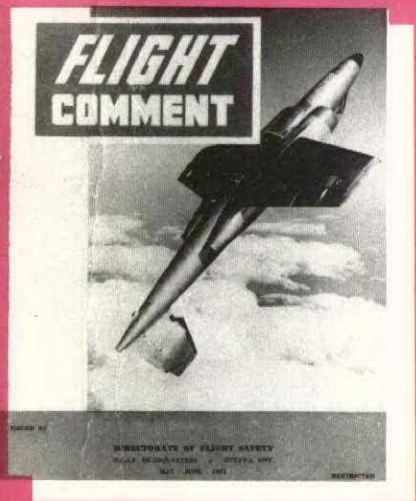
FLIGHT COMMENT



ISSUED BY

DIRECTORATE OF FLIGHT SAFETY

R.C.A.F. HEADQUARTERS • OTTAWA, ONT.

NOVEMBER DECEMBER · 1955

RESTRICTED

FLIGHT COMMENT

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

NOVEMBER · DECEMBER 1955

CONTENTS

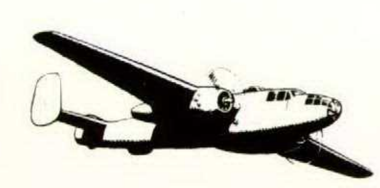
EDMOND CLOUTIER, C.M.G., O.A., D.S.P
QUEENS PRINTER AND CONTROLLER OF STATIONERY
OTTAWA

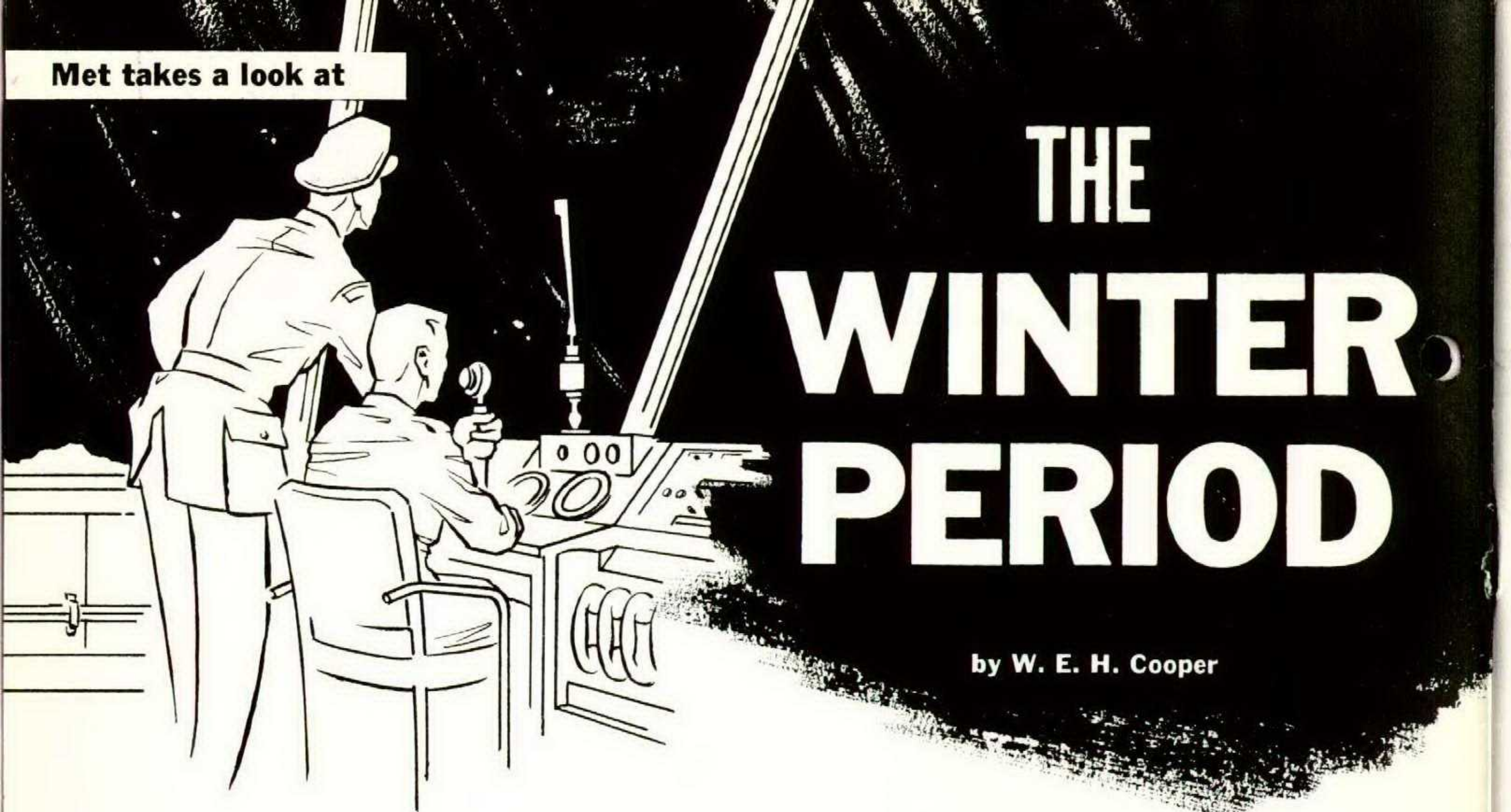
F/L P. KENT

F/L Kent was authorized to air test a Mitchell aircraft. Pre-flight inspection and run-up were uneventful, but immediately after take-off the starboard propeller ran away to 2850 rpm. Fortunately the undercarriage had been retracted and speed increased to 125 knots. Feathering was attempted but without success. With the throttle closed, full coarse pitch selected, and the mixture in idle cut-off, the propeller continued to windmill at 2800 rpm—and again a feathering attempt failed. Speed could not be increased but remained at 125 knots, and the maximum height attained was approximately 50 feet.

The pilot declared an emergency and made a gentle turn toward a lake as a forced landing appeared inevitable. He gradually lost height and, while maintaining 125 knots, warned the crew and informed the tower that he was force landing on the lake. At this time another feathering attempt failed.

The lake shore was crossed at about 30 feet at 125 knots when the feathering button was again pressed as a last resort. This time very slow feathering took place, the pilot was enabled to maintain about 20 feet and 125 knots, and the speed gradually increased to 140 knots as complete feathering occurred. The aircraft was climbed to 1500 feet, the forced landing call cancelled, and a safe, single engine landing made at base. F/L Kent is to be complimented on his judgment and coolness in this emergency.





Met takes a look at

THE WINTER PERIOD

by W. E. H. Cooper

Mr Cooper is on the staff of the Met Section, Directorate of Air Staff Services at AFHQ. We asked him if he would prepare for FLIGHT COMMENT an analysis, from Met's point of view, of the aircraft accidents which occurred in the RCAF during the winter of 1954-55. His observations and conclusions are summed up in the article which follows. They make an interesting contrast to the review of the same period provided for us on page 19 by the Accident Investigation Branch of the Directorate of Flight Safety.

Weather played a part in almost a quarter of last winter's most serious flying accidents and its victims included not only the unwinged trainee but also experienced squadron types and even instructors. The winter of 1954-55 provided an emphatic reminder that weather is ignored only at one's peril.

What Sort of Weather?

Considering the 'A' and 'B' category accidents which were associated in some degree with weather, we find that low visibilities (often in snow) and low ceilings were the specific agents in about half the cases. Among the examples were the non-instrument pilot pressing on into IFR conditions; rated pilots descending below minimum safe altitudes in order to remain visual; pilots attempting to fly visual in IFR conditions; and—perhaps less open to censure but just as fatal—pilots losing orientation in poor visibility while flying at high speeds and low levels. Solid undercasts contributed to several pilots getting lost and, at times of jet

emergency, forced others to abandon their aircraft. Icing was a possible factor, with subsidence, in one fatal accident last winter; but in that particular case the flight had been planned IFR 1500 feet below the minimum route altitude. Dangerous—ice or no ice. Icing is back of a serious accident or two every winter, frequently because, on landing, pilots have allowed insufficient compensation for the effect of a coating of ice on stalling speed.

Winter effects are also apparent in those accident assessments which disclose that hoar frost and snow deposits had not been swept from wings and control surfaces; that snow glare or whiteout caused loss of horizon and height perception; that heavy snow interfered with GCA radars; that fresh, wet snow on runways reduced braking action; or that slush resulted in the freezing of undercarriages and flaps in retracted positions.

The Pilot's Duty

To counteract the influence of weather on our accident rate, the air force is working continuously to develop and sustain weather consciousness in its pilots. "Weather consciousness" on the part of a pilot means not just a knowledge of the weather and the ability to flight plan adequately, but implies as well a full awareness of the multiplicity of accident possibilities in a given weather situation, and the automatic assessment of that situation, with full cognizance of the aircraft's characteristics, the available aids, and his own capabilities. For the FTS trainee, 'Met' may be just another ground school subject to be passed—perhaps, for some, even a bind. The consequences, accident-wise, at FTS may be slight since staff members maintain a close watch on the weather. However the pilot moves away from FTS onto ever heavier, faster aircraft, and into circumstances where the safe margin for error is diminishing at the same time that the onus upon himself is rapidly increasing. It is imperative, therefore, that the development of weather consciousness at AFS and OTU keep pace.

Who Else is Responsible?

