FLIGHT COMMENT

MARCH · APRIL · 1957

FLIGHT COMMENT

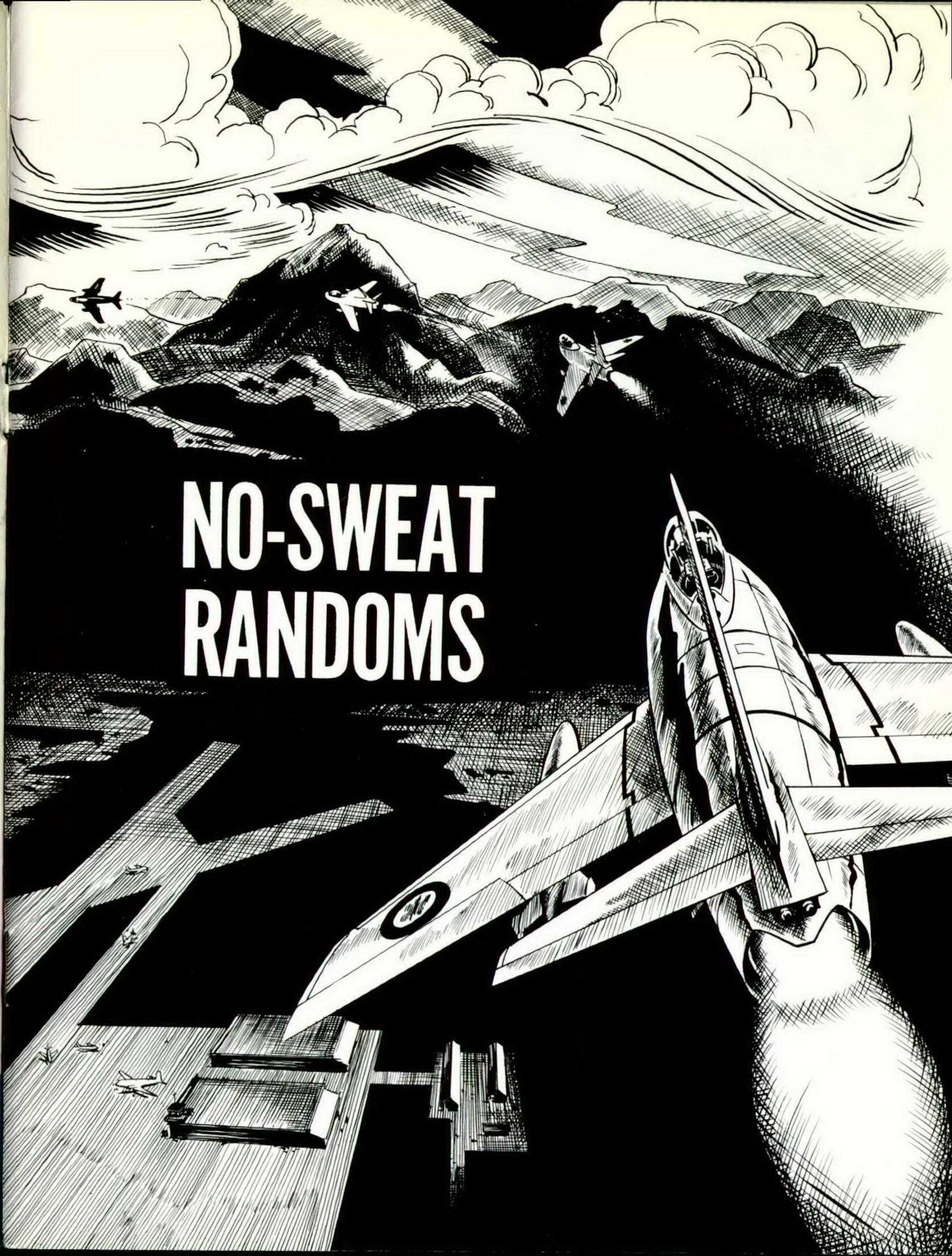
ISSUED BY
DIRECTORATE OF FLIGHT SAFETY
R.C.A.F. HEADQUARTERS • OTTAWA, ONT.

MARCH APRIL 1957

C O N T E N T S

★ ★ ★

EDMOND CLOUTIER, C.M.G., O.A., D.S.P
QUEENS PRINTER AND CONTROLLER OF STATIONERY
OTTAWA



Triphibian SA16 Albatross and crew from the USAF's 54th Search and Rescue Squadron at Goose Bay, Labrador. Large droppable life raft as well as bush survival equipment can be seen in background.

SH19 helicopter used by the 54th Search and Rescue Squadron, USAF, at Goose Bay. This type of 'copter was used by the 54th recently to rescue an F-84 pilot who bailed out over the Labrador wilderness when his engine failed.

Recently in the limelight was the transfer of a number of Sabre Vs, via Operation Reverse Random, to reserve squadrons in Canada. For this reason our readers will be interested in the following account of the original Operation Random.

"Charlie lead, Charlie four...oil pressure gauge is dropping. It's down to five pounds now."

"Roger four...let me know if it gets worse."

Random Charlie section is fifty minutes along course between St. Hubert and Goose Bay, Labrador, on its way to Europe. The pilots are flying at 35,000 in contrails, with an undercast of stratocumulus reported to be based at 5,000 and topped at 8,000. Charlie lead calls GCI Birdseed Control for a fix and is informed, "Have you in good radar contact at 170 miles west Goose Bay."

"Charlie lead, four here, oil pressure off the clock. Getting rough running; am throttling back."

"Roger Four, go distress frequency Dog. Charlie three stay with him as long as possible."

A few minutes later number four transmits for the last time: "Charlie Three, this engine has seized; am turning off the electrics to save battery. Will bail at ten or before reaching the cloud."

"Okay Rouge, give me a call before you pull the handles."

"Will do."

Within minutes of the actual bailout an SA16 Albatross from the 54th Search and Rescue Squadron, USAF at Goose Bay, followed by an SH19 helicopter, is airborne and heading for the scene. The SA16 amphibian is directed by GCI controllers who have marked the known position of the aircraft going down and are maintaining radar watch on Charlie Three. In addition to this, the pilot of the Albatross is guided by a device which homes onto the VHF transmissions of Charlie Three, as well as onto the URC4 portable radio which the downed pilot will put into operation after reaching the ground.

SA16 Albatross of the 54th Search and Rescue Squadron, USAF, at Goose Bay, Labrador, returns from flying the Duck Butt Tango position with load of rime ice.

After dropping supplies to the man, the SA16 circles the position until the helicopter carrying para-rescue medics arrives to pick him up. If a landing is impossible due to conditions of terrain, wind or weather, and if it is determined that the man below has been injured, one of the para-medics will go down after him.

*

Of course this accident never came off. But it could happen. The Overseas Ferry Unit in two years of Random Operations has successfully ferried over five hundred Sabre and T-33 aircraft to Europe with no serious accidents. This enviable record can be attributed to three chief factors: meticulous work by the groundcrew, a reliable brand of airplane, and competent pilots.

"We see to it," said S/L Bob Middlemiss, CO of the OFU, "that every pilot is instrument-rated and up to green ticket standards. If a new pilot is not already rated, he does not fly on Random until he has taken our instrument course and passed the exams. Even after he receives his ticket he is expected to get a minimum of two hours in T-birds under the bag, and eight hours' Sabre time between Randoms."

Integrated with the flying schedule between Randoms at the OFU's home station of St. Hubert is a sound flight safety program run by F/L Les Benson. One day in the flight room (or "The Stable" as it is derisively called by the boys) a lounging member inquired of a chap at the window, "What are you watching? Haven't you seen a Sabre landing before?"

"Yeah. But Benson's up there and I keep hoping that he'll blow a tire." In order that pilots might become more acquainted with the rigors of surviving in a dinghy, F/L Benson had arranged to have everyone don immersion suits and it was dinghys-away in the station pool. In November! It was cold, but it was a graphic demonstration.

"In January" F/L Benson said, "we're holding a winter survival course of our own. Each OFU pilot will be dropped by helicopter alone in the Quebec bush for one week and expected to take care of himself with the equipment he would normally have if he were to bail out."

What each of these fighter pilots could "normally" expect to have with him is a parachute, the flying clothes he is wearing, and the Inland Winter seat pack, which is fastened to his 'chute straps. Included in the seat pack is a nylon sleeping bag, rations for a week, warm mittens, mukluks for the feet, windproof matches, a 22-calibre Hornet rifle and an axe. In addition, most jet pilots who fly over wilderness areas carry a hefty hunting knife of their own.

During a recent lecture on survival, F/L Benson stressed knowledge and know-how to the OFU pilots who someday may be faced with the real thing. "If you know what you have with you, and how to use it, your chances of survival are almost assured."

*

On the day of a Random Departure, the flight room is always a shambles of baggage, flying gear, uniforms and sprawled-out pilots waiting for briefing. The morning that was to see Random 17 off was one of endless delays due to destination weather. The usual din prevailed as one of the flight commanders thromped out of the "wheelhouse" with a paper in hand and waited for silence. Gradually the noise slacked off, and just as the pearl was about to be cast, one of the pigs shouted: "Okay! All pilots with eighteen or more Randoms can go home at five minutes to five." It was voted the best yuk of the day. They never did hear the message. It was lost in the rush.

Thorough pre-flight briefing before each leg of a Random Operation covers every conceivable emergency. Has everyone the destination letdown diagram? Letdowns for your alternates? The radio frequencies and call signs? Do you know those fields having jet facilities? Lengths of the runways you may have to use? All these questions and more must be answered during the session.

"Our job is to deliver aircraft," says F/L Bob Simmons, flight commander with the OFU and Task Force Commander for the Random. "They want them all, so play it safe. If our destination is duffed-in, and you're not happy with it, head for your best alternate. If necessary, drop your tanks and climb to forty-five."

The aircraft to go are flown in sections of four with a ten-minute interval between sections to allow for possible letdown delays at the other end. It is another safety feature built into Random Operations. The roar of Orendas shakes

Section of camouflaged Sabre Six aircraft flown by pilots of the Overseas Ferry Unit over Montreal area prior to Random flight to Canadian bases in Europe.

A chill grey morning in Goose Bay, Labrador, as a Random secion of Sabre V aircraft taxi out for takeoff on flight across the Davis Straits to Bluie West One, Greenland.

Four-plane Random section at Goose Bay awaits signal to start engines for first over-water leg of journey to Europe. Next stop is the USAF base of Bluie West One in "sunny southern Greenland".

Arrival at Goose Bay. Twenty-eight Sabre Sixes bound for Canadian Fighter Wings in Europe stop for fuel and maintenance enroute.

Half-hour before takeoff, Random Seventeen's line of Sabre Sixes stand ready in bright morning sunlight at Goose Bay, Labrador.

the hangars at St. Hubert as Able section is off to Goose Bay on the first leg of the journey.

The cockpit seems crowded as your Sabre climbs rapidly to altitude and the trip gets underway. Extra flying clothing, canvas carrying-case full of enroute flight data, and a bulging seat pack beneath you. Getting a peek at switches or circuit breakers aft of either elbow requires a maximum effort.

The boys flying the Randoms soon become accustomed to excellent GCI control, and it is rarely that radar loses them even for a few minutes. It has been known to happen however. Once, while Random was enroute to Goose Bay and over an extensive layer of cloud, GCI lost contact with one of the sections. "Easy lead, this is Groundhog Control. What is your present position?"

After a moment of baffled silence, during which every member of Easy section rolled over to look at the endless seas of clag below, the leader, F/O Fitzgerald, replied, "I don't know. Try north of Rimouski. Maybe we're there."

High over the ancient city of Quebec we pass the tiny French-Canadian strip farms stretching back from the St. Lawrence, and pass over an unrelieved monotony of rock and bush. The great river below our starboard wing continues to broaden out until it finally merges with the southern horizon in a misty blue line. To the north is a desert scene of scrub pine on grey cracked rock, tiny rivers winding through stone walls rounded by time. Small lakes and large ones, in a hundred different shapes, lie scattered in a thousand places. "Seven Islands radio, this is Random Able lead, four Fox eighty-sixes by Seven Islands at four-five...."

The PXs are handed out by each section at the various reporting points and acknowledged. Positive control is maintained throughout. If an aircraft were to go down, it is likely that the pilot would be rescued before dark. If circumstances warrant, para-rescue man Corporal Hank Jenkinson of the Safety Equipment Section at Goose Bay, would be dropped from

either RCAF Dakota or Otter aircraft to care for the injured pilot.

"The equipment I take in with me varies, depending on the time of year and the weather at the moment. We have a droppable medical kit which includes stretchers, splints, bandages, blankets, plasma and the like. In addition to the regular chest-pack first aid kit and URC4 radio, I take in my own Trail Pack. This is made up of things I'd like to have for bush travel such as spare clothing and a sail silk tent. Of course too, I carry a letdown rope to help me out of trees if I hang up."

*

In October 1954, while stationed at Winnipeg, Hank Jenkinson was called upon to parachute into the bush north of Gimli, Manitoba, to help a French NATO student who had been injured bailing out of a T-33.

"It was my first emergency jump," Hank recalled, "and naturally I was anxious to do a good job. It shook me for a minute when I scrambled down out of that tree and found that all I had left for equipment was a roll of bandage in my hand."

The second leg of the trip is from Goose across the Davis Straits to the USAF base of Narsarssuak, Greenland, more commonly known as Bluie West One. Since it is the first over-water jump, and the list of alternates for Greenland is necessarily limited, close tab is kept on the weather at both ends. SA16 Albatross aircraft are sent out from both Goose Bay and BW1 to orbit positions along the route to be flown by the Random aircraft.

During the briefing for this trip, Captain Plank, one of the SA16 drivers who regularly fly the Duck Butt Tango position, outlines procedures to be followed should it be necessary to ditch or abandon the aircraft. "Give us as much advance warning as possible. If you are going to ditch or bail out, we want to know. Once you're into your dinghy, start using your URC4 radio. We can home-in on it. If it is at all feasible, we'll land on the water to pick you up. Sometimes the sea will permit landing but not takeoffs; if that's the case, we'll land and get you. This Gooney Bird of ours has been known to taxi for a hundred miles on the ocean."

The words are reassuring, and everyone momentarily visualizes himself being snatched out of the cold and briny North Atlantic by the friendly Yanks. Warm thoughts fill the air: "Handy little airplane they have there, even if it is a fan-job."

A half hour film is shown to the pilots to reacquaint them with the route to be flown. This film points up landmarks which will guide them from Simiutak, or BW3, at the entrance to the fjord, all the way in to Narsarssuak, a distance of about forty miles.

F/L Simmons, leading the Random, reads out the navigation figures, and finishes up with a word on the emergency letdown at BW1. "If an unexpected fog bank should move down the fjord, and you're short on fuel, remember that those mountains are 7000 feet high. Try Duck Butt Fjord first. You can formate on the SA16 orbitting at the mouth of the fjord. He'll lead you in if it's possible. Failing all else, cross BW1 beacon at 8000 feet, magnetic heading 040 degrees at 160 knots, and after thirteen and a half minutes, set up a minimum rate descent. You'll make contact with the ice cap and a chopper will pick you up. Any questions?"

Nothing else for it, chaps. Be leaving in a few minutes. You'll have to climb into those suits sooner or later. With a towering display of poor sportsmanship, the pilots begin tugging and fighting their way into the heavy canvas-and-rubber immersion suits that are worn on the over-ocean legs of the trip.

These suits are designed to keep the wearer dry from toes to chin; tight-fitting as they are around the wrists and neck, they are difficult to get on. With the quilted nylon liner that is worn inside of them, they will keep a man alive in the freezing water far longer than he would normally survive.

*

Airborne once again, the sections turn eastward out to sea. Soon they are crossing the coastline and we take a last look at land. "Goose Approach, Random Able was by Cape Harrison at...."

Far below us the wrinkled black surface of the sea disappears beneath the usual stratus layer that covers the Davis Strait. The high altitude skies are mauve in color and the contrails chase our Sabres along, never quite catching up. Very seldom do we catch a glimpse of the tiny Duck Butt patiently circling its position. But sometimes they see Random. "Random Easy, this is Duck Butt Tango. Have four cons in sight. Kind of scattered, with one trailing behind. Is that Easy section?"

"Sounds like Easy all right."

Halfway across, the flights pass over the ocean station vessel, Bravo, and alter heading a bit more north. The weather ship, as it is commonly called, provides Random flights—and American high flight sections that are flying the route—with a radio beacon. If called upon to do so, the weather ship can also give a VHF homing, pick up the aircraft on radar, and in the case of an emergency will institute Search and Rescue operations.

