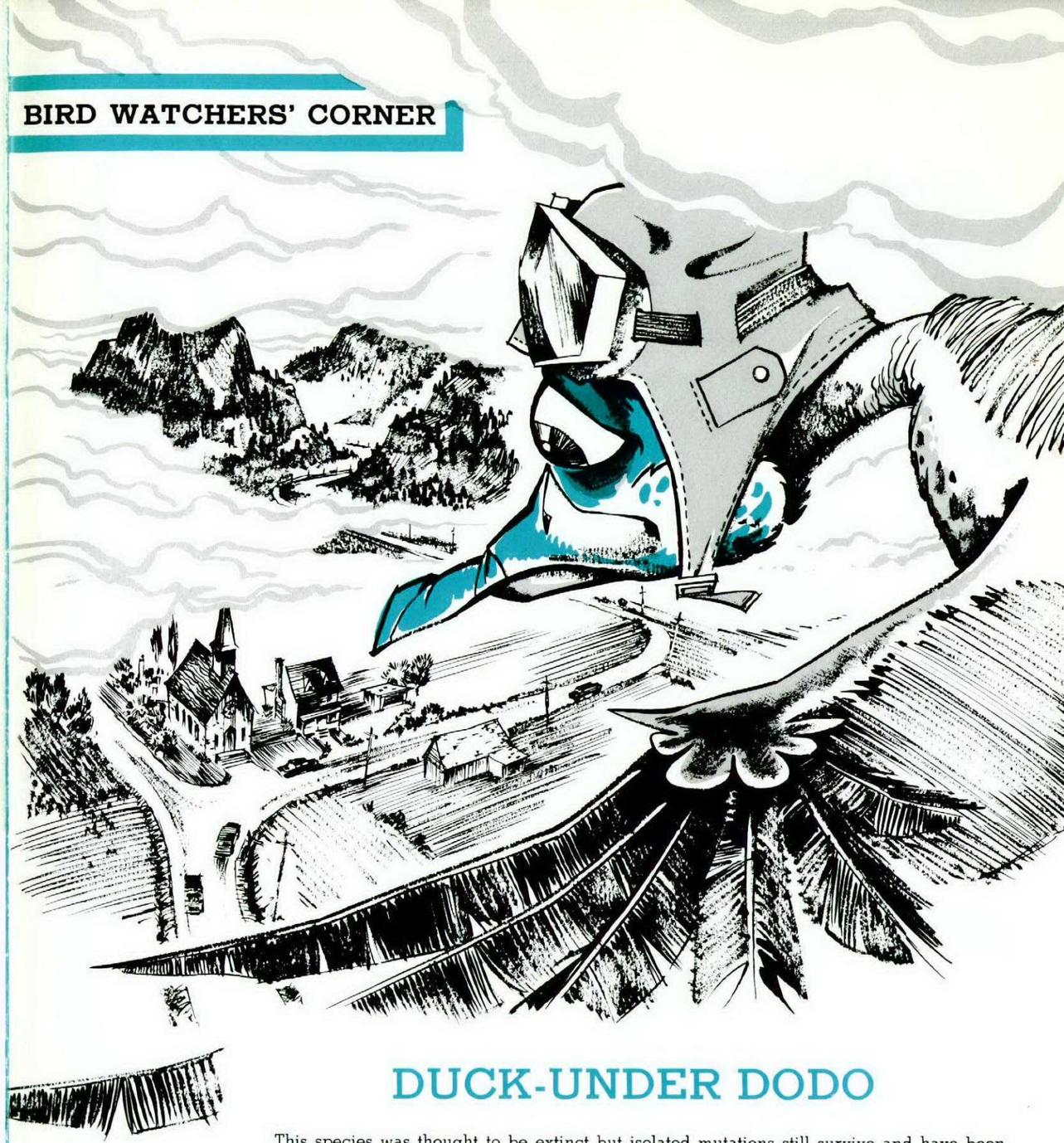


This blackbird caught it in the neck after he/she entered a CF101 through the stabilator hole and was trapped by the rudder. Bagotville bird lovers quickly released the unhappy prisoner.



"The best I can give you is 400 and 1."

BIRD WATCHERS' CORNER



DUCK-UNDER DODO

This species was thought to be extinct but isolated mutations still survive and have been unearthed (often literally) in various birdland units. Ornithologists, and Accident Investigation Boards, have been familiar for years with the feathered, fixed-wing type but there seems to be an increase in the sub-species whose wings move in a rotating fashion. As a result of inheriting crummy chromosomes and grubby genes our dumb Dodo insists on following the suicidal habits of his flighty forebears. His natural aversion to flying in cloud leads him to continue on under the weather no matter how low the ceiling or restricted the vis. Determined to press on, with no intention of landing or turning around, he nervously twitters through the gloom:

UP-AHEAD-MAY-LOOK-BLACK, BUT-I'LL-NEVER-TURN-BACK

When in doubt,

call them out!