Remaining constantly vigilant to the dangers of winter weather is not the duty of the pilot alone. Accident assessments indicate clearly that flight supervising personnel and flying control staffs must also have weather awareness in full measure and in keeping with their important role in a flying safety program. By appropriately weighing the pilot's experience and competence against the weather variable, they can ENSURE THAT NEITHER THEIR DIRECTION NOR THEIR CONTROL WILL PLACE A MAN IN A SITUATION BEYOND HIS CAPABILITIES. At the same time they must remain alert to the possible effect of changing weather upon control facilities and the control problem itself. By

Landing below limits

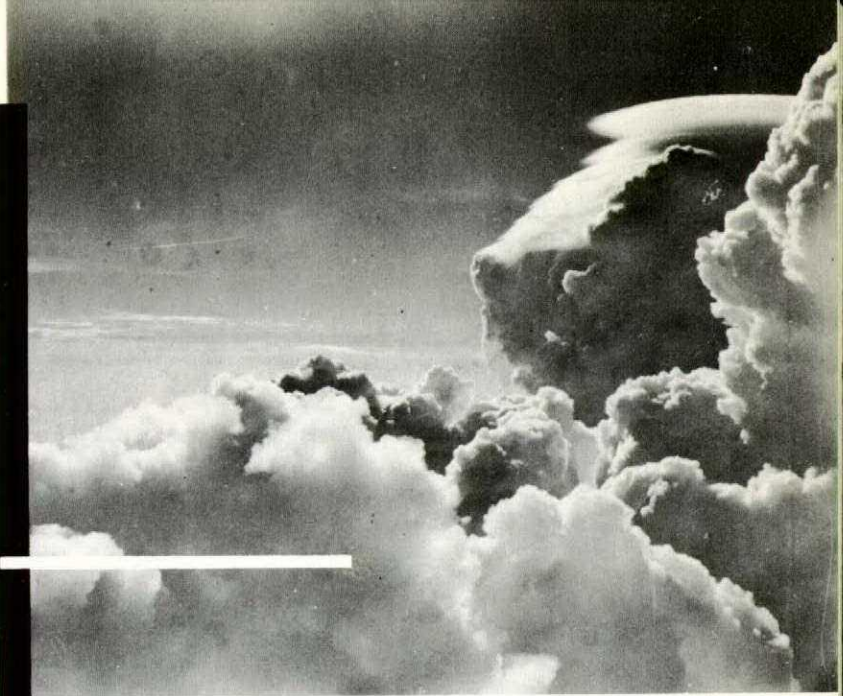
closely monitoring IFR flight plans, by curbing overconfidence such as that displayed in landings below limits, and by insisting on obedience to flying regulations, supervising personnel and flying control staffs will go a long way toward reducing occurrences of flight difficulty in low visibilities and low ceilings.

Weather briefings are a standard procedure in the RCAF, and one of the primary reasons for this is the promotion of flight safety. It is essential that the briefing forecaster convey a clear, concise picture of the current and forecast weather, with a careful underlining of each potentially hazardous condition. Since forecasts can go wrong, it is important that he also explain possible departures therefrom so that appropriate alternative plans can be made if necessary.

*

Winter weather demands constant alertness on the part of pilots, supervisory staff, flying control and Met. Only with the complete co-operation of these four groups of personnel will there be a decline in the importance of weather as a factor in RCAF winter flying accidents.

RADAR STORM DETECTION

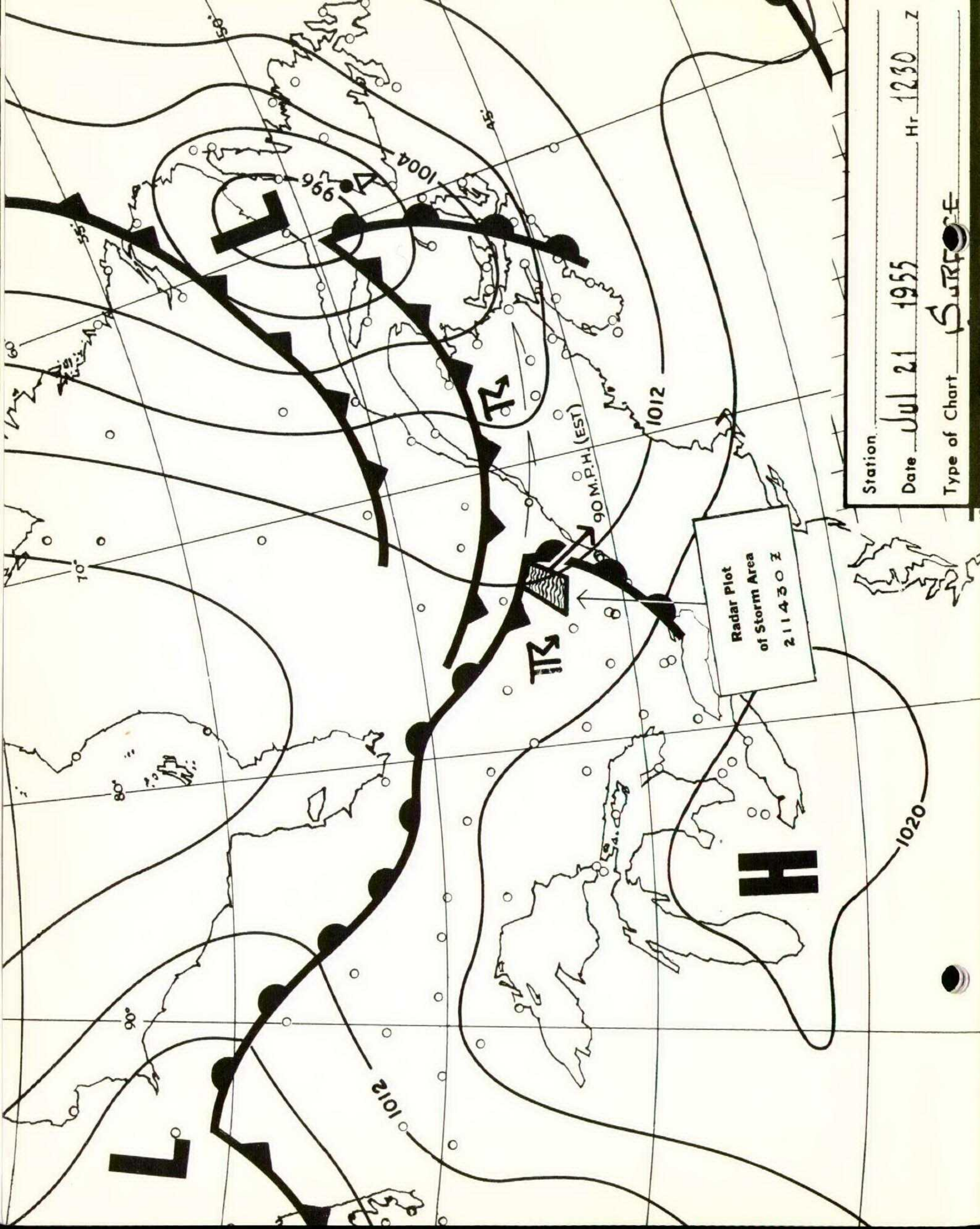


by C. L. Johnstone
Meteorological Adviser
Air Defence Command

```
SD HU 211440Z
HU 211430Z RAREP SOLID LINE OF ECHOES NNW/140 NE/SW
90 LONG 50 WIDE VERY HIGH MVG FM NW RAPIDLY EST 90.
```

A number of radar stations in the Air Defence Command chain are participating in a program whereby all 'scope observations of weather phenomena are passed to adjacent weather offices.

The report from which the above message was prepared for transmission over the Met teletype network was received at the St. Hubert office on 21 Jul 55. Freely translated it means that at 1430Z a solid line of echoes was centered 140 miles north-northwest of St. Hubert, oriented from northeast to southwest, 90 miles long, 50 miles wide, extending to a great height, and moving from the northwest at an estimated speed of 90 mph.



The current weather chart (Fig 1) revealed that the storm area was in the vicinity of a wave crest on the Polar Front—a favoured location for severe thunderstorm activity—but no reason could be found for the phenomenal speed at which it was reported to be travelling. However, since pilot reports substantiated the rapid movement and placed the top of the build-up at 50,000 feet, it was evident that this was an unusual storm.

On the basis of the radar report it was estimated that the southwest corner of the storm area would reach St. Hubert airfield at about 1530Z. Accordingly, warnings were issued and all light aircraft recalled to base. Aircraft with greater endurance remained airborne.

There was bright sunshine at 1530Z but heavy clouds could be seen moving in from the northwest; by 1540Z the sky was almost overcast; and by 1547Z the wind, which had been light, was NNW 40 mph, gusting to 60. Thunder and lightning were continuous and there was a light rain shower. In 15 minutes the storm centre had moved well to the southeast, large breaks in the overcast were visible to the northwest, and the wind was again light. Although the cloud base did not fall below an estimated 5,000 feet, visibility was reduced to one mile by dust and haze. The temperature fell from 84 degrees to 71; and just before the storm struck, the atmospheric pressure jumped 2.8 millibars in a matter of one or two minutes, then fell gradually to its original value over the next hour. Airborne jet pilots reported that the storm covered an area of approximately 75 by 50 miles, that its top extended to 47,000 feet, and that the airport was just inside its southwestern boundary.

*

Because the storm was moving at three times normal speed, it is doubtful whether adequate warnings could have been issued in time without the aid of radar. Results confirmed the original plot in every detail. Truly this was an outstanding example of the value of radar weather reporting and a promising indication of the program's potential.

Ground Controlled Approach • 1932 Style

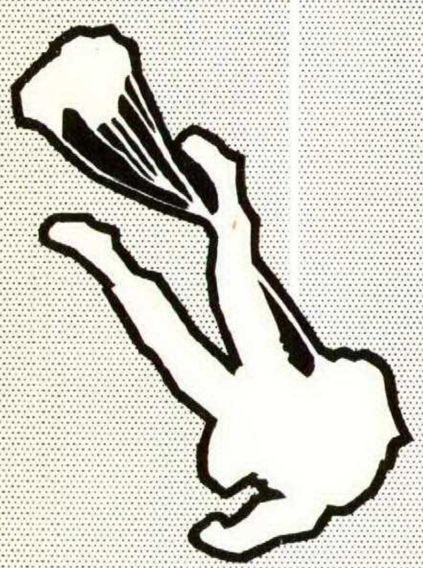
"When the ground man picks up an approaching ship, the pilot will be asked to 'blimp' his motor for identification. United Air Lines will be one blimp, American Airways two blimps. When it has been established that yours is the motor we are hearing, you will be advised your approximate position and direction from the field, and we will continue to advise you until you arrive over the field and you inform us that you are ready to come down through.