Past Bravo and on to Duck Butt Extra. From here the radio range at Simiutak booms in fives. The sparkling white snow peaks of Greenland loom ahead and soon we are letting down. After crossing the islands at the entrance to Tunugdliarfik Fjord, the sections break up into pairs and fly up the fjord to Narsarssuak at low level.

One Random pair became temporarily displaced, geographically that is, having flown up the wrong fjord. Realizing his error, the leader of the section called up the fighter pilots' best friend. "Narsarssuak Homer, this is Random Fox one and two, getting a bit short on fuel. Request steer to base. Do you read me?"

"No".

From Bluie, the flights of Sabres cross the formidable ice cap which covers all but the highest peaks of interior Greenland. Their course continues eastward to Iceland where they land at the American base of Keflavik. And then on to Kinloss, Scotland.

*

The last and longest over-water haul is the flight from Keflavik to the RAF base of Kinloss. No weather ship sitting halfway on this leg. Instead, an RCAF Lancaster bomber, Duck Butt Mike, from 103 Rescue Unit, Torbay, Newfoundland, orbits a position along track approximately mid-way. Though Mike is unable to land on the water, the big Lanc' carries a large life raft which can be dropped. At the Scotland end, Duck Butt Zulu position is flown by another USAF Albatross or B-29 from Prestwick.

The Isle of Lewis, in the Hebrides, is the first patch of green to be seen as you approach Scotland. Over Stornoway the contrails are seen pulling up in huge lazy corkscrews as spirits lift. From here a precision built British voice on the R/T directs us in a QGH letdown. "Random George, you are cleared to begin rapid descent. Kinloss weather five thousand overcast, call when visual, transmit for steer."

"George."

"Steer one-two-zero."

We land in Scotland! Off "poopey-soots" for the last time. The durable immersion suits are hurled into one corner of the briefing hut, with comments, by the long-suffering drivers.

Briefing for the final hop to one of the Fighter Wings in Europe is just as thorough as all the briefings. But underneath it can be felt the impatience and desire to be on the road. Generally Met briefing is given by a short tweedy Brit' who varies the usual North American Met-man evasiveness with different words: "I daresay the weather will hold; however there's a possibility. We expect that if things do not, then it might; provided that the gradient (all things remaining equal, that is) doesn't.... unless with your back to the wind, the isobar is on your left....."

Il Penseroso: 1945 - 195?

(with apologies to J. Milton)

Now, Pupil, have you read the Data
In the notes? You've not? Well, later,
When the Harvard Notes you've studied,
Through the one-two-nine you've hurried,
Come to me and we will talk.
I will show you with the chalk
On the blackboard, how the lift
Varies, and how sideways drift
Occurs with every beam wind blowing.

But hurry now! Be up and doing!
Come, Pensive Pupil, you believe in
Errors which this pre-flight briefing
Should dispel. First, now, the graphic
Form of lift which is not static
But which rises to a peak or
Critical angle, then gets weaker.
On the coefficient number
Or on Reynolds, you may blunder;
So be sure you pay attention:
New ideas cause such dissension.

Aft, on a plot of rising ground
You may hear jet engines sound.
But they are not for you. Oh not!
Those pilots all know what is rho,
And how the lift equation looks
When written in their little books.
You, Pupil, have a lot to learn.
For instance, why the slip-stream turn;
Induced flow: vortices and that
Elusive boundary layer; Mach;
And, if you never learn to fly,
At least you'll learn the reason why.

And may at last your weary age
With Kermode, Pearcy, and the sage
Aerodynamicists find rest,
That you can speak out with the best.
'Tis certain you will not feel sane
While working problems in a plane;
So if you want the answer right,
Not airborne—on the ground sit tight!
These problems melancholy give,
And I with thee will choose to live.

F/L T. E. Johnson, RAF

The remainder of the flight is easily navigated as a profusion of ranges, beacons and GCI stations combine to take care of Random. Arrival at the destination airfield is occasion for celebration, and some have been known to celebrate. North Star aircraft of 426 (T) Squadron return groundcrew and pilots to St. Hubert a day or so later.

*

To date, the Overseas Ferry Unit has flown a total of 16,000 hours which includes nineteen successful Random Operations. The combination of efficient groundcrew plus continued training and practice for pilots paid off. Attention to the precepts of flight safety—thorough briefings, preparedness, and foresight—has resulted in a fine record.

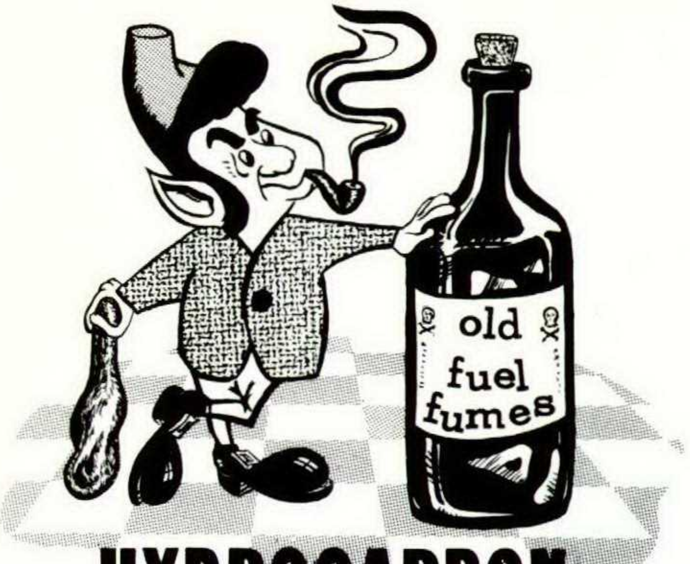
S/L Middlemiss, the OFU's energetic bossman, was speaking of future Random Operations. "We shut down the actual ferrying of aircraft to the Continent for the winter months. During the time of year that the trans-Atlantic weather is at its worst, we hold our green ticket course right here at St. Hubert. The next Randoms should be underway by mid-February, with each operation averaging twenty or more aircraft. We are looking forward to an accident-free year of flying in the OFU."

THE AUTHOR

F/O R.J. Childerhose of the Overseas Ferry Unit, originally comes from Winnipeg. In 1948 he worked first as copy boy and then as cub reporter on the Winnipeg Free Press. He joined the RCAF in the fall of 1950. Graduating from the OTU at Chatham, N.B., on one of the last courses to fly Vampires, F/O Childerhose was one of the first pilots to report to 434(F) Squadron, then at Uplands.

For the two years he was with the squadron, both in Canada and at 3 Fighter Wing, Germany, he handled Public Relations duties for 434. Returned to Canada in the summer of 1954, he was subsequently posted to the OFU at St. Hubert. He has since flown five Random trips. While at St. Hubert, he was also engaged in PRO duties for the unit.

F/O Childerhose recently returned to "civvy street", but he is retaining his association with the RCAF as a member of 411(F) Sqn (Aux).



HYDROCARBON KILLER

Readers will want an answer to the question, What experience has the RCAF had with cockpit fumes? Only a limited number of occurrences have been recorded on D14s, and these are cases where a definite malfunction has been found and rectified. However, the well-known Service grapevine indicates that the incidence of cockpit fumes is greater than the record shows. Rumor has it that there may have been many instances which never got into print, probably because no reason could be found to justify using the D14. But why neglect the Near Miss or the Operational Hazard Report? They were devised for just such contingencies.

One recent D14 reads: "Shortly after takeoff (in a T-33) with full fuel load, smoke and wet fuel spray began pouring into cockpit from head and foot warmer outlets. Pilots went on 100% oxygen and opened dump valves. Foot and head warmers were closed. Burned off fuel to 400 gallons and landed without further trouble. PILOTS WERE STILL WOOZY DESPITE 100% O_2."

No one will argue the fact that fumes in the cockpit are unpleasant and can be highly dangerous. If you detect fumes of any kind, go onto 100% oxygen and land as soon as possible. Then have your aircraft checked, and originate a D14, Near Miss or Operational Hazard Report. In other words, TELL WHAT HAPPENED. These reports can be of great value if you describe in detail the problem you encountered and all the action which you took in effecting correction. In that way you will contribute to our general knowledge of the subject —and your report may be instrumental in producing the final fix to prevent similar occurrences in future.

JET PILOTS have had to lick some strange problems. One of the oddest has recently received top level attention due to its implications throughout MATS and the Air Force.

Because his experience may save lives, Capt. Eugene M. Zolomy sent in an Operational Hazard Report. Since an OHR "is the one report designed for the pilot," it is outstandingly valuable when the man, the machine, or even opinion are involved.

Captain Zolomy of the 1708 Ferrying Gp, Kelly AFB, Texas, flying a T-33A, turned his oxygen selector from 100 percent to normal as he climbed through the 5000-foot level. "Upon reaching 15,000 feet," he reported, "I began to feel groggy and immediately turned the selector to the 100 percent position."

Unknown to Captain Zolomy an emergency, which could have cost his life, crowded into the jet's cockpit. "I continued climbing to 20,000 feet," he explained, "but the feeling of weakness persisted so I selected the 'safety' position on the regulator. I experienced no relief and decided I had better descend and land immediately. By the time I had almost reached Atlanta I had descended to 5000 feet."

Meantime, Captain Zolomy had "dumped" the cabin pressure, closed the vents and extended the speed brakes. "I also pulled the release on my emergency air bottle. Some slight relief was experienced. Now I had Dobbins Field in sight." The emergency had increased greatly; in fact, the jet pilot had nearly lost consciousness. Noise of the engine seemed louder than normal, he wrote in his OHR.

Dobbins AFB tower realized the critical situation. The control tower noticed that Captain Zolomy did not enunciate clearly. He complained of feeling sleepy and groggy. Two aircraft were sent out to intercept and help the T-33, if possible. So close to unconsciousness was the captain that he later admitted he had not seen either of his escorts.

Although touchdown was well handled, instead of stopping the engine as the tower advised, the T-33 executed a 180 on the runway. Then, shocked to find the crash crew blocking his way, the drugged pilot hauled himself out of the cockpit and slid onto the runway. He staggered. His speech was incoherent. But he was down safe, if not sound in body.

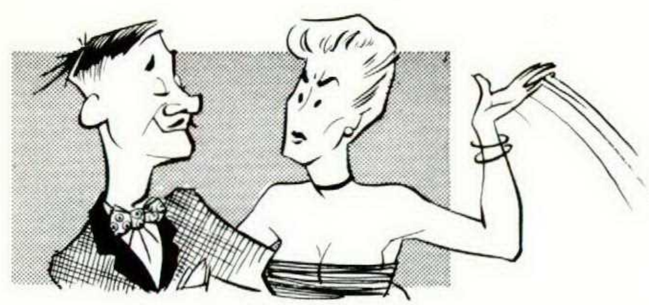
At the base hospital the doctors found nothing to indicate carbon monoxide poisoning or alcohol intoxication. It was not until the line chief ran up the jet's engine to maximum power that the killer was unmasked. Jet fuel leaking from improperly torqued fuel fittings had run into the plenum chamber. The resulting fumes, picked up by the cabin pressurization system, were forced into the pilot's oxygen mask. Conclusion: HYDROCARBON intoxication. In checking back, the jet pilot stated that he had not noticed any fuel fumes or unusual odor during preflight or take off.

As the medical report pointed out, "The pilot's excellent training, presence of mind and flying experience were instrumental in the proper usage of his oxygen equipment, and in getting his aircraft safely to the ground."

Needless to say, action will be forthcoming. A closer, and more thorough inspection of the fuel fittings before acceptance from the manufacturer will almost certainly be carried out. Other recommendations: All pilots and flight surgeons be made aware of the possibilities of intoxication from fuel fumes, especially in fighter type aircraft.

Captain Zolomy's OHR may provide the vital clue to other jet crashes where pilots were erroneously "thought to have experienced hypoxia or carbon monoxide intoxication." In addition, "It may help explain midair explosions or similar catastrophes."

USAF: Mats Flyer



FAMILIARITY BREEDS CONTEMPT

by F/L E.F. Lee

WE ARE SO FAMILIAR with these three words that we are almost contemptuous of them. The phrase was first heard in the age of stone-ones and campfires. How does it apply to the jet and nuclear age?

It has particular application to flight planning for jet aircraft. Because we frequently go aloft on short notice in dubious conditions of weather, and fly specific missions as directed, it is possible we might come to think of all flying as a simple, familiar pastime. But beware of the new and strange lurking under the guise of simple familiarity. When a flight plan has to be made, let us not forget that we ourselves are the planners and initiators, and that the operation calls for a great deal of care and elaborate attention to detail.

There have been a number of classic examples of crews who "went down to have a look" at destination although the hourly weather reports were giving weather below safe landing limits. Once at low altitude they used up the fuel that would have taken them to their flight plan alternate—which was still clear.

Pilots are required to file an alternate when they file IFR. It should never be done mechanically just because it's "required". Your alternate is where you go if trouble develops; if you have no alternate, you have nowhere to go. And don't forget that (in a T-33) fuel consumption leaps from less than two gallons per minute to more than six when you let down.

Whenever you are planning a flight, check these features diligently:

- Weather
- Aircraft performance
- Enroute facilities
- Terminal facilities

Lay out a simple plan of action—one within your powers of execution and covering all foreseeable eventualities.

Finally, stick to this plan unless new information lessens the possibility of its success.

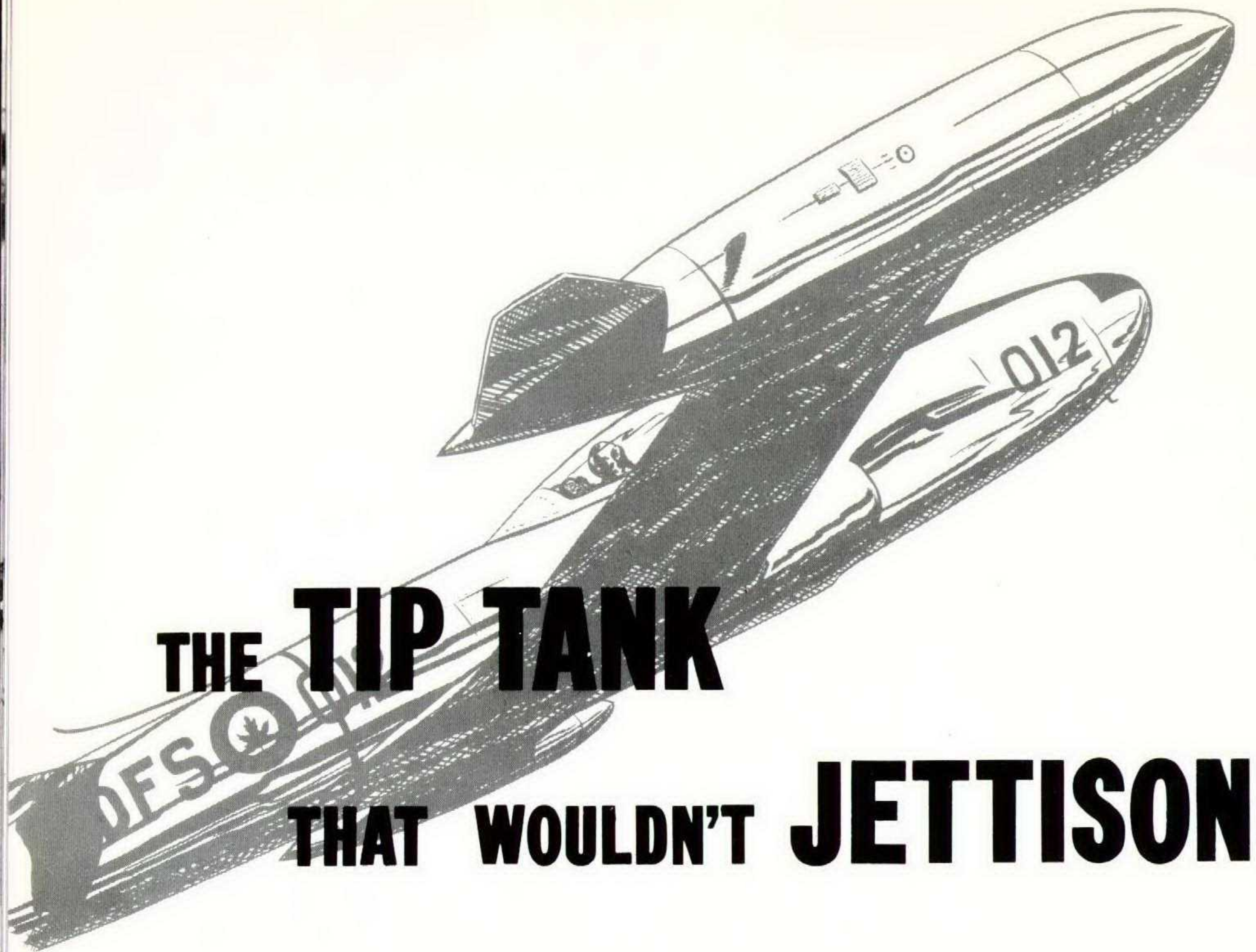
*

For the information of those who occasionally fly an aircraft to another base, a flight plan is to be filed in the flight planning center IN PERSON. Telephone and radio calls are not accepted. This procedure is designed to ensure that pilots will see the latest weather notams and letdowns, as well as any of the commanding officer's instructions concerning visits to other bases. It is a deliberate attempt to keep pilots from risking their lives by becoming contemptuous of things that have grown too familiar. ✔

The 23rd Psalm?

My Savior is an Instructor I do not want.
He maketh me to glide down on green pastures,
He leadeth me by the limited panel,
He restoreth my equilibrium,
He leadeth me into unusual positions
For mine own sake.
Yea, though I walk down the row of Silver Stars
I will fear no evil, for he is with me;
His age and his experience they comfort me.
He prepareth a dressing down for me
In the presence of mine enemies;
He assaulteth my head with noise
And mine eyes crosseth over.
Surely my needle and ball will follow me
One of these days—or
I shall dwell under that hood forever.

Anon.



THE TIP TANK THAT WOULDN'T JETTISON

Directorate of Maintenance Engineering

HERE'S A NEW ANGLE on the failure of T-33 tip tanks to jettison. Fortunately it didn't cause an incident; but very likely the crew had a few anxious moments. This occurrence could have had serious results under different circumstances.

On a training flight the student noticed a left-wing-heavy condition. Trim took care of it for awhile, but it continued getting heavier until the tab was fully up. The instructor took over and climbed to 22,000 feet for a beacon letdown. On a control test it was found that the minimum airspeed for good control was 145 knots. When an attempt was made to drop the tanks at a lower altitude, nothing happened. All three methods of jettisoning were tried but the tanks would not drop. Fortunately a safe landing was made at 110 knots.

Firstly it was found that the port tip tank had failed to feed. Further investigation showed that, eight days earlier in repair squadron, both tip tank release mechanisms had been safety wired with 35/1000" steel wire to prevent accidental jettisoning during the installation of modification 05-50C-6A/192. The wire was not removed after completion of the modification. The LAC Gp2 AFTech made L14 entries for removing and installing the wing tip access door, but there was no entry regarding the temporary wiring of the release mechanism. Finally, the Gp3 AFTech signed the job as completed. A check of other T-33s on the unit disclosed three of them in a similar condition.

The use of a safety wire in these circumstances was desirable; what set things off was the failure to make an entry in the L14 regarding the safety wire. The unit assessed this maintenance error as B4 (inadequate supervision) and C4 (human factor - forgetfulness).

This is all a serious business. Is it not possible to eliminate such maintenance errors by a short stop to reflect, and by taking extra time to make an unserviceability entry in L14s when an aircraft system, part or accessory is made unserviceable, even though temporarily?

L'Allegro: 1939-1945

(with apologies to J. Milton)

Haste thee lad and bring with thee
Thy parachute — sweet liberty —
And helmeted we'll see what doth
Lift and control the Tiger Moth.
This prop to pull, these wings to lift,
And cables twain lest one should rift,
This tail plane, rudder and cockpit.
The front, where I am going to sit,
Will soon be yours to fly alone,
Whose mysteries are now unknown.

Straight your eye will catch new pleasures
As new angles landscape measures;
Russet lawns and ploughland bare,
All passed over in the air.
Then, for joy, like eagles swoop,
Dive and climb and loop the loop.
Stick back! Wings straight! There he flies —
The cynosure of neighbouring eyes.

Sometimes, with secure delight,
We'll spin and let it wind up tight;
First the rudder, then the stick.
See the spin stop? Centralize,
And ease out of the resultant dive.
Now, let's climb again and see
You use full rudder — not just me.

And ever, against aching care,
Perfect all movements in the air;
Try and try, then try again —
Co-ordination be your aim.
Never do too low gyrations
Till you know your limitations;
Then you'll find there's nothing in it
If you stay within your limit.

All these hints and tips I give
Will help you fly, and fight, and live.

F/L T. E. Johnson, RAF

FLIGHT SAFETY PRESENTS

FLYING FOLLIES - PART III | LIVING WITH OXYGEN

14C/2665 | **14C/2834**

This double feature has been chosen from a film survey conducted by Training Command. Watch this space for future billings. Films are listed in CAP 428.

access panel security

Directorate of Maintenance Engineering

REPORTS have been received during past years, on various aircraft types, dealing with accidents or incidents caused by aircraft panels or doors coming off or being damaged in flight. Of particular concern at this time are the four latest cases involving T-33 upper engine access panels. Each accident or incident is described briefly to illustrate the maintenance contribution towards these four occurrences.

First, however, here are a few statistics regarding accidents and incidents where cowlings, panels and doors were lost in flight, remained partially opened or lifted, or damaged an aircraft. The flying period covered is from 1 April 1952 to 31 March 1956. There were a total of 48 such occurrences and ten aircraft types were involved.

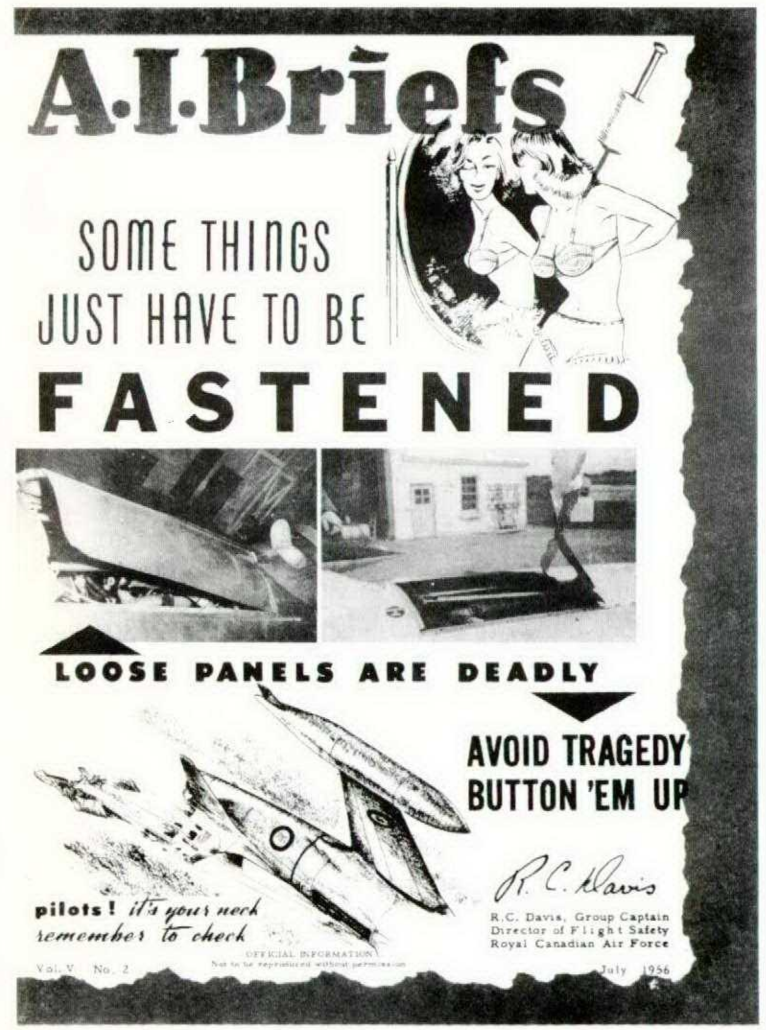
- Cat A (fatal) - 1
- Cat B - nil
- Cat C - 3
- Cat D - 24
- Cat E - 20

The "D" and "E" category accidents should not be glossed over with mere passive comment. Given a different set of circumstances, many of them could have become much more serious because 39 of the 48 occurrences involved jet aircraft. In practically all cases the story is the same: "Failed to secure panel (or doors or cowling etc.)" Thus, in addition to the loss of a highly trained pilot, we are out close to a million dollars.

Now for the panel story itself. Number one occurred in March 1955. At 7000 feet the pilot felt an unusual vibration in the rudders. After landing he found the access door torn and twisted back for about four feet. Inspection revealed that the damage could have been caused merely by the fasteners not being done up, despite the fact that the aircraft had already completed one flight and had had two preflight inspections by pilots and one BFI by groundcrew. The contractor confirmed that eleven Airloc fasteners had not been secured in the locked position. Furthermore he considered it very unlikely that the fasteners could work loose if they were properly secured before flight.

Number two happened two weeks before Christmas 1955. The pilot felt vibration, noise and loss in airspeed. On landing he found the left-hand engine access doors torn open. Again inspection revealed that ten fasteners had not been checked for security. The door had been removed the day before so that repair personnel could attend to maintenance. The fact that the student pilot did not adequately check the fasteners for security on the preflight check does not relieve maintenance of their responsibility.

These first two cases were "D" Category.

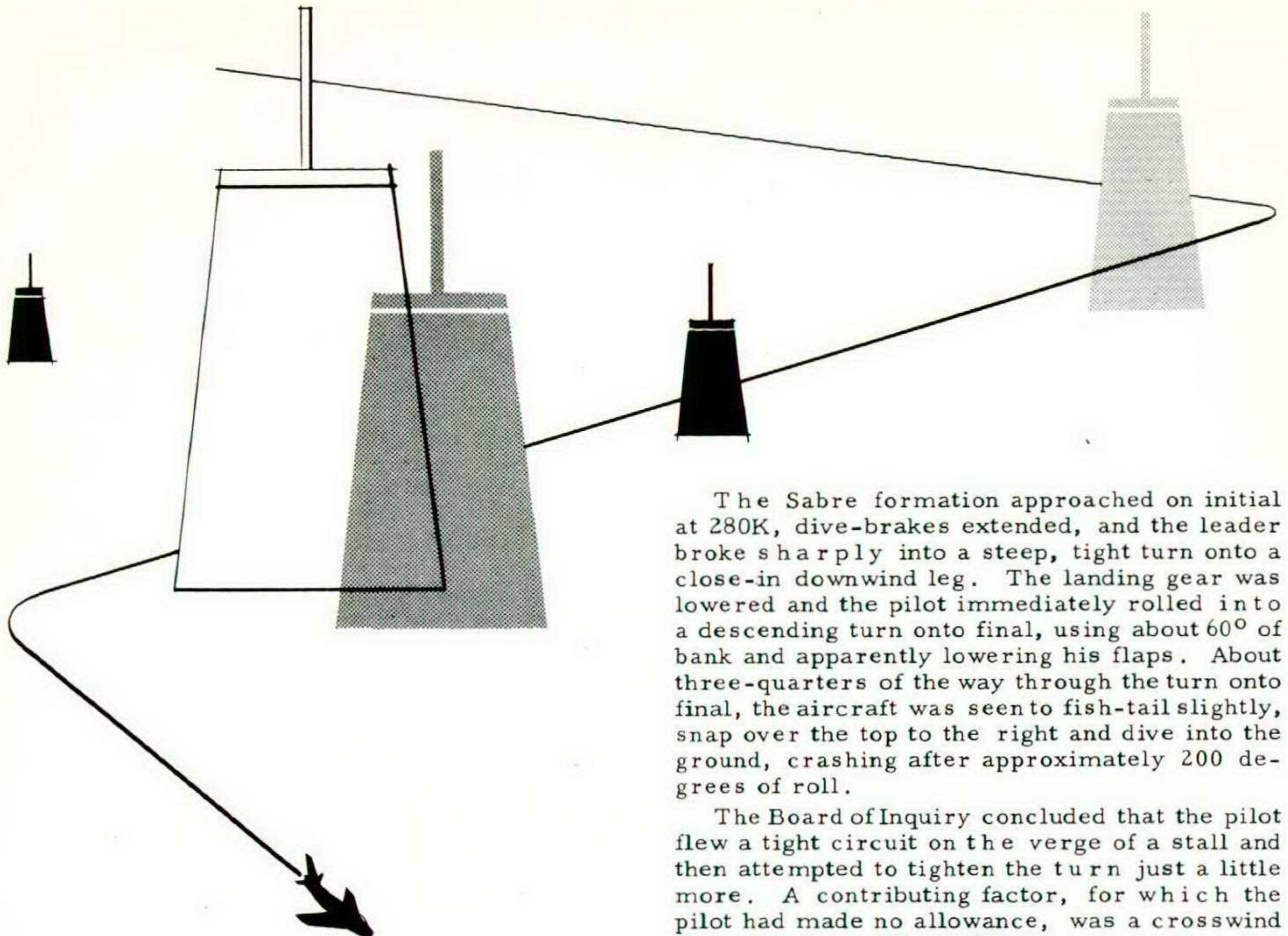


Case three was a category "A" fatal. In February 1956 the pilot of this aircraft took off on a maintenance air test, landed away from base, and took off for the return trip without shutting the engine down. The pilot called for landing instructions when within sight of base but his aircraft crashed shortly thereafter. Evidently he had no indication of failure up to the point of total break-up, which would indicate that the aircraft came apart violently, probably within five to ten seconds. After lengthy investigation and considerable deliberation it was concluded that the accident was caused by the upper engine access doors separating from the aircraft, striking the vertical fin and causing loss of control in the aircraft with subsequent structural disintegration.

The last case occurred early in August 1956 and was of Cat "E" order. The pilot noted severe vibration at 250 knots after takeoff. On landing he found the left plenum chamber door open. An AE Tech, after checking for oil contents did not completely secure the panel because he assumed that an I Tech would check the oil pressure transmitter. No L14 entry was made regarding the unlocked door. Further, no BFI was carried out on the aircraft after its return to the flight line from a previous trip. Read the Mar - Apr issue of Flight Comment, page 47, and also AIBrief Vol. V No. 2, dated Jul 56, which is reproduced here in miniature.

As stated earlier, the degree of maintenance involvement in these accidents is obvious. EO 05-1-2Q points out that insufficient attention is paid to the care and maintenance of fasteners, and requires that safety marks be painted to indicate the locked position. It is evident from the number of accidents that sufficient attention is not being paid to this matter—and we are also aware that safety marks are not always in evidence. There also appears to be a disturbing tendency for maintenance people to follow practices which lead to forgetfulness. For example, following a routine check, an engine may be run up with only a few fasteners properly secured. If the run-up is satisfactory, the panel may be forgotten and left unsecured. Or a lad may break off for a smoke period, or be detailed for another job half way through buttoning up a panel, and forget to complete the job.

As a result of these four T-33 and other similar aircraft accidents, a program is under way to review and revise EO 05-1-2Q(05-1-2U also refers to marking to be applied to aircraft) in order to provide more detail and possibly additional requirements. The above-outlined neglect is potentially unsafe and dangerous as it may set up a situation which is ripe for the old human error factor of forgetfulness. Continuity on jobs of this nature is essential. Consider these situations carefully. It will spare the RCAF needless tragedies, countless unnecessary maintenance man-hours and the loss of costly equipment.



Churning Butter

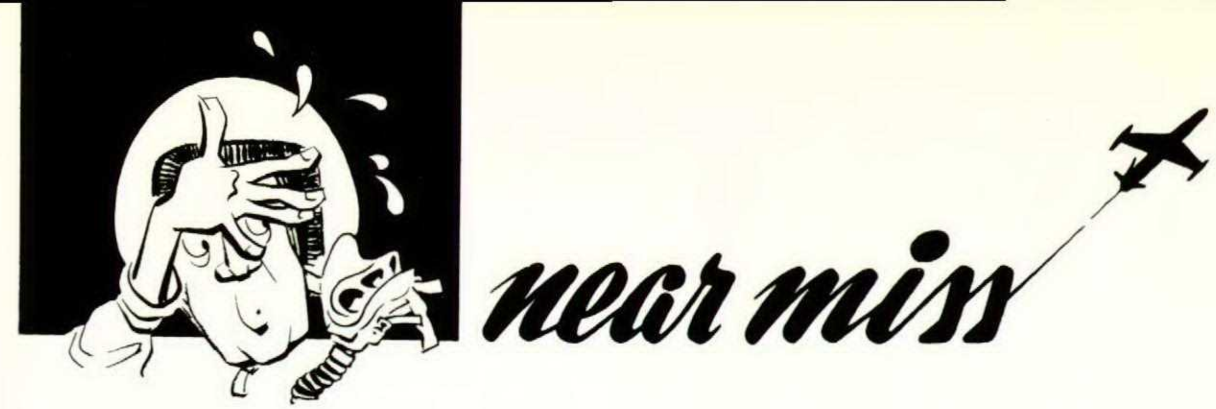
The Sabre formation approached on initial at 280K, dive-brakes extended, and the leader broke sharply into a steep, tight turn onto a close-in downwind leg. The landing gear was lowered and the pilot immediately rolled into a descending turn onto final, using about 60° of bank and apparently lowering his flaps. About three-quarters of the way through the turn onto final, the aircraft was seen to fish-tail slightly, snap over the top to the right and dive into the ground, crashing after approximately 200 degrees of roll.