If, in our opinion, you are in position to come down through, we will give you an O.K. Jazz your motor at frequent intervals as you come down, and we will advise your approximate position. When your plane is sighted underneath, we will tell you where you are and give surface wind and any unusual field instructions. You should advise us as soon as you see the ground." — Seely Hall's Scrap Book, 1932.

Flight Safety Foundation
Accident Prevention Bulletin

EXERCISE

"MAY DAY"



by F/L J. E. Monagle

You have just arrived. "Dropped in" would be a more appropriate term. You're on a rocky hillside and surrounded by the evergreens and underbrush characteristic of a Northern Ontario forest. You've been too busy drawing in parachute shrouds and folding a nylon canopy to notice the rugged beauty of your surroundings. Later you may reflect that this breath-taking view—massive hills of rock, towering trees and a skittering stream—would hold an awesome appeal if you had paid a few hundred dollars to reach it on a hunting trip. As it is, the thrill is somewhat lessened by the fact that you have been thrust into this situation without previous planning or desire.

Certainly those rocks and trees held no features of beauty as they rushed up from below. Lucky you swung out enough to miss the tall fir that was reaching for you! A raw, burning sensation down your arm and across one side of your face indicates that it did get in a swipe.

Ouch! You just shifted your position and a stab of fire went through that left ankle. Off comes the boot. Swelling a bit, but you can move it around without too much pain. Must have twisted it on landing. However, it will carry your weight all right because you didn't even notice it while you were running around gathering up your 'chute. So you get busy gathering things together to make camp, noting rather grimly that the rock under you is likely to make pretty solid bedding.

*

A little later on it suddenly hits you like a bomb. This can't be me! This is what happens to the other guy—to the clots who hurry over their pre-flight checks, and to the dopes that get sloppy in their nav! It's hard to take. You were always a careful pilot. Near the top of your class at FTS and OTU. One of the top pilots in your squadron. A thousand hours plus and not even a minor accident on your record. This flight started as a routine crosscountry, conditions favourable, everything in order. Then an unexpected deterioration and the weather closed in. Couldn't get under it. Compass started acting queer. Not sure of your position. Fuel running out.

"Fuel tanks empty! Flameout! May Day, May Day! Altitude 6,000. Location not known." Canopy off. Eject. A pounding jar right up through your backbone to the base of your neck. Then you were floating and swinging down through the quiet mists.

*

By now you've gathered things together. The seat pack was intact, so by using the bush gear you managed to shape up a fairly comfortable little camp. The building project complete at last, you become aware of feeling a bit hungry. Where's the food packet? Oh yes, here it is: two little metal boxes. You open one up. "Eat No Food On The First Day", it says. That's not too hard to take; you weren't so hungry anyway. It just seemed that it was about mealtime. For now, let's have a look and see what we've got.

Candy! Bloody jelly candy!!! Those crazy fools don't know anything about living in the bush! How the hell can they expect a man to live in this country with nothing to eat but this damned jelly candy!

Much depends on the pilot's ingenuity

Hold on a minute. Let's stop and think things over a bit more calmly. A lot of your air force training has been dependent upon confidence—confidence in your instructor, confidence in your senior officers, confidence in yourself. Every time you fly you are expressing confidence in the design and maintenance of your aircraft as well as in the Met Section, the SFCO, and your own ability to handle the aircraft and to follow the instruments that you know will operate properly. If you didn't have that confidence, you wouldn't be flying. Throughout your air force career you have daily expressed your faith in the science and engineering of every component part of your aircraft and of every piece of ground equipment which, all together, permit you to fly safely. You probably never actually think of this; it is a trust so firm that it doesn't require conscious thought.

*

Take that survival ration you've just blown your top over. It has been scientifically developed over a period of many years. Some of the best brains in medicine, physiology, biochemistry and food technology on two continents have worked together on how survival requirements can best be met.

We know that a man can live without any food for a period of up to 50 days, provided he has sufficient water. He cannot survive without water for more than 10 days in the most ideal circumstances. So it is important that a survival ration waste as little water in the body as possible. Some foods actually form water in the body as they are burned.

*

Let us consider our everyday food and the way it is used in the body. That food is made up of starches and sugars, carbohydrates, proteins and fats. These are burned in the body to provide it with the energy you require to live and work. The heat they supply to the body is measured in heat units called "calories". An average human being uses up 1200 calories daily just resting in a warm room. Colder temperatures require that we burn up 1600 to 1800 calories while resting. Ordinary daily work requires about 3200 calories; and if that work is heavy and performed in cold temperatures, 5400 calories may be necessary.

Generally a person eats slightly more food than he needs. This additional fuel is not lost to the body but is stored as a reserve for future needs. Starch and sugar are changed to a body carbohydrate known as glycogen; fat is stored as fat; and protein is stock-piled in the muscles, blood, bone and other tissues of the body. The body, incidentally, is also capable of interchanging between carbohydrate, fat and protein.

*

In any machine, burning fuel deposits waste materials which must be driven out in some way. In the body the type of waste deposited depends on the food being used. When carbohydrates burn they leave only carbon dioxide and water. The carbon dioxide is breathed out through the lungs. Fat ordinarily burns leaving only water and carbon dioxide, but it requires the presence of carbohydrate for complete combustion. Just as a fire forms excessive smoke and poisonous gases when burning with insufficient oxygen, so fat burned without carbohydrates forms poisonous wastes which the body must get rid of. These wastes are passed out of the body in the urine, their elimination requiring a large volume of water. Proteins form waste substances similar to ammonia when they are burned and these also require water to be carried from the body. The amount of water necessary for the job of disposal is proportional to the amount of waste.

You can see, then, that when meat or excessive fat are burned in the body, more water is required to make proper use of them as fuel. On the other hand, starches, sugars and fats—in the proper proportion—actually give water to the body as they are used.

*

When the body fails to get any food at all, it commences using up the reserves that it has stored. First in line for burning, under these conditions, is the supply of stored starch—the glycogen. When this substance has been consumed the body burns stored fat; and when the fat runs out, it turns to the proteins. This changeover in fuels is gradual, however; there is no sudden cutting in such as occurs when an aircraft's fuel tanks are switched. Some fat is burned along with the glycogen, and protein is used at the same time as fat. When the body begins to burn more fat and protein, an increased quantity of water is required to dispose of the resulting waste materials. On about the second day of starvation, one's glycogen reserve is gone, leaving the body dependent on its stored fat and protein. It has been proved that at this time there is an increased loss of water as urine.

*

Studies of starvation and of survival rations have determined that providing the body with 400 calories of food in the form of carbohydrates (candy) will keep it from burning protein and aid it in employing fat more effectively. Consequently there will be not only a decrease in the amount of water lost in the elimination of waste, but the carbohydrates will help to replenish the body's supply of water as it is used up. If proteins (such as meat) are supplied in survival rations, the amount of water lost while they are being burned is greater than it is in complete starvation.

If the present RCAF survival ration were to be designed to meet

all the energy needs for just resting and waiting for a rescue party, it would have to provide at least 1800 calories per day. That would mean arranging for four to five times as much food in the survival pack, displacing other items of gear from the pack, and adding extra weight.

Although ten days is the estimated maximum time for Search and Rescue to reach a downed pilot, a man—as we pointed out earlier—can survive without food for longer periods. Thus the other items in your emergency gear are carefully selected as being essential to survival and rescue. It would be foolish to leave out equipment that is absolutely necessary in order to include additional food that you do not need. It would be equally foolish to increase the weight of the aircraft unnecessarily for an item that isn't really essential if you do force land. The evidence to support leaving out food altogether might be considered even greater than any evidence of its requirement for this time. Certainly it could be considered of more life saving value to allocate the space and weight of the food packet to tinned water.

Are you under the impression that you can probably find water wherever you may be forced down? You would be right in most cases, but there are many areas in Northern Canada where drinking water is not readily available. If you come down in the ocean, the amount of water you can obtain either from the desalting kit or by collecting rain is limited. In winter you may not have sufficient fuel for a fire to melt snow; and eating snow in sufficient amounts for your water requirements can give you a sore mouth in a short time. Therefore it is essential that we do our best to cut down your water requirement for survival.

The minimum normal daily requirement of water is about 800 cubic centimeters, or slightly over one pint. With the present ration of 400 calories of carbohydrate in the form of starch jelly candy, you will withstand a ten-day survival experience without ill effects, and use only 300 cubic centimeters (one large glass) of water per day. Where your survival situation is such that you cannot supplement your ration of food and water from nature, you will want to stretch your food supply so that it will do you the most good. Inevitably you will experience some discomfort from hunger. Eating the candy very slowly and at the prescribed intake of four per meal will help to ease your hunger and will give you the most practical benefit from the food. Spreading your intake to two candies every two hours for a total of twelve per day may be even more satisfying.

*

You are now down in the Northern Ontario bush. You have made camp and are awaiting rescue. How does the story end? The answer is up to you. Your survival depends entirely on self-discipline, ingenuity, and the practical application of your training.

THE AUTHOR

F/L J.E. Monagle has been with the RCAF's Institute of Aviation Medicine since June, 1954. He is presently on loan to the Defence Research Medical Laboratories where he works in the field of nutrition.

Born in Consort, Alberta, in 1919, F/L Monagle entered the University of Alberta in 1938. Enlisting with the RCAF in 1941, he served as a Nursing Orderly until 1943 when he remustered to Laboratory Assistant and worked with the air force's Nutritional Survey until the end of the war.

The author returned to the University of Alberta in 1945, graduating with a B.Sc. in '47 and an M.D. degree in 1951—the year he was commissioned as a Medical Officer. From that time until his move to IAM, F/L Monagle was SMO at RCAF Detachment, Fort Nelson, B.C. The only doctor on the Alaska Highway between Fort St. John, B.C., and Whitehorse, Y.T., he provided medical care to Indians and civilians in addition to performing his regular Service duties.

WANTED : A Map for "Non-Paraffin Chaps"

You may have heard of a depressed race of people called staff officers. They fly ardently around their parishes, unmourned when lost and unsung on arrival, in something which the modern air force calls 'pistons'. Because their keenness is greater than their anxiety over the forecaster's optimism, they often fly in weather conditions conducive to meditation, but with confidence—I speak, of course, for pilots—in their ability to read a map. Which brings me to the point of my letter.

I presume there will always be communication flights and slow aircraft. I also presume that the FTSs will continue to teach the basic principles of map reading to ab initio students. Who, then, was responsible for the present half-million map which has so many omissions of important detail as to lead me not only to feel perpetually lost but to the inescapable conclusion that its birth took place after an inadequate period of gestation?

I have been told that it was originally designed for the "paraffin chaps", but when I asked one recently what he thought of it, he said, "Er—map? I always call up."

RAF Air Clues

INFORMATION PLEASE

SOMETHING NEW has been added to flight procedures—"Radar Advisory Procedure". Information about it is contained in the July 1955 issue of the Supplementary Flight Information Document, better known to some of you perhaps as CAP 482. This document contains a wealth of information for pilots but probably doesn't get nearly the attention it deserves. In any case, we suggest you take time out to look at page 172.

What Is It?

The Radar Advisory Procedure is a system by which a pilot in flight may obtain advice relevant to the flight and the safety of his aircraft. The instructions apply to aircraft flying within the CADIZ and are not to be confused with those dealing with the Radar Advisory Service used in the U.S.A. The Radar Advisory Procedure is purely Canadian and uses the facilities made

available by the installation of the radar network within the CADIZ. The primary purpose of the network is to identify aircraft and to control fighter aircraft in operational and training exercises. The Radar Advisory Procedure will function subject to prior commitments of the radar network.

The procedure is very easy to follow and it's use will greatly assist pilots. Generally speaking, a pilot can receive confirmation of his position, track and groundspeed, vector to an airfield or other point, geographical hazards, and the position of any heavy cloud formations relative to the aircraft. In an advisory sense, there isn't much more a pilot might need.

How Is It Used?

This is the way it works. Suppose you are flying along one dark night when the weather is only fair, and considerable precipitation static has reduced your radio reception. There is no emergency but you would like confirmation of your position and warning of any dangerous cloud formation. First you select 122.2 megacycles on your VHF set. This will be a common frequency for military and civilian aircraft to work radar stations—and eventually, by the way, for all enroute position reporting on airways. If you don't have 122.2 mcs use 126.7; or failing that, 121.5 mcs—but only as a last resort. Remember, 121.5 mcs is the distress or emergency frequency.

Having selected the desired frequency, call "Radar Advisory" and give your aircraft identification. The nearest radar station, or stations, will reply by identifying themselves and requesting your approximate position. In replying you will acknowledge return transmissions to the loudest received ground station. It requires this information in order to help sort you out from other aircraft in the area. When you have passed on your position and heading and made your own query for information (advice on heavy cloud, for example), you may be asked to turn ninety degrees for final identification.

Now that you are accurately identified, the radar station can warn of dangerous cloud. You may learn that a line of cumulo nimbus extends across your flight track fifty miles ahead. Being a pilot who uses discretion, you decide that it is not desirable to continue and that diversion would be the sensible move. So you ask Radar Advisory for a bearing and distance to an airfield clear of storm clouds. After receiving these, you may then be advised of a geographical hazard such as hills 5,000 feet high, located sixty miles from your present position along the track to your diversion airfield.

In this hypothetical case, Radar Advisory provided the pilot with useful information essential to the safe conduct of his flight. Remember, though, that the system assumes no responsibility for the control of an aircraft or a change in flight plan. If at any time you deviate from your filed flight plan, you must advise ATC and obtain clearance for the change. Radar Advisory will assist you by providing information; it will NOT assume traffic control responsibility.

There have been circumstances in which the use of this facility would have saved an aircraft. A T-33 westbound across the Rockies was a long way north of its track. The pilot, on reaching the north leg of Vancouver range, apparently turned south and began to reduce height. Unfortunately it seems he was unaware of how far north he was, for his aircraft ran into mountains during the descent. Had he asked Radar Advisory for a fix or vector to Vancouver, he would have been aware of his position and flown the T-33 accordingly.

For our readers' convenience, page 172 of the SFID is reproduced here. The system looks like a good thing and pilots are encouraged to use it. It is not an emergency procedure; just a system to provide advice and information. The pilot who is lost, short of fuel, suffering from lack of radios, or finding himself in any other circumstances constituting an emergency, should use the Radar Distress Procedure (also pictured here) which appears now on page 173 of the SFID (or CAP 482), instead of in CAPs 467 and 468. These excellent aids are there to be used. If you get into trouble, use them. There is nothing like a helping hand when you need it.

172 RADAR ADVISORY PROCEDURE WITHIN CADIZ.

RADAR ADVISORY PROCEDURE WITHIN CANADIAN AIR DEFENSE IDENTIFICATION ZONES

The following procedure is established to provide advisory service on a 24-hour basis for both military and civil flight agencies operating WITHIN CANADIAN AIR DEFENSE IDENTIFICATION ZONE LIMITS OF THE DOMINION OF CANADA with regard to:

a. Track and ground speed (knots) checks.

b. Position of aircraft given in latitude and longitude or GEOREF, or by bearing and distance from a known point. Position to be given as GEOREF unless otherwise requested by pilot.

c. Vector to nearest aerodrome or other designated point and indicating major geographic hazards if applicable.

d. Position of heavy cloud in relation to the aircraft.

The radar network will render navigational advice when and where possible. Because of military commitments it cannot accept responsibility for the direct control of aircraft and therefore the use of the radar advisory service does not, in any way, absolve the aircraft captain of the responsibility for complying with appropriate ATC clearance, or adherence to applicable flying regulations and procedures.

Radar Advisory Procedure
(Applicable to the Area within the CADIZ)

1. All Radar Advisory Procedures should be initiated at the highest practicable altitude relative to the flight plan of each specific flight desiring the use of said procedure.
2. All military and civil aircraft are to contact Canadian Radar Advisory on 122.2 mcs.
3. The aircraft will request required Advisory Service using the call sign given by radar control.
4. If normal air defense commitments preclude the granting of the advisory service, the ground radar stations will transmit the word "UNABLE". No further explanations will be given.

Example:

Aircraft: "Radar Advisory, this is Air Force 123—over."

Radar: "Air Force 123, this is radar advisory Vulture, what is your approximate position, heading, and altitude—over."

Aircraft: "Vulture, Air Force 123, approximately one five zero miles north of Ottawa at one five thousand, heading zero one three, enroute to Goose, request position of heavy cloud area—over."

Radar: "Air Force 123, Vulture, Roger, make a left turn of zero nine zero degrees for identification—over."

Aircraft: "Vulture, Air Force 123 turning left through zero nine zero degrees—over."

Radar: "123, Vulture, have you in radar contact, resume heading, heavy cloud zero three zero right at two eight miles—over."

Aircraft: "Vulture, 123, Roger, out."

DISTRESS PROCEDURES 173

DISTRESS PROCEDURES

(When Lost or in Distress)

DISTRESS PROCEDURES 173

I IF IN DISTRESS OR LOST THE FOLLOWING PROCEDURES IS RECOMMENDED:

A. Switch IFF equipment to "EMERGENCY".

B. Should time permit, and if in recent radio contact, inform controlling agency of nature of distress and the pilot's intention.

C. Make the following message on one of the frequencies listed:

500 kcs	MHF	CW
8364 kcs	HF	CW
121.5 mcs	VHF	VOICE
243.0 mcs	UHF	VOICE

*1. a. *VOICE* — SECURITY (3 times) (PAN or MAYDAY may be used if applicable) followed by aircraft call sign (3 times); or AHHH (Sustaining for 5 seconds and repeated) — if time does not permit distress message. THIS IS followed by call sign of aircraft (once) OVER.

b. *CW* — SOS (3 times). DE followedby call sign of aircraft (3 times); or Two 10-second dashes — if time does not permit distress message. Call sign of aircraft (once) K.

2. TYPE OF AIRCRAFT.
3. POSITION** and TIME.
4. HEADING (True or Magnetic).
5. TRUE AIRSPEED.
6. ALTITUDE.
7. NATURE OF EMERGENCY.
8. PILOT'S INTENTION (Bail out, ditching, or crash landing, etc.).

OR

9. ASSISTANCE DESIRED (radar steer, bearing or fix; interception or escort, as applicable).

D. If flying at low altitude attempt to climb. This will increase chance of radio or radar contact.

E. Once contact has been established, comply precisely with the instructions given.

II WHEN LOST OR IN DISTRESS AND UNABLE TO MAKE RADIO CONTACT, ATTEMP TO ALERT THE AIR DEFENSE COMMAND RADAR SYSTEM AS FOLLOWS:

A. IF RECEIVER ONLY IS OPERATING: Fly a triangular pattern to the RIGHT (see diagram). Hold each heading for two minutes (1 minute for Jet use). Complete a minimum of two such patterns before resuming original course and then repeat pattern at 20 minute intervals.

B. IF TRANSMITTER AND RECEIVER ARE BOTH INOPERATIVE: Fly a triangular pattern to the LEFT (see diagram), in the same manner as described below:

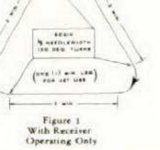


Figure 1
With Receiver
Operating Only

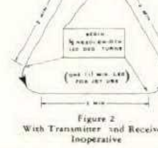


Figure 2
With Transmitter and Receiver
Inoperative

*Use **SECURITY** when unable to contact the ground station or you do not know what station to call, and your emergency is not critical.

*Use **PAN** when unable to contact the ground station or you do not know what station to call, and you have already tried SECURITY with no success, or your situation requires urgent action.

*Use **MAYDAY** when you are threatened by serious and imminent danger and you require *immediate* assistance. This should be used only after all other means have failed.

**When geographical coordinates are used by a distressed aircraft in establishing location, latitude and longitude will be expressed in "degrees and minutes."

PILOT error

What do RCAF personnel think about the value of the accident assessment, "Pilot Error"? The question contains all the ingredients for a lively discussion. Here are the opinions of CJATC Rivers, as expressed in a report submitted to TAC headquarters in Edmonton.