The Board of Inquiry concluded that the pilot flew a tight circuit on the verge of a stall and then attempted to tighten the turn just a little more. A contributing factor, for which the pilot had made no allowance, was a crosswind component from the left.

Does this story sound familiar? DFS records show that quite a number of such accidents have occurred, though usually the pilot has been able to regain partial control and stall into the undershoot area, thereby at least saving his neck. Obviously there is no need for such accidents: the circuit is no place for "tigers"!

But our original story does not stop here. Further inquiries disclosed that the pilot of an F86A was in the habit of "churning butter" with the control column whenever he found himself too high or too hot on final. This "churning butter" amounted to a rapid, circular motion of the control column, calculated to make the ailerons offer more drag to the airflow.

Trials carried out on other F86A aircraft revealed that such action induced a complete loss of aileron boost. To counter the greatly increased stick force, exaggerated stick movement was required which in turn caused a violent over-control when boost pressure returned. Though such a loss of boost is not possible on our own Sabres, it could conceivably occur on T-33 aircraft. In any event the procedure is also highly dangerous from the aerodynamic standpoint—as well as being of dubious value—so it should hardly be necessary to warn pilots not to indulge in such an unsafe practice.



WANDERING NUT

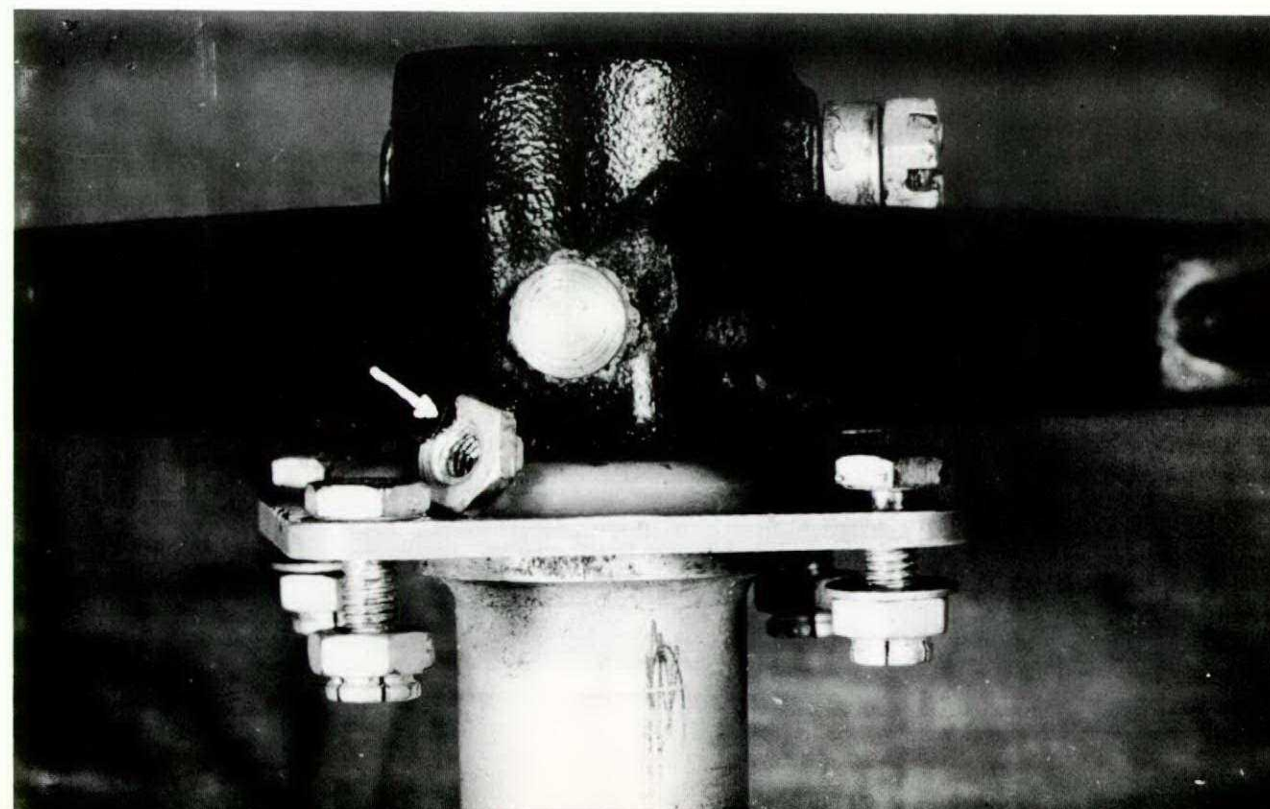
At 1030 hours we took off in the Canuck on a routine air test. After completing the required dirty stall at 20,000 feet and the raising of the undercarriage, I found that the latter indicated unsafe. After repeated selections the indicator remained unsafe. A slow low pass was made by the tower, and personnel there advised that the undercarriage was up and appeared locked.

The aircraft was climbed to 20,000 feet and a roll to the right was completed. Controls checked OK. Speed was increased to 300 knots and a roll to the left initiated. When I tried to recover from the roll, the controls appeared locked. I asked the man in the back seat if he was touching the controls (by this time we were banking at 90°). He replied, "No". I then checked the hydraulic pressure. Because it was at approximately 2050 pounds, I suspected a lock in the hydraulic lines; so I cut out the boost and asked the rear man to give me a hand to recover control of the aircraft.

By this time we were in a steep spiral dive at 300-320 knots at 17,000 feet. We both got on the controls (boost out) and were able to straighten the aircraft out at 15,000 feet. I called tower on 121.5, declared an emergency, and requested a straight-in approach. I slowed the aircraft down to 150-165 knots and headed towards base. It took the combined efforts of both of us to keep her straight. Alone I would have had to abandon the aircraft.

At 10,000 feet I lowered the undercarriage and flaps and started a long, straight-in approach using five to ten degrees of bank as this was the maximum control available with both of us on the controls. We subsequently landed without incident.

After landing, we found that the stick would move to port but not to the right past centre point, so this made me suspect foreign material in the controls. This was indicated on the L14.



The quadrant and offending nut.

Commented the specialist officer: "Inspection of the aileron control system revealed a redundant nut which had become wedged between the LH aileron quadrant assembly (part #1/R22155) and the shaft bearing inner housing (part #2/R31020). Stick forces applied by the pilots caused this nut to groove the web of the aileron quadrant, cutting out two chips of metal.

The Staff Officer Flight Safety says: "This Near Miss is forwarded for information only. Incidents of this nature can happen and have always been one of the hazards of flying. All the orders in the world will never overcome the non-conscientious workman."

*

Origin of damaged nut has not been established definitely. Because of its new appearance and the lack of primer paint, it is thought that it entered the port wing during conversion of the aircraft to a dual trainer.

No work carried out on the aircraft during its acceptance check required removal or installation of nuts of this type. The acceptance check, in addition to searching the area for loose objects, required only inspection of hydro-boosters in this area. Because of openings—lightening holes, bracket and rib easements—it is possible for a small object to move from one compartment to another, both inboard and outboard, when the aircraft is in aerobatic flight. The design and configuration of the aileron quadrant assembly is such that small objects can be trapped in the quadrant webs and held there, since there is no relief space to permit them to drop free. This lack of clearance caused the aileron quadrant to jam the nut against the shaft bearing inner housing."

A VISIT FROM ST. ELMO

We were on a night flight from Goose Bay to St. Hubert in a C-119, and flying at 6000 feet. Cockpit lighting was normal for a night trip.

As the flight was through an extensive high with very stable air in the lower layers, no significant weather had been forecast. It was noticed, however, that heavy cloud layers were forming over the St. Lawrence River; and between Seven Islands and Mont Joli instrument conditions existed over the river. Temperature in the cloud was near 0°C though only rain was encountered. Moments of heavy rain produced severe precipitation static on the radio compasses and even light to moderate turbulence at times.

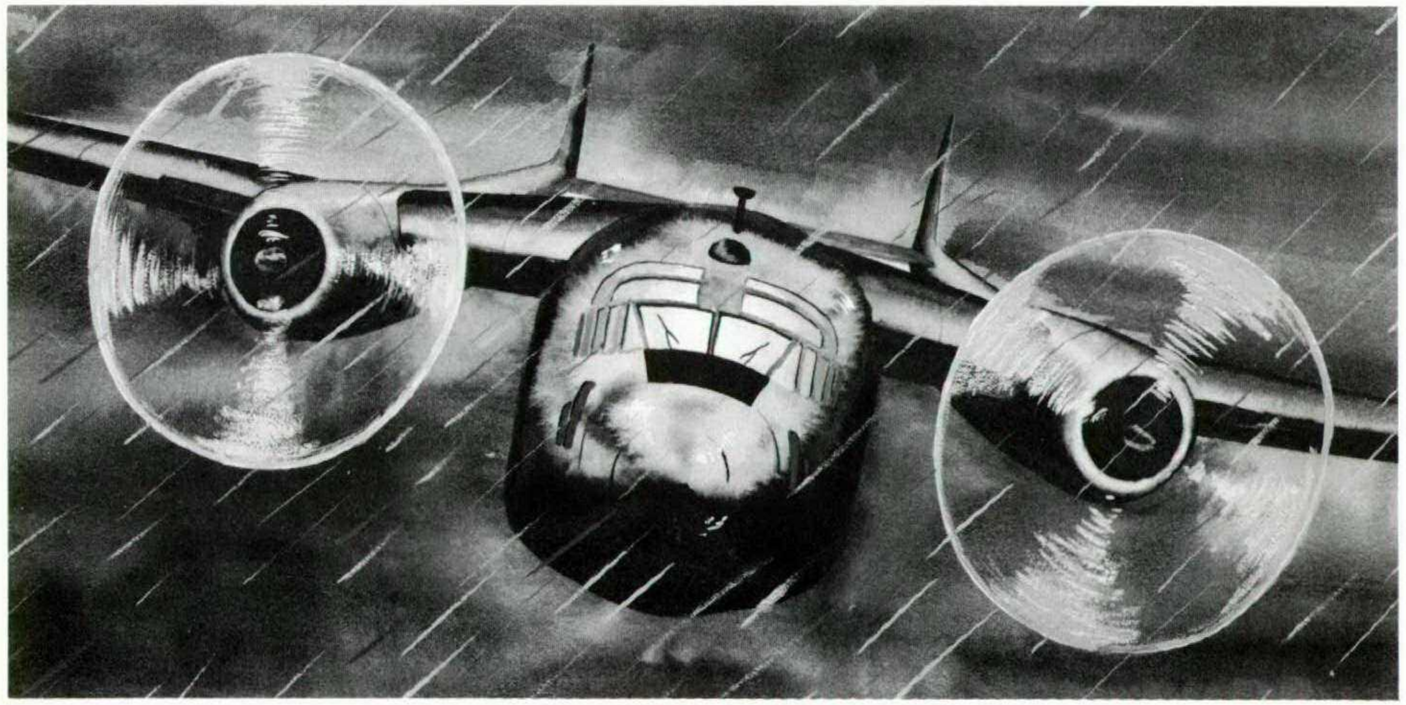
Throughout this period, both Seven Islands and Mont Joli were reporting only high-based layer clouds (eight and ten thousand feet) and no rain. No CB activity was forecast for this area and none had been reported. No lightning flashes were visible. There was only the odd, hard crackle of static discharge one hears on the radio compass when an aircraft is near thunderstorms.

Then, during a period of heavy rain, a blue torch—like a discharge of St. Elmo's fire—was noticed on the windshield wipers. It appeared only seconds before a burst of white light erupted in the cockpit area, accompanied by a loud explosion. The captain and the first officer were temporarily blinded. Passengers in the cargo compartment reported later they had heard the explosion from there.

Vision was regained a few seconds later by both pilots, and all cockpit lights were turned on to full intensity. A thorough check of the cockpit and electrical equipment showed everything normal and functioning. At the time of the discharge the usual electrical equipment was in use, with the exception of the radio officer's transmitter and receiver. These had been turned off preceding the discharge because the ARC-13 aerial was arcing continuously.

Unknown to the pilots at the time but noticed by the Radio Officer, the wing tips were also enveloped in St. Elmo's fire just before the discharge occurred. For the next twenty minutes the flight was continued to Mont Joli under the same conditions. Over destination the weather was clear once again.

The Captain of the C-119 advises that where conditions produce St. Elmo's fire, pilots should take the precautions they would adopt on entering an area of thunderstorm activity—in particular, turning the cockpit lights up to full intensity.



A burst of blinding white light erupted in the cockpit area.

POOR VIS IN THE COCKPIT

We had just carried out an hour-and-a-half cross country at 35,000 feet in a Canuck. During the flight the heater had operated improperly, causing the cockpit temperature to drop well below freezing point.

During letdown, cloud was entered at 20,000 feet. At 15,000 feet a starboard procedure turn was being made when the cockpit suddenly filled with fog or mist of such density that it was impossible to see the instruments. Cockpit pressurization was immediately dumped and the mist soon cleared. When proper visibility was regained, it was found that the airspeed had risen from 250 to 300 knots but that the angle of bank had remained fairly constant. However, it is considered that a hazardous flight condition could have developed while cockpit visibility was impaired.

The sudden cutting-in of the heater at about 15,000 feet caused the water vapour in the warm air to condense when it came in contact with the cold air in the cockpit, the result being a dense fog. To further aggravate the situation the windscreen side panels and the entire canopy iced up completely. It was noted that during the descent through cloud, the phenomenon of St. Elmo's Fire occurred, indicating that unusual atmospheric conditions were prevailing.

In my opinion, pilots should be aware of the possibility of such a flight hazard occurring, even though the chances are remote. Dumping of pressurization will help relieve the situation; but if this fails, the canopy should be opened.

Pilots will find that the circumstances described here will occur when moist or warm conditions exist at lower altitudes. A tendency for fog or even ice to form on the canopy and side panels will occur in extreme conditions even when the heater is operating properly. The reason is immediately apparent: Comparatively warm and moist air coming into contact with cold surfaces and resulting in condensation of the water vapour.

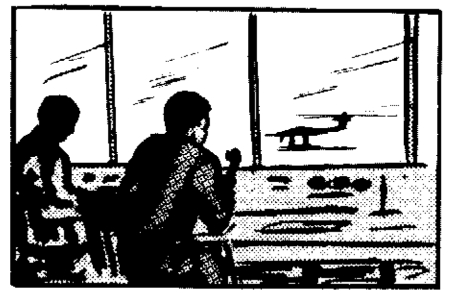
The following precautions and corrective measures are recommended:

- If it is known that warm, moist conditions exist at lower levels, turn the cockpit heat "full hot" for a short period prior to descent.
- If possible, descend to from 20 to 25,000 feet during this period.
- Ensure that the windscreen de-mist is turned on, and feel the glass to check if it is warm. This also should be done prior to take off.
- If heater and de-mister are not functioning properly, allow for a sufficient fuel reserve to loiter at low levels until the fog or ice has cleared.

(Dumping of pressurization and switching to emergency air in a Canuck will help to clear fog or ice by increasing the volume of air passing through the cockpit; but at the time of decompression, this procedure will actually cause an aggravation of the condition due to the sudden expansion and resultant cooling of the cockpit air. At low levels, "cracking" the canopy will also help.)

For the future, the introduction of a modification to improve the heating qualities and reliability of the Canuck's air conditioning system, and the incorporation of side panel demisting should go a long way toward solving any fogging and canopy icing problems.

BASIC SAFETY



by W/C L.A. Yellowlees

COUNTLESS WORDS have been written and countless dollars have been spent in the effort to reduce aircraft accidents and promote safety. And the more complex our aircraft, the greater our safety efforts become. But we still have accidents!

Yes, someone says, and we always will—as long as we insist on making machines that move with incredible speed, and especially when we persist in strapping ourselves into the monsters and using them! This is all very true, but it is also true that the "pure" accident is a rarity and that 95% of our accidents never should have happened, and would not have happened if someone, somewhere, had done more thinking or had cultivated better safety habits.

So someone else suggests that we need more safety gadgets: more red lights, more warning horns, more solenoids, more posters, more orders, more meetings, more speeches, more bosses and even more punishment! All very fine, but we have those things now. On the modern service aircraft, safety devices are installed in great abundance; in fact the designers are constantly striving to get more and more power out of their engines in order to compensate, to some extent, for the ever-increasing weight of the gadgets. If we want to get off the runway at all, we must call a halt somewhere!

Is There A Basic Cause?

So possibly we should do some mental backing up. Let us consider the basic cause of accidents: Where does the trouble start? As you have guessed, the trouble starts with man—the personality, the mind, Joe Doe if you like. He may be the tradesman who forgot to put a simple entry in the L14, or the driver who "didn't know there was anyone behind!" or the pilot who tossed his oxygen mask in a dirty corner. In any case, each accident is preceded by a mental lapse on someone's part, a malfunction of some individual's mental process, or a combination of several mental anomalies.

Should we say that accidents really happen right in the human mind? I believe the concept is quite valid. You may feel that it is obvious and that this is the reason why we need more and more gadgets and red lights. In other words, you may feel that we cannot do anything further about the actual brains or mentalities upon which we are depending for safety. On the contrary, there are a number of things that can be done—and most of them seem to depend upon leadership!

Are Some Of Us Accident-Prone?

Consider for a moment the psychology of accidents. The subject is a large one and cannot be covered here except in a very superficial manner. You must also appreciate that I am by no means an expert. However, psychologists have provided us with some rather interesting facts. Through several prolonged studies they have established that there are "accident-prone" individuals—people who constantly have much higher accident rates than their fellows. Any manager of a large trucking line knows this and so does the executive in your automobile insurance company. And probably the sergeant in charge of your maintenance crew knows it only too well!

On closer examination, other interesting facts are noted. It has been found that the accident-prone individual is usually—I repeat, usually—a somewhat maladjusted person. He may have feelings of inferiority, or he may suffer from some form of anxiety neurosis, depression or worry. In general it may be said that he is poorly adjusted to his environment. He is not necessarily a dull or slow-witted individual. As a matter of fact he often has above-average intelligence; but a high intelligence level does not guarantee wisdom or good judgment. The preoccupied or worried executive is often a poor risk behind the wheel of his car.

The Role of Poor Morale

Most of you will agree that this is true, and you will probably suggest that the problem should be left to the officers whose job it is to weed out undesirables at the Selection Unit. We'll accept that, if only to keep the discussion within reasonable bounds. So now we will assume that the majority of our tradesmen and aircrew are rational, more or less normal people. The trouble is that everyone, at some time or other, becomes worried, confused or unhappy. Morale gets low. This is the time when the mistake is liable to be made; this is the period when the mind short circuits the department in charge of "safety habits". It may be only for an instant—but it could lead to a fatal accident.

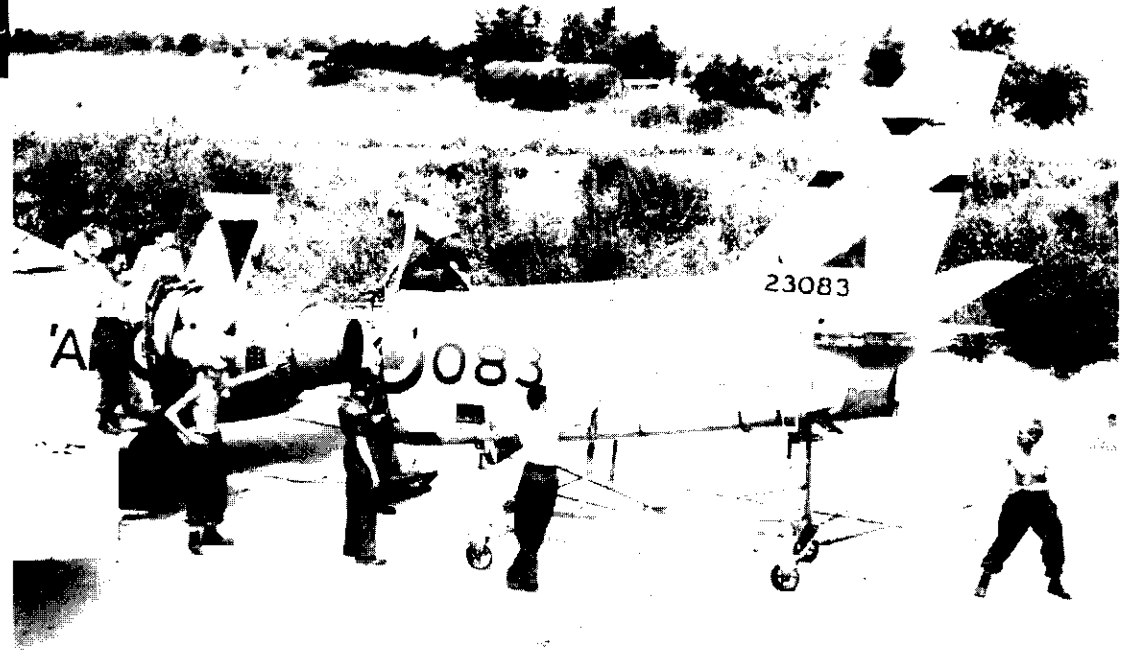
Just a few days ago an account was published of accident rates in a certain factory. In one department it was noticed that there was a sudden increase in the accident rate. The high accident rate coincided with a change of shop foremen, and it wasn't until another change was made that the rate dropped to normal. Here was a product of poor leadership: shop morale dropped and the accident rate went up. This is not an isolated example; it happens everywhere. And it happens in the RCAF.

If we accept the theory that many accidents are the result of preoccupation with worries, anxiety and low morale—and there is much evidence that this is true—then we must have a long, hard look at our present leadership. Our officers and NCOs must be quick to detect any lowering of morale in the individual or in the group and be ready to take prompt and effective action. The reduction of mistakes and errors is accomplished to a great extent by a sound understanding of the basic psychology of the subject, and the supervisor's ability to develop good safety habits in his men.

The Need for Safe Habits

In 1953, 8642 lives were lost in Canada through accidents. Just think of it. That figure represents the population of a good-sized town! This disgrace reflects the average man's lack of foresight and ordinary care with respect to the safety of both himself and others. Development of the safety habit in the RCAF is a major responsibility of both Officers and NCOs. It should be encouraged not only in aircraft technicians and aircrew but also among the ground tradesmen, for accidents may be caused indirectly by the supply clerk or the teletype operator who makes a careless mistake. There have been many instances of administrative errors producing the circumstances which set the stage for an aircraft accident.

The aeroplane is a good servant when treated with respect, but it seems to resent the careless attitude or the off-hand approach and can become deadly at the drop of a split pin. Our maintenance schedules, inspections, modifications and orders are all carefully planned to prevent accidents, but while they are excellent in themselves they are not enough. It is not enough to do exactly what is stated in the regulations; the technician must use his initiative and imagination; he must always be on the alert for the hidden fault or unsatisfactory condition that is lying in wait to cause trouble. How often have we heard the plea: "But sir, I did check exactly as shown in the book!" An example is worth giving.



Shortly after a Sabre was given an acceptance check, it was taken on an air firing exercise. On the way back to base the pilot found that his aileron controls were jammed. An accident was barely avoided. It was found that a cover or panel on the rear bulkhead of the spent ammo compartment had not been installed at the factory, allowing spent ammo to go through to the controls. While orders did not state specifically that this cover was to be checked on acceptance, it should, nevertheless, have been done. And then there was the question as to responsibility: armament, airframe or factory?

These questions, or their answers, mean nothing to a dead man. What does count is a serious attitude and constant checking before the equipment is certified as serviceable. When this attitude is recognized as the desirable one, and when it is carefully encouraged and developed by all, then the accident rate goes down. The experienced, safety-conscious technician can always take time for another look, another check. And these stalwart people seem to develop an instinct or sixth sense for locating trouble.

Multiple Responsibility

From the time a piece of aircraft equipment is conceived on the drawing board of the designer until it is installed in the aircraft by the technician, it goes through countless stages and is handled by a great many people. While the man who finally signs for the part as serviceable probably plays the most important role in the sequence, it must be emphasized that any one individual along the route bears a responsibility for the condition of the part. And this responsibility applies, as has been mentioned, to the personnel handling the vouchers, certificates, orders and correspondence that go with the equipment in its long journey from the designers' board to the aircraft. Safety is the business of each and every member of the RCAF.

It will be seen that the elements or ingredients of an accident can be created by anyone at anytime, in spite of safety devices and regulations. The person who has a firm understanding of his responsibility, no matter what his trade, and who is enthusiastic about his work, will be the one most likely to develop good safety habits. It is the responsibility of the leader to see that his men have this understanding and this enthusiasm. The leader on his part must always be safety-conscious and set the standard by his example.

We may sum up then, with the thought that regulations and safety devices are not enough We must have an awareness and an understanding of the basic reasons for accidents so that we may cultivate better safety habits. This, I believe, is principally a matter of leadership.

THE AUTHOR

Born in Zealandia, Sask., W/C L. A. Yellowlees received his early education at schools in England, Saskatoon, and Vancouver. In 1935 he joined the RCAF's pre-war 111 Fighter Squadron (Auxiliary) at Vancouver and in 1939 transferred to the Regular Force. From early 1940 to 1943 he served at various RCAF stations in western Canada.

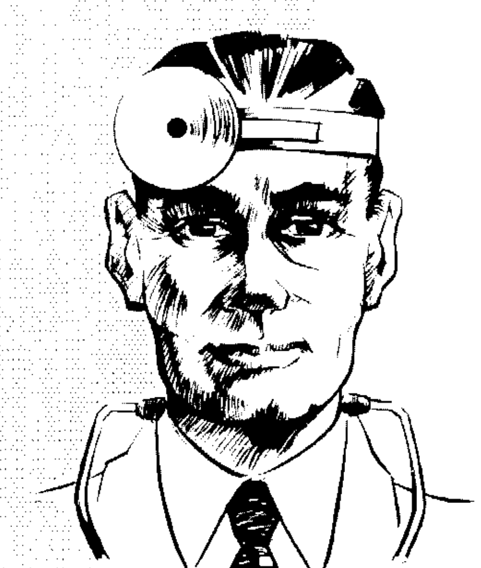
Following a two-month course at the School of Aeronautical Engineering in Montreal, W/C Yellowlees was commissioned as a Flying Officer in March 1943. After attending an administrative course at St. Margaret's, PQ., he was transferred to 1 Training Command Headquarters in Toronto as a trade test officer. In 1946 he was posted to the Institute of Aviation Medicine in Toronto to open the Personnel Selection Research section. The following year he was transferred to Training Command Headquarters at Trenton to inaugurate the Personnel Selection Unit for airmen set up at RCAF Station Aylmer. Appointed officer commanding the unit in April 1949, he continued in that post when the unit moved to St. Johns, P.Q., early in 1951.

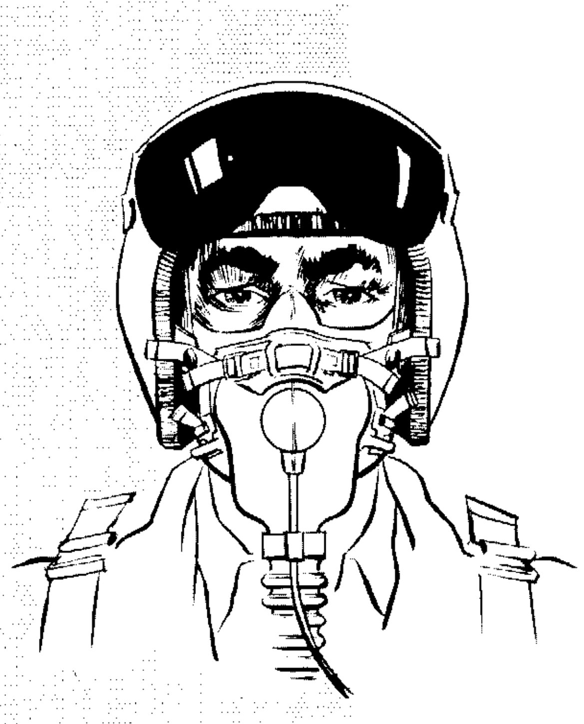
W/C Yellowlees was named Chief Technical Officer at Station Bagotville in February, 1953, and served in this capacity until selected to attend the NATO Defence College in Paris in February, 1956. On completion of the course he was appointed maintenance staff officer at the HQ of the 4th Allied Tactical Air Force at Trier, Germany.

A THING CALLED RAPPORT

by COMDR. CARL E. WILBUR

Comdr. Carl E. Wilbur, MC, USN is currently assigned to the Aviation Safety Division, Op-57, Chief of Naval Operations, with duties as liaison officer with the Bureau of Medicine and Surgery.





The RCAF, unlike the USAF, does not have at station level a medical organization to care specifically for aircrew. However, the responsibilities of the Medical Officers at RCAF flying stations approximate those of the Flight Surgeon group in the USAF, and all our Medical Officers receive training in the aeromedical problems discussed in this article.—ED

A FLIGHT SURGEON, searching for additional ways to improve his local program, writes in part: "Have you any good ideas about the promotion of aviation safety by the flight surgeon in the field?" One mighty fine answer to this query is found in a word of French origin: "rapport"—rapport between the flight surgeon and the squadron commanding officer; rapport between the flight surgeon and the exec, the operations officer, the safety officer; rapport between the flight surgeon and every aviator in his squadron. The word may be French and most commonly used in medical lingo, but the meaning is clear: "having a close understanding or working in mutual dependence." The women's pages may refer to it as "togetherness".

Mutual Dependence

There is no magic formula for safety, no substitute for command responsibility, adequate training, thorough pre-flight planning, careful maintenance, and all the other ingredients which make for accident-free flight hours. But there is one ingredient without which none of these is completely effective. That ingredient is rapport. Each and every member of an aviation unit must work together in a spirit of mutual dependence and close understanding.

The commanding officer and the aviation mechanic are mutually dependent on one another. The aerologist rides with every pilot aloft. The operations officer and the most junior flier in the squadron work in an atmosphere of close understanding. Plane captain, taxi director and landing signal officer, the entire aeronautical organization lives and works as a team; the members either figuratively hang together or literally hang apart—each from a different yardarm.

The Need for Rapport

Just two examples from a foot-high stack of recent Medical Officers' Reports will emphasize the squadron's operational dependence on the flight surgeon. We take for granted that the medical officer is the man to call when we have a broken leg. Does a pilot need a "close understanding" with the doc when he is seemingly well and sound of limb? Let's look and see.

F9F-5: On routine flight and landing, pilot dropped flaps and failed to lower gear. Injury: none. Damage: major. The flight surgeon reports; "Wheels-up landing occurred at 1917; pilot had been on duty since 0730; this was his third hop of the day; had sweet roll and milk for lunch, nothing for supper; contributing factors in this accident are insufficient nutrition and inadequate rest prior to flight."

AD-5N: On his first pass he failed to go through his landing check-list completely and landed wheels-up. Injury: minor. Damage: major. The flight surgeon reports: "The pilot had no sleep the night before the flight; he slept only 4.5 hours from 0930 to 1400 on the day of the flight; the inadequate physical rest and nervous tensions involved in the previous night's squadron duty contributed largely to the cause of this accident; the pilot's wife was at term in her first pregnancy, so this may have occupied some of his subconscious thoughts before and during the flight."

These two pilots and their flight surgeons could not have enjoyed a "close understanding". Or perhaps it was the operations officer who failed to realize that the success of his scheduling was "mutually dependent" on the flight surgeon as well as the pilots. Now we recognize that the flight surgeon is not expected to spoon-feed the pilots and tuck them into bed; nor is the maintenance officer expected to check every turn of the pliers made by his mechanics. The point is this: The flight surgeon gives the word on such things as adequate rest and nourishment. If he has rapport with his pilots, they get the word and accidents like the foregoing don't happen. We know that one of the best ways for the flight surgeon to establish rapport with his pilots is by constant association, by working and relaxing together—in the ready-room, at meal time, in the wardroom, and at O-Club musters. In all of these places he can keep his finger on the pulse of the squadron.

*

If the flight surgeon is up at the dispensary, perhaps assisting the entry of that AD pilot's baby into the world, the squadron should not forget its operational dependence on the surgeon and his duties toward the pilots. When the doctor is busy with dependents or routine sick calls, the older heads in the squadron must be alert to the physical and mental status of the younger pilots. A grounding chit from sick-bay is easier to come by than an Aircraft Accident Report.