The assessment "Pilot Error", contributes little to accident prevention. Having stated this premise, we next attempted......to isolate similar cause factors in a number of accidents, the idea being to use the resulting information for accident prevention training.

The subject of our scrutiny was the RCAF's "Quarterly Summary of Aircraft Accidents" for the period Oct - Dec, 1954, and the chief observation we derived was that, although assessments ranged from "Pilot Error" to "Materiel Failure", FOUR TRAINING DEFICIENCIES CAUSED, OR CONTRIBUTED TO, 31 OF THE ACCIDENTS summarized therein. These deficiencies, and the number of accidents in which they were found to be a common factor, are as follows:

▲ Inadequate knowledge of equipment and/or handling instructions (11)

▲ Poor engineering test flight technique and/or flying with known unserviceabilities (7)

▲ Poor weather flying technique and/or ignoring weather conditions (9)

▲ Violations of flying regulations (4).

It is believed that accident prevention can be improved by accentuating major cause factors in local training. To further assist unit commanders, each of the above factors is discussed in more detail below.

*

- Inadequate Knowledge

Pilots tend to learn handling procedures on the first aircraft they fly. As they undergo transition to newer types, they try to adapt these procedures to them, rather than learn the changed and recommended procedures. This practice is dangerous simply because Tiger Moth technique will not work on Sabres. Many pilots have received all their training on type at this station without OTU instructions. Approved operating instructions are available in EOs and should be stressed at all times. If EO errors are discovered, action should be taken to correct them. In no instance should local procedures be permitted to develop contrary to published instructions.

- Poor Flight Technique

Curiosity is a desirable trait in pilots but it should be used with discretion when engineering test flights are being made. As indicated (in a recent memo from CJATC), test flights at Rivers are conducted to determine whether equipment is serviceable or unserviceable; and when unserviceabilities are found, the test flight is complete. Often it is necessary to fly with minor unserviceabilities, but these should be checked carefully against the contemplated task. One unserviceable C119 heater is a major unserviceability if flight through heavy icing is likely. Thus the importance of closely checking minor entries before signing for an aircraft cannot be overstressed.

- Poor Weather Flying Technique

Pilots tend to remember the last formal instructions they received on weather flying rather than those which are current; and special VFR is often used in lieu of an instrument flight plan. The worst habit of all, perhaps, is to obtain terminal conditions and neglect additional briefing. The individual's personal flying safety program in this area can be improved.

▲ Keep abreast of all new development in weather flying techniques.

▲ Use weather flying publications. Radio facility charts contain all current procedures including recent changes in flying regulations.

▲ Do not try to recall all the details. Just remember where to find them.

▲ Always carry—and use—weather flying publications when outside the local area.

▲ Check weather carefully, including terminal and alternate conditions and forecasts. Never accept a forecast until you have gone over the basic points with the weather man.

▲ Keep in mind that special VFR was designed to permit flight from a navigation aid to a nearby airport. It was not intended as a substitute for the IFR flight plan.

- Violation of Flying Regulations

Regulations are usually violated through ignorance or semi-ignorance. Probably the only cure for deliberate violation is detection and elimination of the pilot concerned. Ignorance can be eliminated by education. The assumption that it is legal to buzz a field at ten feet merely because the tower cleared a low pass exemplifies semi-ignorance. CAP 100 limits low flying to 250 feet above ground, unless otherwise cleared by CAS. Flying control's clearance is also limited to this height; if a pilot descends lower he is violating regulations.

*

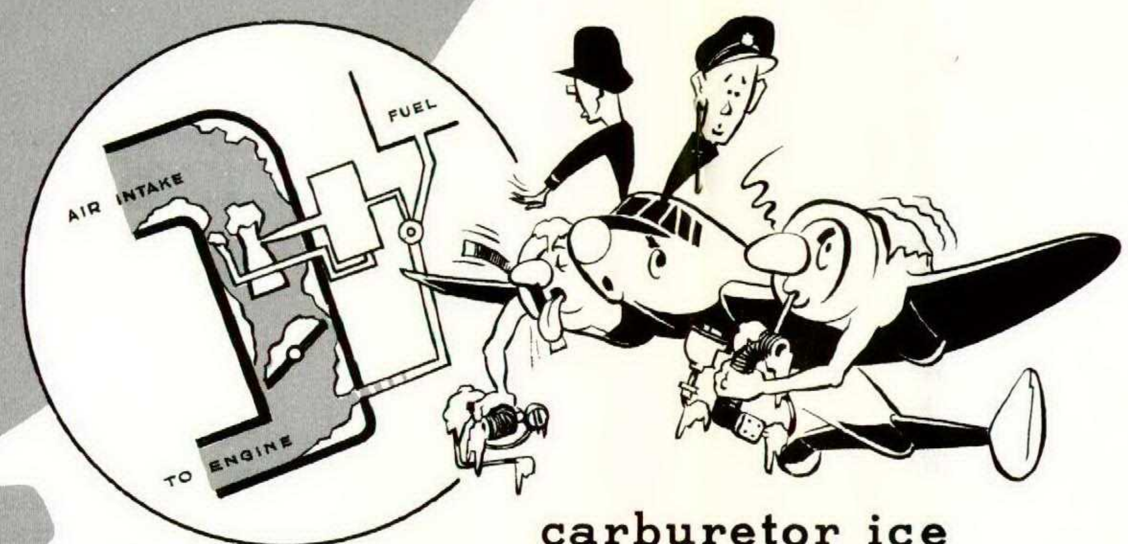
"Training deficiencies" is the phrase which best describes the accident cause factors discussed here. CJATC believes that training designed to eliminate these factors will lower the RCAF's accident rate and has therefore requested that TAC headquarters in Edmonton bring their findings to the attention of all aircrew personnel on its units.

FLIGHT COMMENT is carrying the ball a step further by presenting this report to the wider audience consisting of its readers. We feel that CJATC deserves a pat on the back for making such good use of the accident statistics compiled by the Directorate of Flight Safety, particularly in view of the fact that in some cases we suspect the information moves no further than the adjutant's strong box.

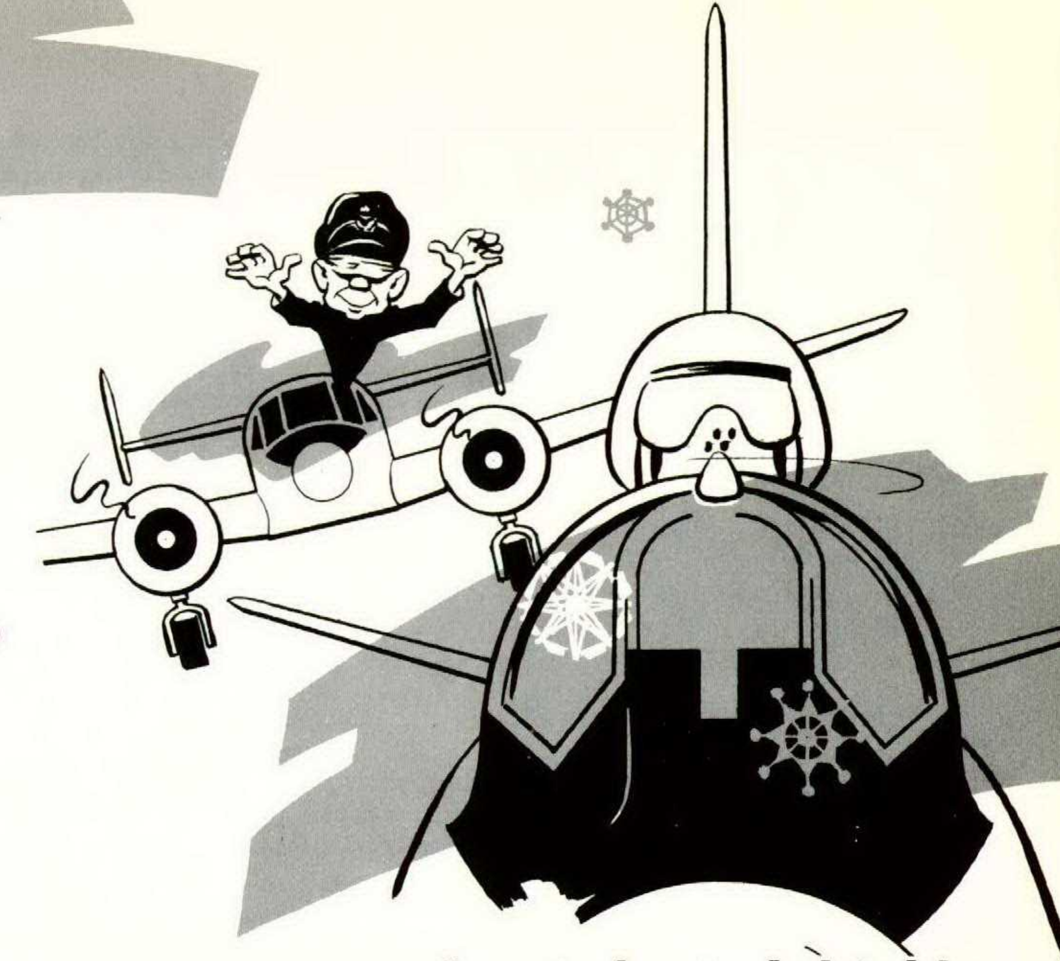
The quarterly accident summaries have their own contribution to make to accident prevention. One section specifically indicates the unsafe acts committed, the safe acts omitted, and the hazardous conditions which contributed to each of the accidents reviewed. Elimination of hazardous conditions and the promotion of safe practices are largely the responsibility of supervisory staffs. WELL-SUPERVISED TRAINING CAN REDUCE THE ACCIDENT RATE.