The answer to aeromedical supervision of flight personnel is not necessarily more flight surgeons. The fix can often boil down to more rapport—among ALL members of the squadron.

USN: Approach

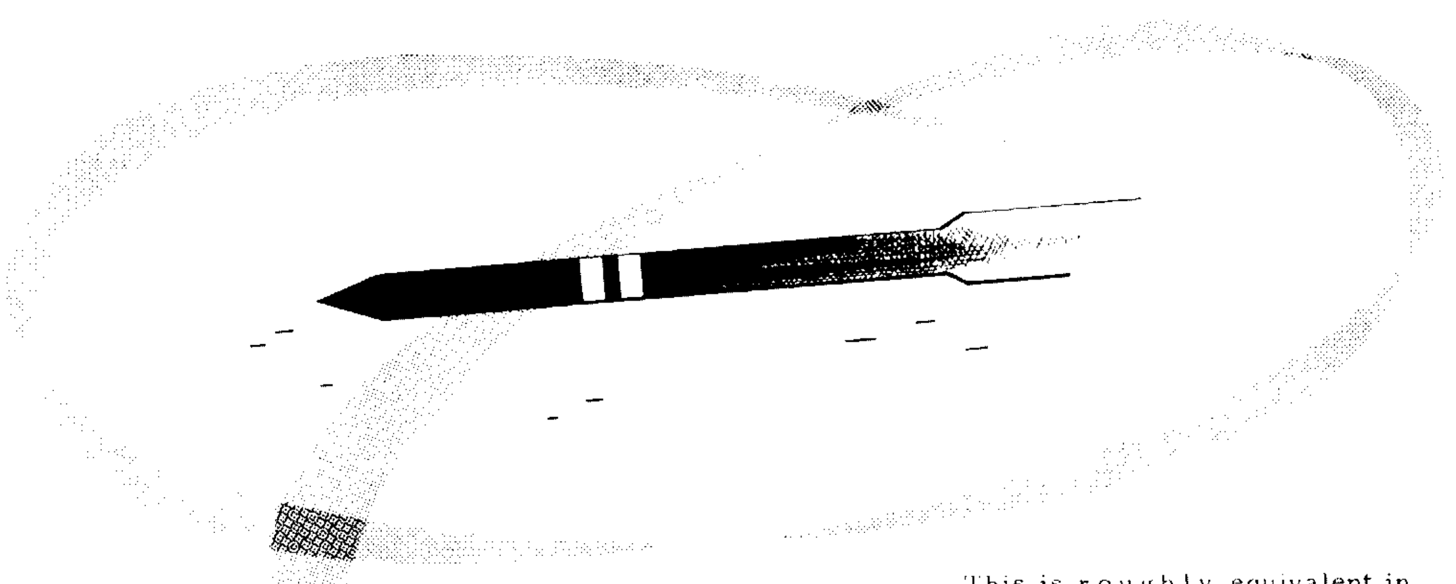
RoRoRogRogROGER

As one step in combatting the problem of prompt detection of anoxia, and other emergencies, the flight surgeon can arrange to have his extra ears in the control tower.

This impossible feat is accomplished by educating the control tower personnel to be suspicious of unintelligible speech. It could be caused by under-indulgence in the bottle (probably the oxygen bottle) or some other part of the oxygen system, unused or inoperative. Or it could be one of a number of other reasons such as hyperventilation alkalosis.

Get the control tower crew together and tell them about such danger signals as stuttering speech, incoherence and tension in the voice. Whether the cause is anoxia, anxiety or angina, they may save a pilot or two by being alert to suggest remedial action and to simplify procedures for a troubled pilot. They may be able to talk a groggy aviator through his landing checkoff list and to a safe touchdown. Wingmen and landing signal officers can often observe the same symptoms and perform the same service for a fellow pilot.

USN: Aero-Medical Safety Journal



Where Angels Fear

Directorate of Armament Engineering

WOULD YOU walk wittingly into a minefield? Of course you wouldn't! Your first impulse is to dismiss the question as absurd. However the equivalent in foolhardiness is being perpetrated by the armament personnel of crash crews.

Recent accidents involving Canucks have demonstrated a need for clarifying the duties of these personnel if they are to avoid injury from rocket heads and seat and canopy ejectors, all of which have considerable explosive potential.

Not long ago, demolition was performed on the rocket heads of a crashed Canuck in order to render them harmless. Twenty of the rockets had failed to explode on impact. When discharged, the heads blew a crater in the ground approximately 14 feet in diameter and seven feet in depth.

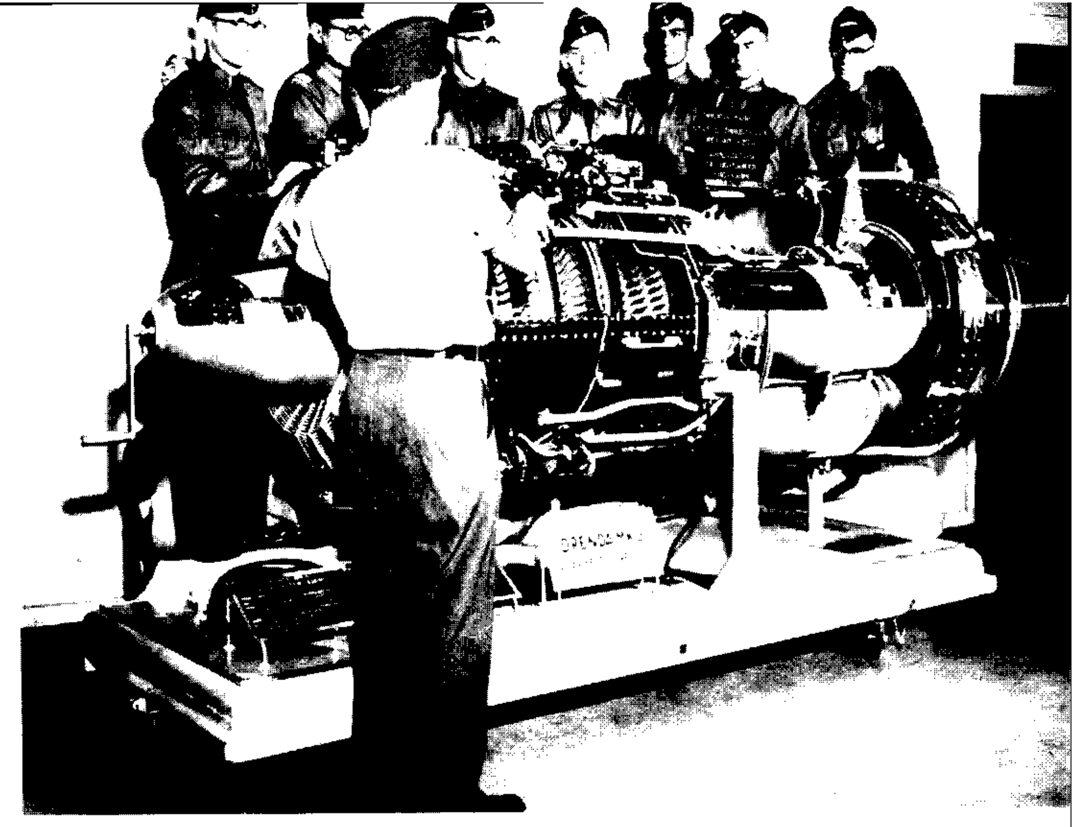
This is roughly equivalent in blast, shock and shrapnel effect to a 250-pound, high explosive bomb—and it does not include the additional risk that would arise if the rocket motors went off.

At this point it should be obvious to all concerned that the following precautions (as outlined in EO-00-80-1, para 12) should be carefully observed.

"Extreme care is to be taken when removing occupants from armed aircraft or from aircraft carrying explosive material, and when removing personnel from aircraft equipped with ejection seats to preclude the accidental discharge of the seat ejector mechanism. All personnel other than those attending to the occupants of the aircraft are to remain clear until the area has been declared safe.

"Qualified armament personnel, when applicable, are to disarm all guns, and immunize all explosive material, prior to their removal from the aircraft or surrounding area, unless the circumstances are such that those present consider that immediate action is necessary and the risks are justified. Explosives which are strewn about or buried at the scene of the accident are to be removed from the surrounding area or the aircraft by armament personnel. The officer or NCO in charge is to ensure that both the aircraft and area are free of explosives before salvage crews or investigating parties attempt to probe the wreckage.

"Explosives which are known to have been carried by the aircraft and which are buried or cannot be located are to be recovered by sifting or forking over the soil in a systematic manner. In winter, when snow conditions make it difficult to locate explosives strewn about or buried, the area is to be marked off and appropriate warning signs (bilingual) erected. The owner of the property should be advised when this action has been taken. Subsequently, when mild weather permits, proper clearance action is to be taken as per the foregoing instructions. It is most important that every precaution be taken to ensure that explosives do not fall into the hands of the public."



COMPRESSOR STALL

Compressor stall is a mixture of many complex and difficult-to-understand phenomena. However, it is the intent of this article to explain some of the phenomena in non-technical terms for the benefit of those who are not versed in the "deltas and thetas" of engine performance. Needless to say, the simplifications and analogies employed here must not be interpreted as the final explanation, but should be used as a steppingstone to more complex and exact descriptions.

THE HIGH-OUTPUT, high-pressure-ratio engine is here to stay. And with good fuel consumption, too. However, the law of averages always catches up with us sooner or later. In order to produce high-output engines with superior fuel consumption and rapid acceleration characteristics, it is necessary to operate as close to the stall region as possible.

The damage inflicted on mechanical parts by compressor stall varies considerably from one engine design to another. Primarily, rugged construction and attention to details will result in a dependable engine. However, even though engine damage is unlikely to occur, it is felt that a discussion of compressor stall at this time is needed to relieve anxieties that may develop when this phenomenon is experienced by field operational personnel.

Not Restricted to Jets

First of all, let us understand that stall (or surge or pulsation as it is also called) is not a phenomenon peculiar to any one particular brand or type of engine. On the contrary, it may occur on any engine if the conditions are right. Even the gas turbine compressors used for starting large engines frequently encounter stall as they accelerate up to operating speed. In the past, stall has been encountered on two-stage or turbo-supercharged piston engines, so there is no need to look upon it as some mysterious product of the current jet age.

Pilots are familiar with the backfiring of reciprocating engines where any number of mechanical defects such as bad spark plugs, lean carburetion, or sticking valves can result in engine backfiring. Similarly for turbine engines, maintenance and field conditions can influence appreciably the compressor stall problem. The condition and adjustment of such components as the fuel control, overboard air-bleeds and exhaust nozzle assembly (afterburning engines) is of vital importance in maintaining stall-free operation.

In general, there has been less stall of high

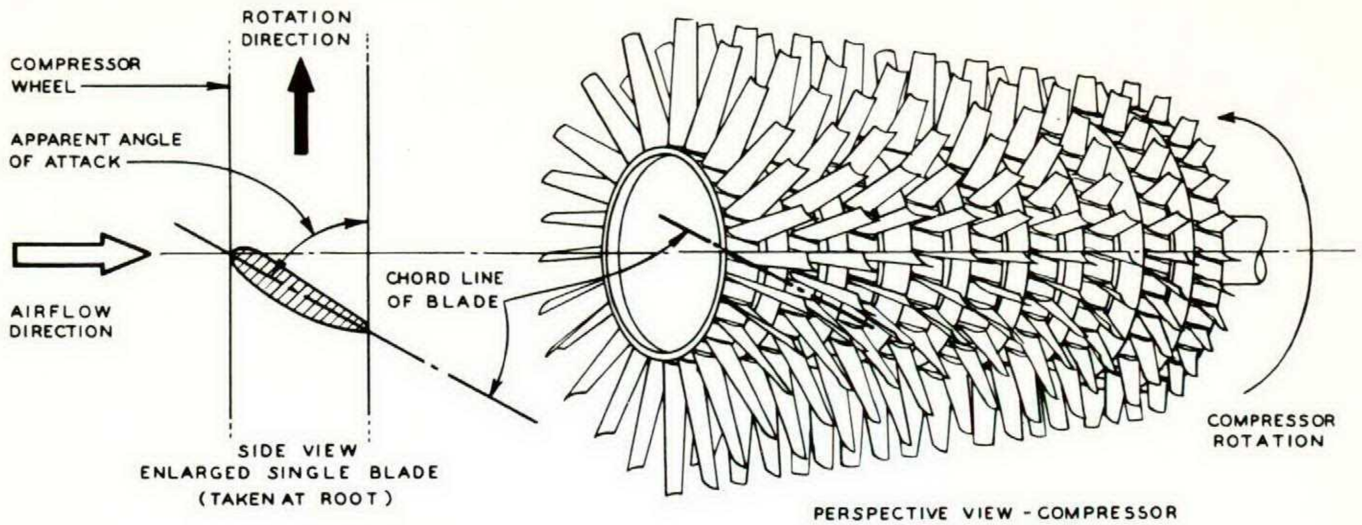


FIGURE 1

intensity on centrifugal types than on axial types There are several reasons for this, but probably the one having the greatest bearing is the fact that centrifugal jet engines operate at much lower pressure ratios than the axial type. The constant demand for more thrust, lower thrust specifics, higher airspeeds and altitudes has broadened the range over which the engine must operate, and consequently has made them more vulnerable to stall. Then too, the fact that centrifugal-type engines usually are fed from a plenum chamber helps overcome aircraft duct shortcomings. The following discussions will be confined to the axial-type jet engine.

Causes of Compressor Stalls

Compressor stall is very much like aircraft wing stall, and compressor blades may be thought of as miniature wings. This analogy is not as easily seen when one considers that the angle of attack (α) can be readily changed for the aircraft wing, as in a pull-up, but that the rotating compressor blade remains physically fixed in its hub. Actually the effective α of the compressor blade changes and the apparent or mechanical α (see fig. 1) remains fixed. This variation of the effective α (see fig. 2) is the prime consideration when discussing compressor stall. Now, let's see how this comes about.

Figure 2 illustrates this effective angle of attack at a given or chosen position on a rotating compressor blade at some operating condition. This effect is similar (if the diagram were rotated to the right) to watching snow fall from a side window in a moving car (no wind). The snow is actually falling vertically, but the forward motion of the car, coupled with the vertical motion of the snow, gives the impression that it is falling at an angle by the car. This direction of snow fall is synonymous with the resultant illustrated in figure 2.

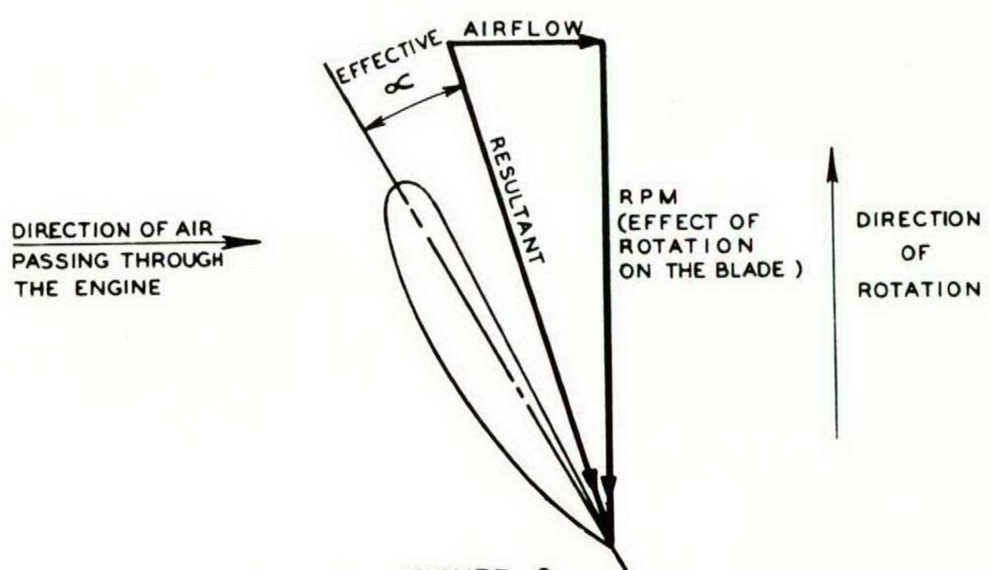


FIGURE 2

The triangle beside the airfoil section is made up of two variables: the airflow which occurs along the axis of the engine, and the rpm which represents a blade velocity acting perpendicular to the axis of the engine. For a given airflow and rpm (direction and amount as indicated by the arrows) there can be only one resultant which is fixed in both amount and direction and thereby defines the effective α.