In the flying game, none of us can afford not to learn from the mistakes of others. The average man does not live long enough to commit all of them himself. Thus the philosophy behind our sending the "Quarterly Summary of Aircraft Accidents" to your unit: THE PILOT WHO HAS BEEN INFORMED OF THE ERRORS OF OTHERS STANDS A BETTER CHANCE OF AVOIDING THEM HIMSELF.—ED

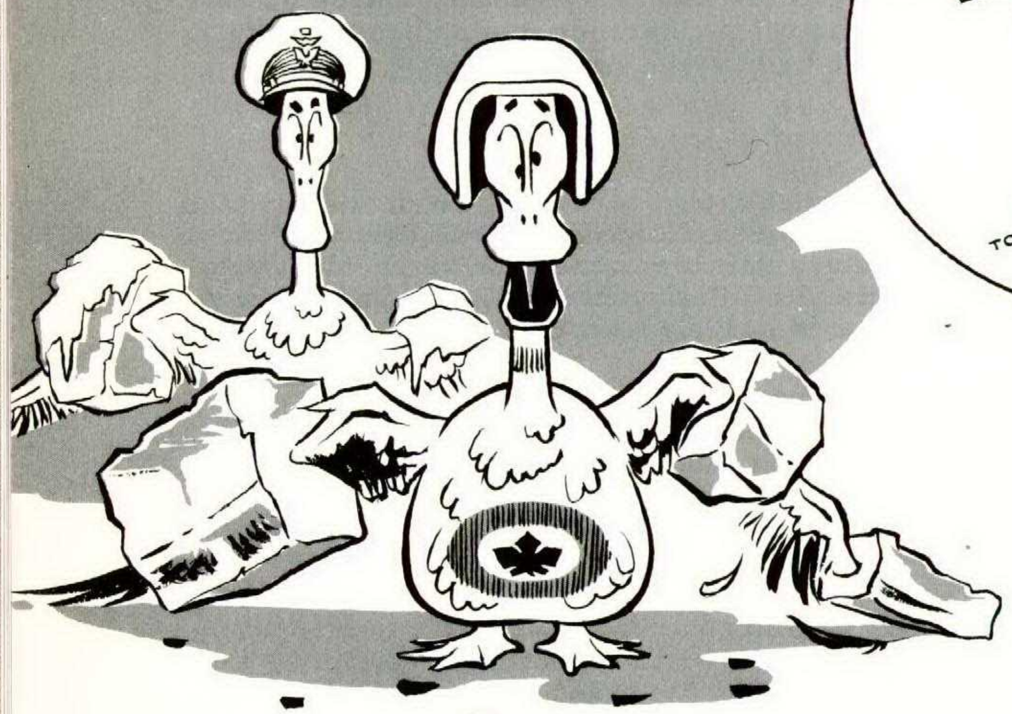
winter hazards



carburetor ice



frosted windshields



ice on wings

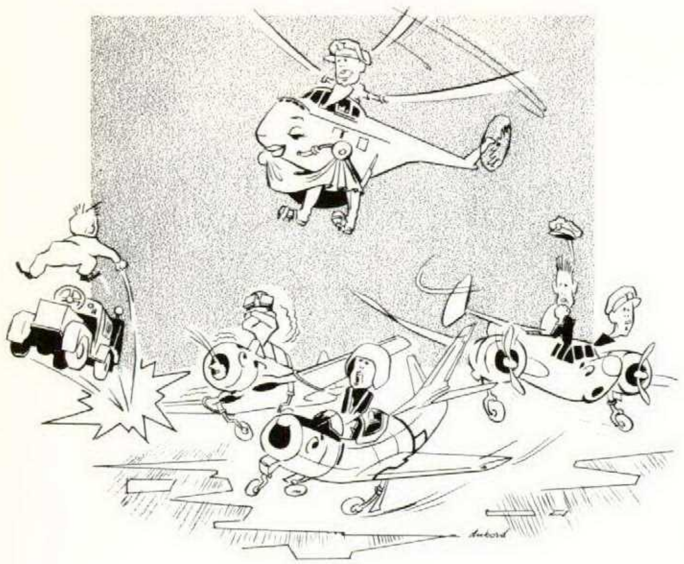
snow on runway sides

On page two of this issue of FLIGHT COMMENT, Met takes a look at last winter's accidents. The following article was written for us by the head of the Statistics Section of the Accident Investigation Branch, Directorate of Flight Safety, AFHQ. Readers will be interested in comparing the two points of view.

During the winter months of 1954-55, winter flying conditions were a major contributing factor in 64 RCAF accidents and incidents — a rise of 30% over the previous year. Eight of the 64 were fatal and accounted for nineteen deaths, a costly reminder that Old Man Winter is not to be fooled with. In addition, two pilots were forced to abandon their aircraft as a direct result of weather, winter style.

The Human Factor

"Pilot Error" (there it is again!) accounted for 55% of all winter accidents in 1954-55! Add "Briefing" and "Ground" assessments to this factor and we find that a grand total of about 80% of those accidents are attributable to human error. In other words,



What can the pilot do to help himself?

it is within the power of us all—pilots, flying control officers, supervisory personnel, and the man clearing away snow from the hangar door—to eliminate four out of every five winter accidents.

The Weather Factor

Our ancient enemy, poor visibility, continued to pull the same old tricks—snow storms, rain, freezing rain, fog, low cloud, misted and frosted windscreens, and glare. As in previous years, a portion of both fatal and non-fatal accidents during the period were cases of "Sure we can make it VFR"—when even the birds were walking! Flying through low cloud embedded with trees and hilltops doesn't make any more sense than it did the first time it broke an aircraft, yet people still seem ready to risk their necks. Remember to flight plan carefully. And stick to your flight plan in the air. If you can't maintain it, be sensible and keep out of our statistics ledger. It's better to be safe and late than sorry and never there.

Runway Surfaces

Wet and icy runways and taxi strips continue to plague our winter operations with slippery surfaces. The final solution to the problem may be a long while in coming. In the meantime, what can the pilot do to help himself? A minute or two of extra taxi time could make the difference between a successful flight and a costly skid. And what's wrong with a go-around for another approach? If you're landing too far down the runway or drifting too far to one side, such precautions are insurance against having to answer embarrassing questions later on.

Snow covered surfaces under glare conditions call for more vigilance during landings. As one of our helicopter pilots learned, a form of glassy water technique is called for. Large banks of snow along runways and taxi strips remain a menace to flying operations, so personnel responsible for their elimination are obligated to make every effort to get rid of them. When the time comes to mark those runways with "Christmas Trees", a guiding principle is to use only those of modest size so that aircraft may strike them without incurring damage. Students! (and ex-students!) Stay out of those infields! They're impossible to keep clear of snow. Countless aircraft have nosed over in only a few inches of the stuff, so let's be smart and stay on the runway.

Again during the 1954-55 winter months, accidents were caused by slush on taxi strips and runways. Propellers picking up ice and slush damaged several airframe components; and the problem of undercarriages freezing in the "up" position provided the usual quota of headaches. We can all buy a little additional protection against this latter hazard by giving the undercarriage time to drain off and cycling it a few times as a matter of standard procedure.

We Are The Worst Offenders

During the past several years, the number of accidents of the purely "winter hazard" type have been on the increase. As most of them wind up in the "human error" category, we (that is every last man of us, from the top down) can all do our part in getting rid of them. We've said numerous times before in these pages that flight safety is the job of each and every one of us. It's an ideal, certainly—but it can be achieved if we arm ourselves with as much foreknowledge of bad situations as we can acquire. Armed with that knowledge—and exercising constant vigilance and the utmost skill—we "have what it takes" to eliminate or successfully overcome potential hazards. Let's bear down on it, lads. A safe winter's flying in 1955-56. And no new statistics! We'd sooner have you alive and fit any day of the week.

The Flying Green Cross

A safety organization in Ohio has as its symbol the Flying Green Cross. Each member pledges to adhere to and uphold the FGC precepts of aviation safety. They are worth appending here because they apply doubly to winter operations.

- I WILL obey all air safety laws.
- I WILL taxi carefully and safely.
- I WILL respect my own limitations.
- I WILL respect the limitations of my aircraft.
- I WILL keep my aircraft properly maintained.
- I WILL make certain that the weather is suitable before starting on a flight.
- I WILL be on the alert constantly for other aircraft.
- I WILL promote safety by example.
- I WILL NOT let false pride prevent me from turning back.
- I WILL practise safety at all times.
- I WILL obey the Golden Rule.
- I WILL do my best to improve our aviation safety record by observing these rules.

PXing

LETTERS TO THE EDITOR

Latest on Vertigo

One of the best articles on vertigo to cross the Editor's desk in a long time—"Vertigo Alley"—appeared in the August 1955 issue of "Atlantic Monthly" magazine. We intend to seek permission to reprint it in a future issue of FLIGHT COMMENT, but in the meantime it is well worth looking up in your station library. Incidentally, a condensation of the article appeared also in the "Reader's Digest" for October, but we recommend that you explore the original. — **ED**

Wholesale Switch

Dear Sir:

The chaps in the photograph on page 22 of the May - Jun 55 issue of Flight Comment have shown a great deal of course spirit by exchanging names. Possibly it is just an error which mixed up the front and rear rows?

J. G. Sloan, F/L
SOA/OPS, AMCHQ
OTTAWA, ONT.

Our proofreader occasionally trips over the small ones. But thanks, chum. It's good to hear from our vast, unseen audience. We have to boob now and then—otherwise we'd never know you were out there. — **ED**

Hi-Level Flight

Dear Sir:

In the interest of Flying Safety, I would like to submit the following comments on the article "Hi-Level Flight" of your May - Jun issue.

The rather general treatment of the subject of high altitude, high speed flight was no doubt necessitated by space limitations but unfortunately general statements and rules of thumb are often limited by some important and serious exceptions.

In the article referred to, mention is made of longitudinal oscillations under the general heading of "Compressibility Effects". The article states that recovery from such a flight condition is effected by reducing speed. I would like to point out that the method of reducing speed is rather important. The article implies that speed brakes may be used first. In certain aircraft, usually those with speed brakes in the wings, some rather unpleasant and possibly violent trim changes and longitudinal oscillations may occur if speed brakes are used under compressibility conditions. I feel that the best rule for reducing speed under these conditions is: Throttle back first.