Every airfoil is limited as to the maximum (or critical) angle of attack it will tolerate under a given operating condition. When this angle is exceeded, the airfoil stalls, and the air separates from the airfoil section, thereby greatly reducing the lift on the wing. In the compressor this loss of lift is evidenced as a loss in pressure ratio and therefore a reduction in pressure level at the compressor discharge. Figure 3 shows how this angle of attack is varied.

In figure 3 the airflow has decreased for a given rpm (dotted lines) and caused the angle of attack (α) to increase. When this decrease in airflow becomes critical, the airfoil stalls—and when the airfoil stalls, there is a relative reduction of pressures within the compressor. Recovery from compressor stalls is accomplished when the pressures reduce within the engine and permit the increased airflow which in turn decreases the angle of attack and allows the compressor to recover normal operation. If the same low airflow condition which caused the first stall still persists (no change in operating conditions), the cycle will be repeated. Now we are ready to apply this condition of low airflow for a given rpm to the actual circumstances which may cause it.

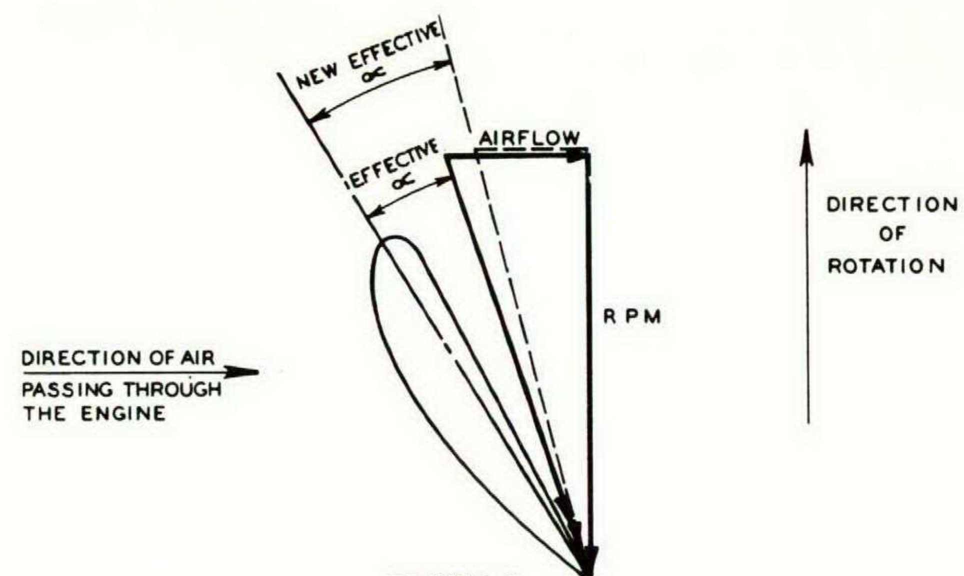


FIGURE 3

During acceleration, compressor stall may be induced by improper scheduling of fuel to the burner. For instance, if the fuel flow is too high, temperature and pressure in the burner become higher than those for which the designers planned, thus causing abnormal back pressure on the compressor. This decreases the airflow for a given rpm (as illustrated in fig. 3), increases the effective α beyond the airfoil's critical angle of attack and causes the airfoil section to stall, thereby reversing the airflow in the compressor for an instant and greatly reducing the pressure. However, it is necessary that the acceleration fuel flow be maintained as high as possible in order that the best engine acceleration rates may be obtained. Therefore there must be a compromise between acceleration rate and compressor stall. To achieve it, a margin must be provided between actual operating conditions and stall, and this is effected by means of fuel control scheduling.

Another condition of possible compressor stall occurs at high altitude, particularly during high power operation. The condition is brought about by low temperature effects and what is known as "Reynolds Number" effect. When air gets thinner, as it does at high altitude, it has difficulty following the contours of the airfoil section of a compressor blade and therefore reduces the stall margin. As the air gets colder, the engine tends to operate closer to stall, so more care must be exercised when operating at altitudes where the air is both thin and cold. In order that the engine may operate efficiently at both high and low altitudes, the apparent angle of attack must be a compromise; hence stall margin for these conditions must be designed into the engine before it is built.

Compressor inlet conditions will also aggravate stalling characteristics. The engine

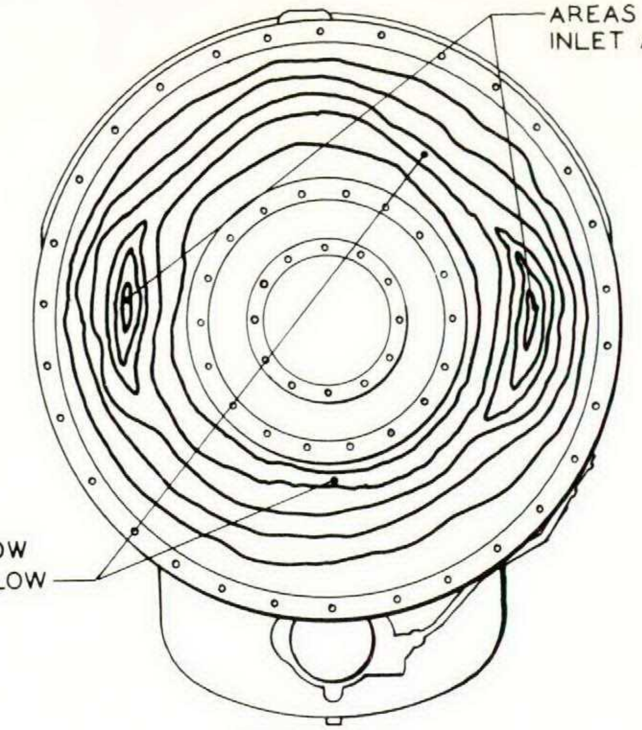


FIGURE 4

was designed to function at a certain power level for a given rpm-airflow relationship (see fig. 3). When the airflow for a given rpm is decreased, thereby causing the effective angle of attack to increase, compressor stall will occur. Let us now see how inlet conditions can affect this airflow variable.

For a given airplane we will assume that both engine and airplane have been matched properly for normal operations—ie, the engine will tolerate the amount of airflow loss arising from ducting inefficiencies. These inefficiencies, coupled with airplane attitude, airspeed and engine power level, will vary the distribution of the incoming air at the inlet to the compressor as shown in figure 4. This airflow variation between the high and low areas in figure 4 must be kept within reasonable limits or the compressor blades travelling between these areas may stall and unstall with such rapidity that a continuous stall may result. Airflow distribution can be varied outside the acceptable limits of the engine by skidding and slipping the airplane to such an extent that the ducts are unable to deliver an acceptable airflow to the engine. If an aircraft is flying at reduced airspeed at high altitudes where the effective angle of attack is close to its critical value, stalling conditions may be induced by milder skidding and slipping. (Supersonic flight may adversely affect ducting efficiency, especially at the intake entrance and at any constriction that may be present along the duct.) These facts indicate that care should be taken to maintain airspeeds at a respectable level and that, at extreme altitudes, carefully co-ordinated flying becomes increasingly important.

So here we have a situation in which high performance, good acceleration, and low fuel consumption require that an engine and control be designed to operate near conditions where stall is encountered. Working against the attainment of these goals are the effects of Reynolds Number, cold air, and possible inherent or induced maldistribution of air entering the engine. Some measure of control of acceleration stall is afforded by flexibility in fuel control setting, but for the most part the important factors are fixed when the engine and airplane are designed and built to a given configuration. Airplane and engine manufacturers are continually working to reduce the possibility of compressor stall occurring within the operational range of the engine

Severity Of Stalls

Stalls vary in severity depending on whether they involve only a portion of a stage, a stage, several stages, or an entire compressor. Incipient stall may produce roughness with or without audible accompaniment of rumble or drone. More pronounced stalls may produce noises varying in intensity from pistol shots to cannon fire, and these can be frightening if the pilot doesn't know what to expect. This is especially true of fighters where the pilot may be sitting over or between the long inlet ducts. Extremely bad stalls may produce pulsations which cause flame, vapor, or smoke to appear at the exhaust, in the bleed valves, and even at the inlet.

How To Limit Stalls

Now that we have seen the nature of some of these stall conditions, one might ask, "What can I, as a pilot, do to avoid or diminish the intensity of these compressor stalls?" Here it is in a nutshell:

- Always treat the power lever with respect. No erratic movements.
- High altitude means more Reynolds Number and cold air effect, which enhance the possibility of stall by imposing a lower acceptable angle of attack on the compressor blades. To reduce the possibility of compressor stall:
  - Co-ordinate your flying to aid inlet duct efficiency.
  - Climb at slower rates and higher airspeeds.
  - Avoid abnormal airplane attitudes such as nose-high level flight.
  - Maintain airspeeds above acceptable minimums.

The next question might be, "How do I get out of stall?"

- If compressor stall occurs during subsonic flight:
  - Slowly retard the power lever until compressor stall ceases or the lever reaches "idle" position.
  - Correct any abnormal attitude of the airplane.
  - If stall persists at "idle" power lever position, reduce altitude and increase airspeed (remain subsonic) until stall ceases. Don't forget that the chances of recovery increase as altitude decreases due to Reynolds Number effect and increasing compressor inlet temperatures.
- If compressor stall occurs during supersonic flight:
  - Terminate afterburning and retard the power lever to "idle".
  - Reduce altitude and establish high subsonic airspeed by controlling airplane attitude.
  - Do not manipulate the power lever until normal operation has been obtained.

Under some circumstances it may be necessary to take several of the above corrective measures simultaneously.

*

As was brought out in the beginning, compressor blade stall is similar to aircraft wing stall. When an aircraft is unintentionally stalled, the pilot is usually very concerned, to say the least. His immediate reaction is to recover from the stall, and this he generally manages satisfactorily if he does not exceed the "G" loading. Normally the actual aircraft stall does not affect the aircraft's structure. This situation can also be applied to the compressor stall, except that there is no way in which the compressor blades can be overloaded to cause their structural failure. Engine reaction to overloading may be a flameout, after which an in-flight re-light may be accomplished. However, there is a possibility of overheating an engine during the stalled condition if corrective action is not taken.

Manual of Aircraft Gas Turbine
Pratt and Whitney Aircraft

INTEGRITY ON THE JOB

In aviation, how well we do our work has a direct effect on the lives and safety of the people who trust us to deliver them safely from one place to another. Here there is no room for the "Well-that's-good-enough" way of doing and thinking. That sort of work can lead to newspaper headlines of the type we don't want to see. The right way—the one hundred per cent correct way of doing things—is the only way that is good enough.

We can all appreciate how a person would feel if, due to his negligence or poor workmanship, an accident were to occur in which people were injured. Such a situation can be avoided if integrity in our work is developed to the point where it is no longer a conscious thought but a definite work habit.

FSF: Aviation Mechanics' Bulletin

PXing

LETTERS TO THE EDITOR

Our Fault Entirely

On page 23 of the Nov - Dec issue of Flight Comment appeared an error. Under the heading "Briefing", the first sentence reads: "Eight percent of the accidents.......were caused by poor weather briefing". The word "weather" should be deleted. The "eight percent" refers to accidents caused by all forms of briefing. Actually Met was at fault in only one flying accident in the 1955-56 season—an enviable record.— **ED**

More About Maintenance

W/C H. Bryant's article in the Jul - Aug '55 issue of Flight Comment is still stirring up lots of discussion. First of all we had two letters reach us. One of them was written by a reader who wished to remain anonymous. The other came from Cpl. J. Cockerell, Station Flight, Canadian Joint Staff, London, England. Both letters were published in Flight Comment for Mar - Apr '56.

Lately we received another expression of opinion on the subject of maintenance and maintenance men—this time from Cpl J.J. Etzl, 430 (F) Squadron, #2(F) Wing, Gros Tenquin, France. Cpl Etzl's letter is reprinted below, followed by comments from specialist officers at AFHQ.— **ED**

*

In the Mar - Apr '56 issue of Flight Comment you state that more information from men in the field is required in order to bring general discrepancies and maintenance errors to light. It would be of valuable assistance to all of us if you would have a monthly report on this subject printed in your magazine so that all personnel involved in the maintenance of aircraft could see what corrections are going to be taken in each applicable instance.

The personnel attached to squadrons overseas feel that the letter written by Cpl Cockerell is in all instances very true—especially the phrase "How soon can we have it?". The latter is the most over-worked phrase in squadron life, where the majority of texts and orders are slyly laid aside in order that the aircraft may be made serviceable as soon as possible.

When instances like this arise, and technical personnel try to comply by doing their best as quickly as possible to maintain serviceability, the result sometimes is either a duplication of work (because a haphazard job was done) or, in some instances, a fatality (because the job was incomplete).

A point not brought out in Cpl Cockerell's letter concerns the misemployment of skilled, experienced, technical personnel (who are required continuously at their work) on so-called "joe jobs" such as fire piquet and guard duty. It is granted that these occupations must be carried out by someone; but if the few experienced tech men on the squadron are detailed for them, who will be on hand to guide the inexperienced?

At one time in the history of the RCAF it was a recognized fact that the immediate, primary concern of all sections in an established wing was to "keep them flying"—which meant that all sections (regardless of what trade) were to direct all their efforts to the task of helping pilots and aircraft to get into the air where they could fulfil the essential roles for which they were designed. Through the growth of extra-curricular duties it has become almost an impossibility to perform these functions. How can the primary duties be carried out when a majority of experienced personnel are engaged in band practice, sports, mobile striking force, guard duty, fire piquet and numerous other activities? It would be a disastrous thing indeed, should another war become a reality, if we were unable to commence the primary function because the required personnel were too busy doing "joe jobs".

Another problem needing investigation is the responsibility of tradesmen generally. Tradesmen in technical fields—especially those directly connected with the maintenance of aircraft—are constantly faced with responsibilities that require their utmost attention; for should they neglect to do a job correctly, they will be held responsible. This responsibility, when compared to that of trades which receive equal pay, is far greater than what others are obliged to face. For example, an accountant may make an error in addition amounting to a few thousand dollars. When discovered it is normally erased and rectified with no further comment. But a tech tradesmen, if he installs a component incorrectly, may be faced with the total cost of the damage he has caused.

It would be beneficial to all tradesmen in the field if a calculated system of responsibility allowance were devised so that the men faced with these greater responsibilities would at least have the recognition due to them.

J.J. Etzel, Cpl
430(F) Squadron
#2(F) Wing
Gros Tenquin, France

Cpl Etzl has brought up two specific points:
(a) Why should the technical tradesman be required to assume extra duties when this employment might prejudice the completion of his primary duties?
(b) Why is a tradesman not paid an additional allowance based on the responsibility of his particular trade?

In the first instance, establishments for all trades have been calculated in a manner which will permit airmen to assume essential extra-curricular duties. An estimate of the time the average airman spends in activities such as fire piquet and guard duty has been incorporated in all establishment calculations, and as a result sufficient personnel are made available to carry out both primary and secondary duties. Therefore, when an airman is required to assume a secondary duty, the primary task should not suffer through lack of personnel. However, it is recognized that the strength in a particular trade may not always be up to establishment. It is necessary in these circumstances for the CO to use discretion in the allocation of personnel to secondary duties in order to ensure that the primary function of his unit does not suffer.

The second point raised concerns responsibility pay. Rank is the means employed in the RCAF for recognition of responsibility. The rank structure has been based on a calculated formula designed to provide a proper degree of supervision at all levels. However, it is considered that Cpl Etzl is referring to trade responsibility—or the differences in skill and knowledge between trades. In this regard, the trade grouping system was introduced to differentiate between the skill and knowledge required of specific tradesmen. It is because of these differences that we have four trade groupings. Some trades advance only to Group 1; other more highly skilled trades advance to Group 4. In other words, the trade grouping system is the means used by the RCAF to recognize that some trades require from the airman a greater degree of skill and knowledge than others.

Cpl Etzl has singled out two of the major problem areas in the airman personnel field. We have been constantly striving to reduce the extra duty load which now falls upon the skilled technical airman. Our efforts in this respect are continuing and it is hoped that many of the administrative functions—pay parades and sick parades, for example—can be streamlined to effect a saving in the time lost through diversions from the primary job. The question of an adequate pay differential between trades is also under active consideration. New airman career concepts are under study, so it is not inconceivable that the highly skilled technician may, sometime in the future, be accorded greater recognition in terms of pay differential between trades.

Quarterly summaries of ground accidents and maintenance errors are presently being compiled and distributed to all commands and groups within the RCAF. Condensed summaries of these reports are being published periodically as articles in Flight Comment.

It is to be noted, as stated in the article entitled "Safe Maintenance" (also appearing in the Mar - Apr '56 issue of Flight Comment), that remedial action will be initiated when specific trends appear. Trends will not be evident until considerable statistical records are available. These records can only be compiled by diligent submission of ground accident and maintenance error details by operating units.— **ED**

Accident Resumé

Low And Slow

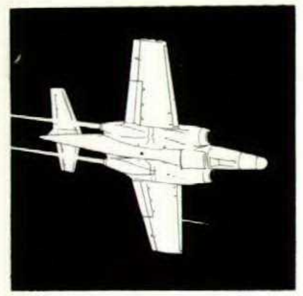
A pilot is dead because he ignored the warning inherent in our title. Immediately after takeoff as number three in a four-plane formation, the pilot saw his formation leader crash. He at once started to orbit the site of the crash—from which, incidentally, the pilot crawled away. Number three had rightly assumed the lead; and when one of his wing men complained of small orbit and low airspeed, he ordered both to return to circuit height while he continued to circle the crash site.

The orbitting aircraft was seen to flick into a roll from a turn which by now had become very tight. The pilot checked the roll at a dive angle of about 60 degrees and apparently rapidly applied engine power in his attempt to recover. His efforts were unsuccessful and the aircraft struck the ground and exploded, killing the pilot on impact. His attempt to aid a downed pilot was commendable, but the dangers associated with tight turns at low airspeeds should never be forgotten or ignored.

Approach Problems

The T-33 was being flown on a local exercise during which two touch-and-go landings were practised. On the third approach, which was to be full-stop, the pilot rounded out well before the runway, with the airspeed indicating between 150 and 155 knots and the power off. After landing—and while taxiing to the hanger—the pilot in the rear seat informed the captain that he thought they had hit a "pheasant". The "pheasant" turned out to be an approach light situated one thousand feet from the end of the runway. Damage to the aircraft is shown in the accompanying photograph.

An approach so low as to result in striking an approach light must have followed an into-wind turn made at too low an altitude. The pilot was criticized on both counts. Circuit procedures for a jet aircraft require a much more precise technique than those for pistons. The reasons for them will be dealt with in Flight Comment in a forthcoming article on the subject of the power curve.



Dirty Fuel

Modern high speed jet aircraft have somewhat delicate digestive systems, which means that if anything foreign is introduced into the formula, an upset is highly probable. Flamed-out crashes and forced landings have resulted from water contamination in fuel, and serious damage to pumps and other fuel system components has also been traced to the same source.

With modern facilities and equipment there can be no excuse for dirty fuel in aircraft. How often have you mentally snarled about filling station operators after finding foreign matter in the carburettor or sediment bulb of your car? Surely it is of even greater importance to ensure that only clean fuel is put into aircraft tanks.

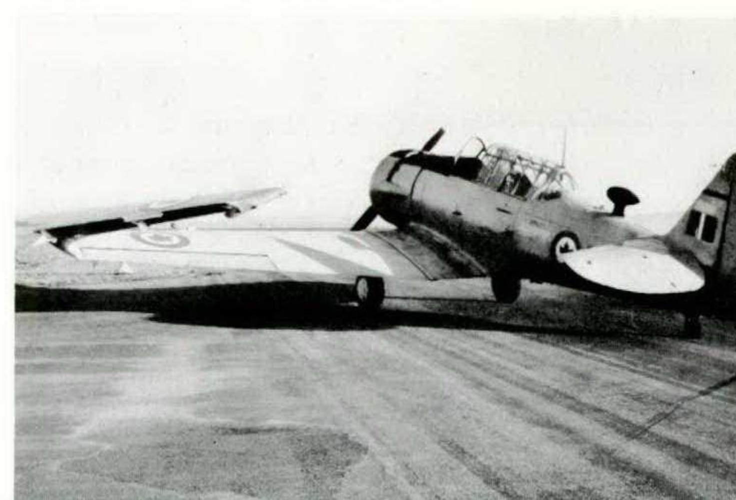
A Canuck had been airborne for a matter of seconds when the starboard engine lost power and, within 30 seconds, flamed out with a dull explosion. The pilot at once closed the HP cock and, because of the explosion, decided against attempting a relight. After burning off some of the excess fuel load with the port engine at fairly high power, he completed a successful single-engine landing.

Investigation revealed that the aircraft's fuel was contaminated with water and that engine components had been severely damaged. The fuel had come from drums and it was evident that engineering orders had been violated by the operator of the bowser equipment. He had recognized that water was present but had neither done anything about it nor even reported the fact. An educational program and stricter supervision would have corrected such a dangerous situation. And it is worth stressing that this accident is not an isolated case. Watch for an article, based on a recent survey, on the subject of fuel handling in the RCAF.

Thereawtabinroomenuff

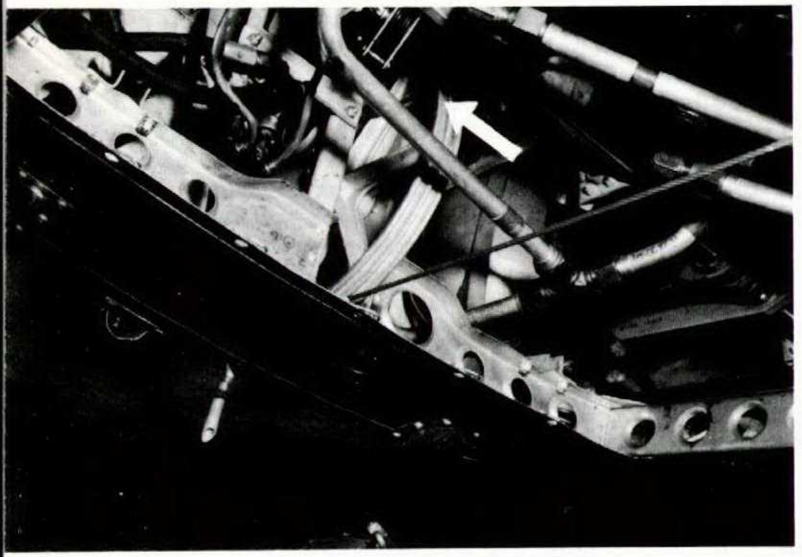
Readers will doubtless recognize the accompanying cartoon which originally appeared on the inside back cover of Flight Comment for May - Jun 1956. Taxi accidents are still being reported, so a reminder appears to be in order.

The "bird" in question had landed and was taxiing back for another circuit when he saw another Harvard, properly parked, well to one side of an intersection. He continued his zig-zag turns believing he had room enough to get by. An eye witness account revealed that, had it not been for excessive speed, there would have been sufficient room. Excessive speed caused the zigs and zags to increase in sweep—with the result pictured. Don't be a "bird". Whether your experience is measured in hundred or thousands of hours, keep your speed at a rate which will leave you with full control at all times. The taxi accident just should not be!



Gusts And Control Locks

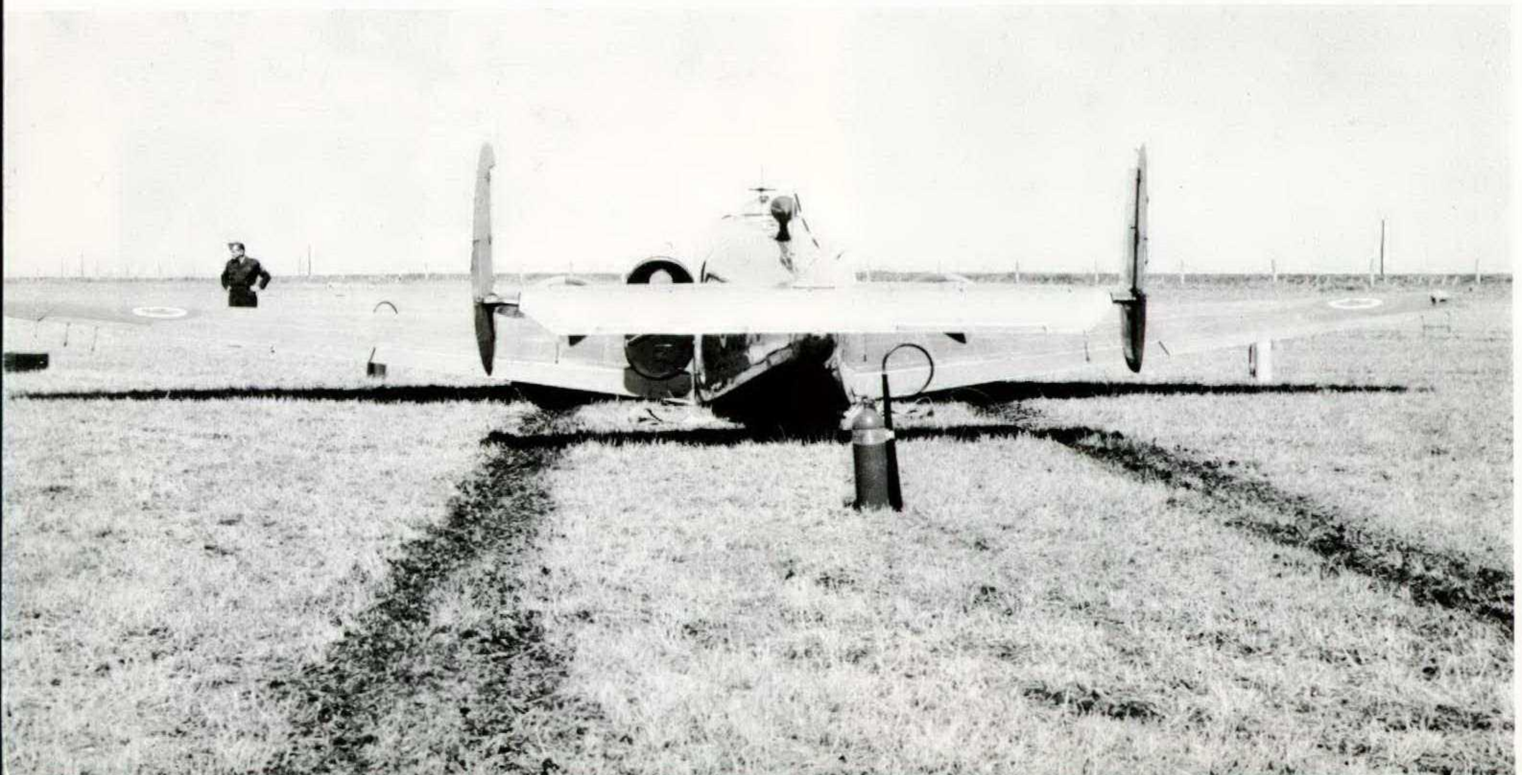
Soon after takeoff the pilot discovered that elevator control was reduced. To counteract an extreme nose-high tendency, he had to push the control column fully forward. Deciding to force land the Expeditor straight ahead, he cut engines, switches and fuel and found that he had sufficient elevator control to get the tail down for the belly landing, thus minimizing the damage. The accident could have been serious. It was found that the elevator cable had slipped partly off the large pulley but that, when replaced, the tension was correct. In the pilot's preflight inspection the elevator control seemed normal. After the accident it still seemed to be correct—until an internal inspection disclosed the trouble.



In the investigation to determine what had caused the cable to come off the pulley it was learned that three days before the flight the aircraft had been parked on the tarmac, tail into wind. During the afternoon strong gusts developed with speeds of 45-50 mph and, although control locks were supposed to be installed, the elevator was seen to be banging up and down. Servicing was ordered to check.

Shortly thereafter a T-33, parked tail to tail with the Expeditor, was started up. As it taxied out, the Expeditor elevator was again seen moving violently up and down. The Expeditor was removed from the line but no internal inspection was done in spite of the violent banging of the elevator that had been observed.

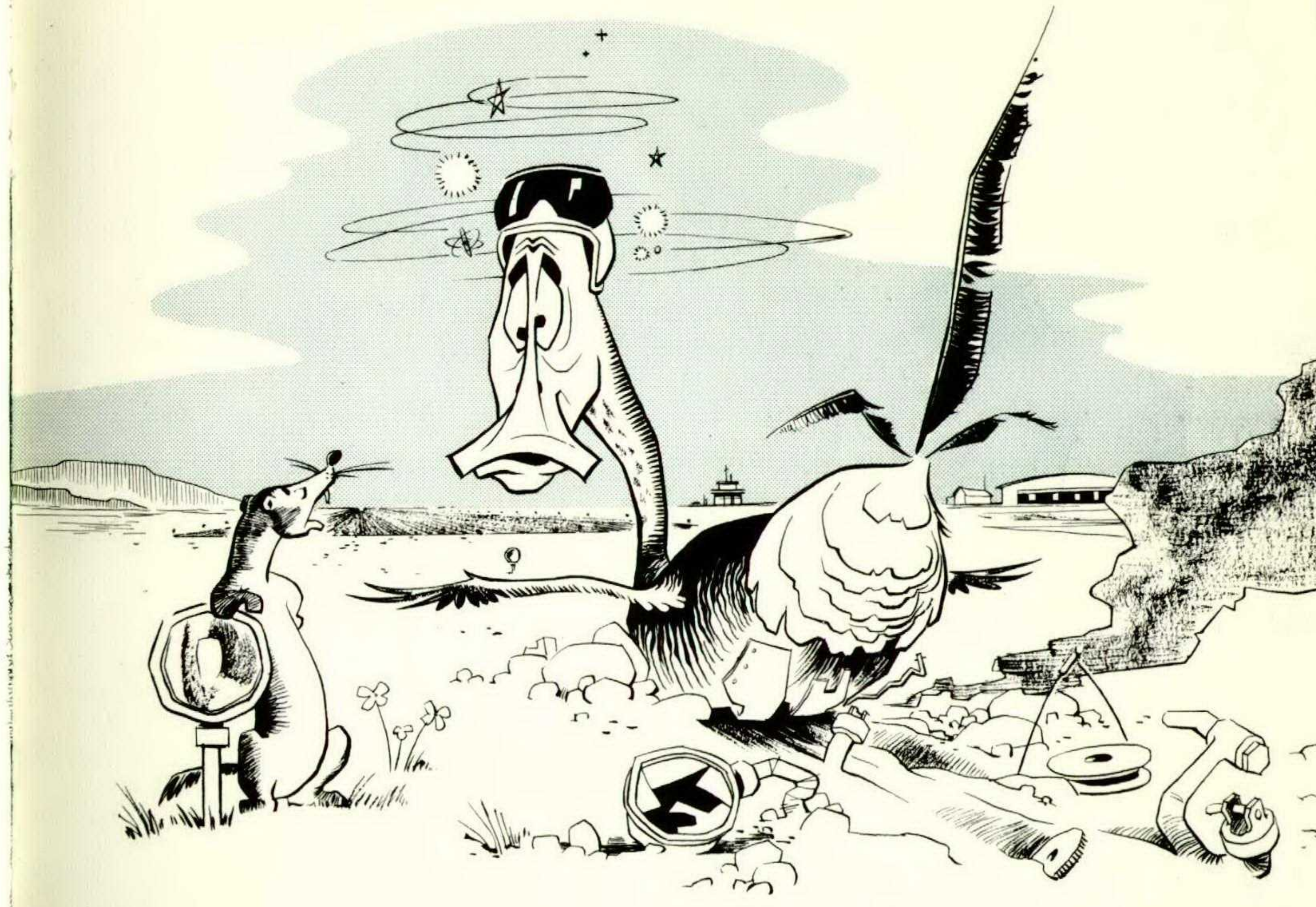
Because of the time lapse involved it was not possible to establish exactly why, with control locks supposedly on, the elevator was able to move in wind and jet blast; and orders for control locks to be installed or checked were issued twice. Apparently the movement of the elevators was sufficiently vigorous to whip the cable off the pulley. Violent movement of the control surfaces like this warrants a comprehensive check of the control system. Some precautions were taken to ensure the safety of the aircraft at the time; but the need for a complete check was not appreciated. This could have been a fatal accident because someone failed to make sure that no damage had been done. Remember: Don't be just "half safe".



SPADE-BILLED TOOLEY-SQUATTER

Alights unexpectedly in the "toolies" short of the desired perching site, frequently clobbering such items as approach lights in the process of damaging itself. Fatalities have also resulted. This bird seems not to understand why small wings, high loadings or marginal speed should produce such a high rate of sink. Apparently thinks that the term "back side of the power curve" has reference to egg-laying.

Call: **THOUGHTIHADITMADETHOUGHTIHADITMADETHOUGHTIHADITMADE**



BIRD WATCHERS' CORNER

DFS