On the basis of the above, exception may also be taken to the concluding paragraph which states that "....if control difficulties are encountered at high speeds at high altitudes, it is advisable to reduce speed by using the speed brakes first." There are at least two types of aircraft in service which will probably react most violently to such a procedure. For a particular example, you may refer to EO 05-25E-1 Part II para 35 which states in part:

"WARNING: Speed brakes must not be opened to reduce speed if the limiting Mach number is inadvertently exceeded, as violent rolling and pitching will occur." (The foregoing refers to the CF-100 MK-4.)

If a general rule regarding recovery from control difficulties at high speeds is desired, I feel that the safest procedure is to throttle back first. As stated, this is a general rule. I believe that, while it may not be the best rule for all aircraft, it is the safest. Handling notes of course outline the best procedure for each aircraft type.

G. A. Heck, S/L
Detachment Commander
CEPE (NAE) Det. Uplands

In a generalized discussion of high speed flight problems it is not possible to detail handling procedures which will apply equally well to the multifarious types of aircraft in service. The instructions contained in POIs for each aircraft type must necessarily take precedence over any general statements which were made in this article.

In the discussion of recovery action from porpoising, it was not intended to imply that speed brakes should be used first. As a matter of fact, an important method of recovery was omitted. The approved method of recovery, for Sabre aircraft, is to release the stick and allow the aircraft to fly itself out of the manoeuvre. The oscillations will apparently damp out more rapidly this way than by the positive pull-up method.

Your last suggestion has much merit. After all, when control difficulties are encountered, the instinctive reaction is to reduce power. — **ED**

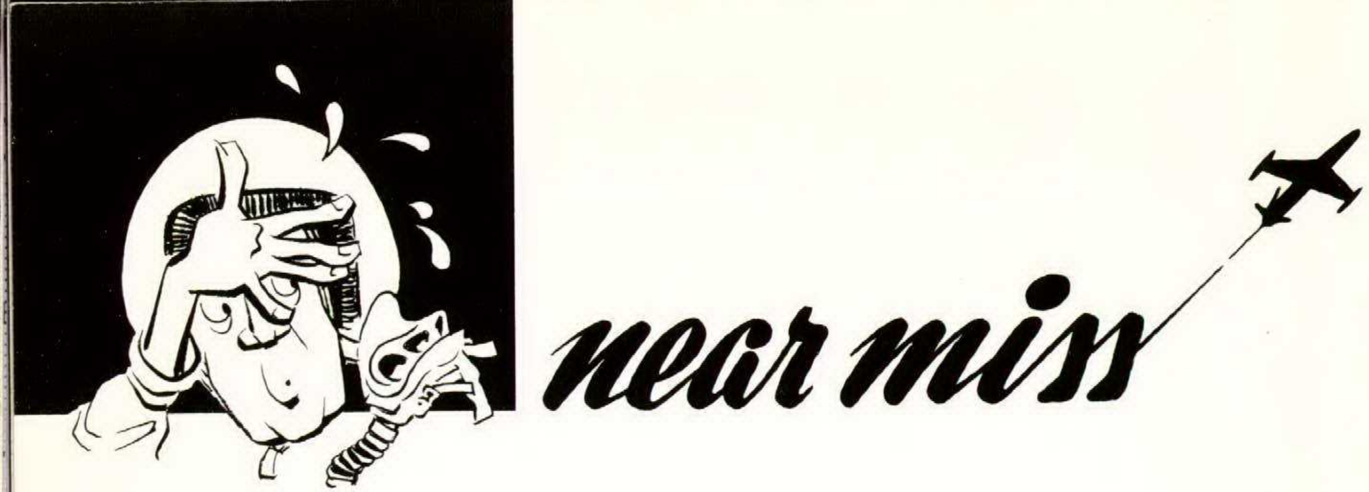
priceless prose

REPORTED ON A D14 AFTER A WHEELS-UP LANDING:

"When I touched, it felt like I was rolling along on wheels without rubber tires on."

CAUGHT DURING PROOFREADING:

"On final approach he allowed his speed to drop too low and undershot the runway by about 70 years."



near miss

KNOW WHERE YOU ARE

This incident occurred in the Western Arctic when a Dakota on a search mission attempted to let down through a stratus overcast without benefit of a radio aid. The Dakota and crew were detailed to proceed from Norman Wells to the Liston-Sutton Island at the east end of Amundsen Gulf and conduct a search for a family of Eskimos missing on a boat trip from the mainland to Victoria Island.

During the first half of the flight the weather was clear and no trouble was experienced maintaining visual contact. Good pinpoints were obtained and an accurate track was established. The flight was about half over when an extensive layer of low stratus was encountered and the captain had to decide whether to attempt to remain VFR or proceed above the layer IFR. He tried to remain visual under the cloud; but fog, rising ground, and the fact that the area was unmapped, made contact flying impossible. The captain then decided to climb above the layer and continue to the search area using DR navigation. Radio contact had been lost, but the last weather report from the area indicated that a low, broken condition prevailed in the search area. It was hoped that over the area a break would be found through which a letdown could be made.

Upon arrival at the coastal DR position from which the search was to start, it was found that the whole area was under a solid overcast which extended to 5000 feet. A check of available maps showed no ground above 1000 feet MSL within a radius of seventy-five miles of the DR position; however, the maps were annotated as being unreliable on the subject of heights and contours. The captain, who was fairly familiar with the area, knew that there were hills along the coast about 25 miles west of their DR position, but he was positive they were below 1500 feet MSL. Acting on this conviction he made a letdown from 5000 to 3000 feet, hoping to break out at 3000 feet above the water. At worst this would leave him 1500 feet of clearance over the terrain.

The aircraft entered cloud at 4800 feet and began a smooth letdown to 3000. At the 4000-foot level a light film of ice formed on the windshield and built up to such an extent that neither pilot was able to see out for the last thousand feet. At exactly 3000 feet the captain called for climbing power and raised the nose to climbing attitude. Simultaneously violent turbulence was experienced, and at times full aileron and harsh rudder were required to maintain control. In addition, the rate of climb shot up to 1500 feet per minute. The turbulence persisted until the aircraft broke out at 4700 feet. After a number of unsuccessful attempts to locate a break in the overcast, the aircraft was flown back to base without further incident.

That night an RCMP sergeant who had been a passenger on the aircraft mentioned casually that he had been a bit worried when the aircraft got so close to the ground. The captain (who thought he was referring to the earlier stage of the flight when an attempt had been made to maintain visual contact) assured him that the aircraft had never been below 500 feet. But the sergeant declared that the height had been more like fifty feet as he had been able to pick out each individual wind ridge in the drifts. Further discussion disclosed that he had seen the ground just before the aircraft encountered turbulence.

*

Reconstructing the incident, it appears that the Dakota had been approximately thirty miles west of track and had let down over one range of hills into a valley and climbed out over another range. The rough air resulted from ground drift, set up by a 20-mph wind which was causing orographic turbulence near the ground. The RCMP sergeant, who had had considerable experience in the country, claimed that this wind caused turbulence only to 250 feet. Therefore the aircraft must have been at altitudes of only 50 to 500 feet from the time it reached 3000 feet until it broke out on top. Worst still, when the aircraft failed to become contact at 3000 feet, the captain had seriously considered letting down a further 500 feet. Had he done so, and had the aircraft crashed, there would have been little chance of survival as the temperature was hovering around -25°F, and the weather was so stormy that search aircraft would not have been able to cover the area for at least another four or five days.

The lesson to be gained from this Near Miss is only too obvious: never let down under IFR conditions without a radio aid unless you are certain of your position and know the current weather. Among the contributing factors to the incident were an unserviceable radio altimeter, an undercast and an overcast which made accurate DR navigation difficult, and inaccurate maps. Last but not least in the list was an error of judgment on the part of the captain who allowed a desire to complete the job to outweigh his common sense.

some thoughts on

Winter Operations

With the advent of another winter season comes a further spate of do's and don'ts through which we endeavor to reduce the number of accidents in which cold, snow and ice are factors. A good deal of what follows will be well known to many of our readers, but those who are still gaining experience may find something of value which is new to them. Eternal vigilance being the price of safety, it behoves all of us to use that bit of extra care which can make the difference between a safe flight and an accident report.

The RCAF's Central Experimental and Proving Establishment has published some interesting and valuable reports on the problems of winter flying operations. Since these reports form the basis of much of our know-how in this business of working and flying in cold weather, we have taken the liberty of borrowing some of their words of wisdom along with a few photographs from the same source.

Staying Under Cover

Protection from the elements is necessary for aircrew and groundcrew personnel as well as for aircraft. The accompanying photograph shows a CF-100 fully dressed for a night in the open. If aircraft must be dispersed, covers like these will reduce materially the time required to prepare them for flight. During a severe blow, unfortunately, snow finds its way inside. It was also found that in cold, wet weather the covers froze to the aircraft; and during conditions of extreme cold, they failed to prevent frost from forming on the underside of the wings.

Canuck with winter covers

Two men wearing full winter clothing took one and one-half hours to fit a set of these covers at temperatures down to -30°C and in winds of less than 15 miles per hour. With winds in excess of 20 mph it was almost impossible to fit them because of their size and bulk, but removal can be accomplished in 30 to 45 minutes. The best cover material appears to be a plastic-coated nylon which is light, strong, flexible and reasonably waterproof. Tests with such materials are continuing.

Covers are most practical for small aircraft on which they can be fitted by personnel standing on the ground. On larger aircraft it is often impossible to fit covers in a 20-25 knot wind, and estimates must be made of the danger involved for personnel fitting covers and of the probable results if they are not fitted. When freezing rain is expected and shelter is not available it is usually better to fit covers. In drier conditions blanking plates and bungs are generally all that are necessary; loose snow, which may have fallen overnight, can then be swept off prior to flight.

Removing Ice and Snow

If an uncovered aircraft has been exposed to freezing snow or rain, the ice usually cannot be removed mechanically by sweeping or scraping without damaging the finish of the aircraft. The best way to de-ice is to place the aircraft in a heated hangar; but if heated space is not available, other methods must be used.

Removing wing covers from a Canuck

Sweeping loose snow from the Canuck

Heat can be applied by fitting covers and then introducing warm air from heater ducts under the covers. The process is slow, requires many heaters, and is practical only for small aircraft. Also, as it is usually impossible to get the wings warm all over, the melted ice tends to refreeze in colder areas such as hinge points.

De-icing fluids have been used to remove frost and ice and can be applied with a spray or mop. The best fluid tested was one which consisted of 85 percent ethylene glycol, 5 percent ethyl alcohol, and 10 percent distilled water. The mixture was very expensive, made the wings of large aircraft treacherous to walk on, and required one pint of fluid per square foot of wing area to remove ice and frozen snow up to one quarter of an inch thick. This method has the advantage that the slush formed will not refreeze, but it must frequently be swept since spraying the fluid on alone is not sufficient except in very mild cases.

Removing ice with a jet blast

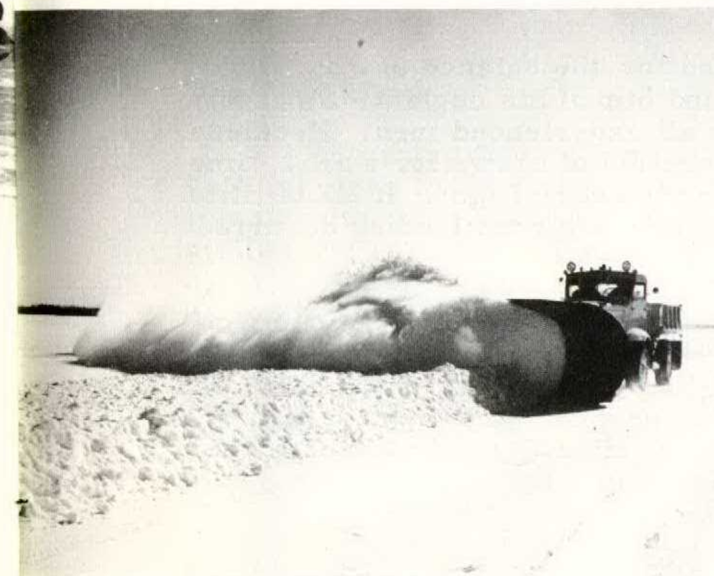
As in most phases of low temperature operation, ingenuity plays an important part: whatever equipment is available is used if it serves the purpose. For example, jet engines have been used to melt frozen snow from the wing of another aircraft. In the case depicted here at an air temperature of -15°C and with the Goblin engine running at 3500 rpm, 12 minutes were required to clear one wing of the Venom.

Runways In Winter

During the winter months operating problems multiply, and while a great deal can be done to help the pilot, there still remains much that he can do to aid others in their endeavours to ease his job. For instance, a prompt report of runway conditions (if extreme iciness or inadequate snow clearance is experienced) will assist those responsible. A bank of snow or ice too close to a parking area or taxi post should be reported—as should cases where snow banks are built up too close along one or both sides of a runway. Conditions like these constitute a hazard to the safe operation of your aircraft, so don't just grumble about it and live with it—report it!

CEPE's experiments on runway clearance are continuing. Unlike aircraft, runways cannot be sheltered. Ice-melting chemicals which are economical enough for the area involved are too corrosive for aircraft, and as yet no plans have been made for heating entire runways. They have to be cleared by mechanical methods. In the past, graders, one-way snow plows and snow blowers have been used. A high speed snow remover tested recently consisted of a truck with a specially-designed snow plow which could be swivelled hydraulically to provide a cutting angle of 40° either to the right or left. It operated most efficiently at 25 to 35 miles per hour and was by far the most effective machine for light snow yet tested. On one occasion two runways—each 6800' by 150'—were cleared of five inches of snow in two hours and twenty minutes by one man operating a high speed snow remover. The accompanying photograph shows this particular machine plowing snow 28 inches deep.

No matter how carefully removal is handled, a small amount of snow will be left on the runway unless the plow is followed by a rotary brush. Formerly, a large portion of this snow blew away in the propeller slipstream of conventional aircraft so that only a small amount was melted by the sun and refroze as patches of ice. Conditions were thus not too hazardous for pilots of these aircraft provided a precautionary approach was made and the brakes used gently during taxiing over patches of ice. Jet aircraft, instead of blowing the residual snow away, melt large areas of it which frequently refreeze and make runways treacherous.



High speed snow remover

Chemicals such as calcium chloride lower the melting point considerably, but as yet no cheap chemical has been tested which will both lower the melting point and leave a solution which is not highly corrosive to aircraft. Sanding of ice has been used to advantage but sand gets blown away quickly. Hard packed, dry snow gives suitable traction in ordinary circumstances but jet blast is notorious for converting it into ice. A slight crown on the runway is a handy method of keeping water from pooling—and vital today, for the only completely satisfactory runway for modern jet aircraft is a dry one.

Only the highlights of these problems can be set out in an article of this nature. For details and precise techniques a man must follow the lead of more experienced personnel; and he can also review unit orders and command instructions for additional information on specific operations.

Protective Clothing

Much study and research goes into the flying clothing with which you are issued. Do you wear it? Our accident files include cases wherein fighter pilots have flown wearing low shoes instead of proper flying boots. Don't jeopardize your chances of survival by wearing insufficient or inadequate equipment.

The best possible protection from cold is an absolute necessity, and anyone who defies this law is asking for trouble. Some years ago the writer had a Dakota and crew in the far north. An over-night stop was made enroute. Temperatures were in the 40-below-zero region and winds were 35 knots. By takeoff time the following morning the Dakota was unserviceable. Then we discovered that one crew member possessed only flying boots, battle dress, a rain coat with a parka over it, and gloves. No flying pants! Another lad had gloves and part of a flying suit—but no flying boots! His feet were protected only by low oxfords and thin socks. Obviously these men were not comfortable working on the aircraft outdoors in that weather.

Additional clothing was borrowed for the balance of our flight, but one man had frostbitten feet to remind him of his neglect. Strangely enough the members of this crew were all experienced men. Needless to say, the skipper's personal kit inspection of crews for some time thereafter was minute and detailed prior to every flight. It takes little imagination to picture what would happen if a forced landing occurred to people so unprotected.

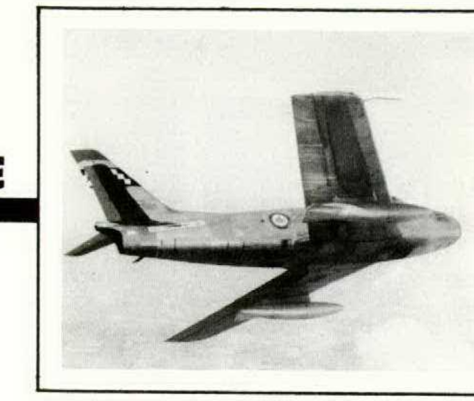
An Anson nav-trainer was on a flight over the prairies one winter night a few years ago when the crew was forced to bail out. One of the men was wearing a pair of loose-fitting flying boots which came off when his parachute opened. Once on the ground, he set out toward the light of a distant farmhouse. He reached it alive; but not long afterward was discharged from the Service—minus both feet.

*

We have attempted in the foregoing to cover generally some of the hazards which accompany flying operations in the winter months. For the Jan - Feb issue of FLIGHT COMMENT we have scheduled further material on the subject—this time an article dealing with one specific problem: that of runway ice clearance. Written for us by the Directorate of Construction Engineering and Design, it is based on tests which were run off during the 1954-55 winter season.

Accident Resumé

SABRE



The Pilot Lived

Returning from a routine training flight the pilot positioned himself too close to the field on the downwind leg. While he was trying to line up with the runway he pulled such a tight turn that the aircraft stalled and crashed. Fire broke out but the injured pilot was helped clear of the wreckage. Again, we cannot stress too strongly the dangers of making too tight turns with high performance aircraft in the landing configuration. If in doubt, go around.

Fatal Tail-Chase

Two Sabre pilots were authorized to practise cine-camera gun attacks. The exercise was completed without incident and the leader decided to do a tail-chase, even though he had not been authorized to do so. Number two followed the leader about 200 yards line astern through a number of manoeuvres. Then number one decided to do a loop at 10,000 feet.

As he was pulling into the vertical position he realized his airspeed was too low for a tail-chase loop. He rolled onto his back and allowed the Sabre to dive. In attempting to roll out he encountered high speed control difficulty but, by pulling through, managed to recover and regain control of the Sabre at only 500 feet above ground. In the 10-1/2G "pull through" the leader severely overstressed his aircraft, tearing the nose wheel door panel loose and wrinkling the wing and fuselage.

THE NUMBER TWO PILOT ATTEMPTED TO FOLLOW HIS LEADER THROUGH THE LOOP AND WAS KILLED WHEN HIS SABRE DISINTEGRATED.

The leader of this two-plane formation engaged in an exercise for which he was neither authorized nor briefed, and he tried a tail-chase loop below the known minimum altitude of 15,000 feet. Furthermore he led his formation into a manoeuvre from which he was unable to recover without causing severe airframe damage—and from which his wingman could not recover.

Improper Installation

The pilot assigned to fly this Sabre noticed on checking the L14 an entry in the "Major U/S" column reading "to be test-flown for sticky aileron controls". After becoming airborne, he noticed that all flying controls were much less responsive than normal. (What happened to his pre-flight check?) When he later eased the control column back for roundout the aircraft would not respond and a hard landing resulted. Fortunately the Sabre was undamaged.

Inspection revealed that the starboard aileron cable had been improperly installed when the aileron bellcranks were changed; it was riding over and cutting into a hydraulic line. The aircraft was made serviceable by changing the hydraulic line and re-rigging the aileron cable properly. While this case can now be considered closed, there is some pertinent information which did not appear in the D14 but which we hope the Squadron Commander obtained:

- ▲ Why did maintenance personnel not discover the binding and improper rigging when EO 05-1-2J was carried out after the bellcrank change? Or was the EO complied with?
- ▲ The sticky controls should have been obvious to both maintenance personnel and the pilot on the daily and pre-flight inspection. Why was the aircraft allowed to leave the ground in this condition?
- ▲ Since no malfunction of the elevator control system was reported, why did the pilot have poor elevator response?

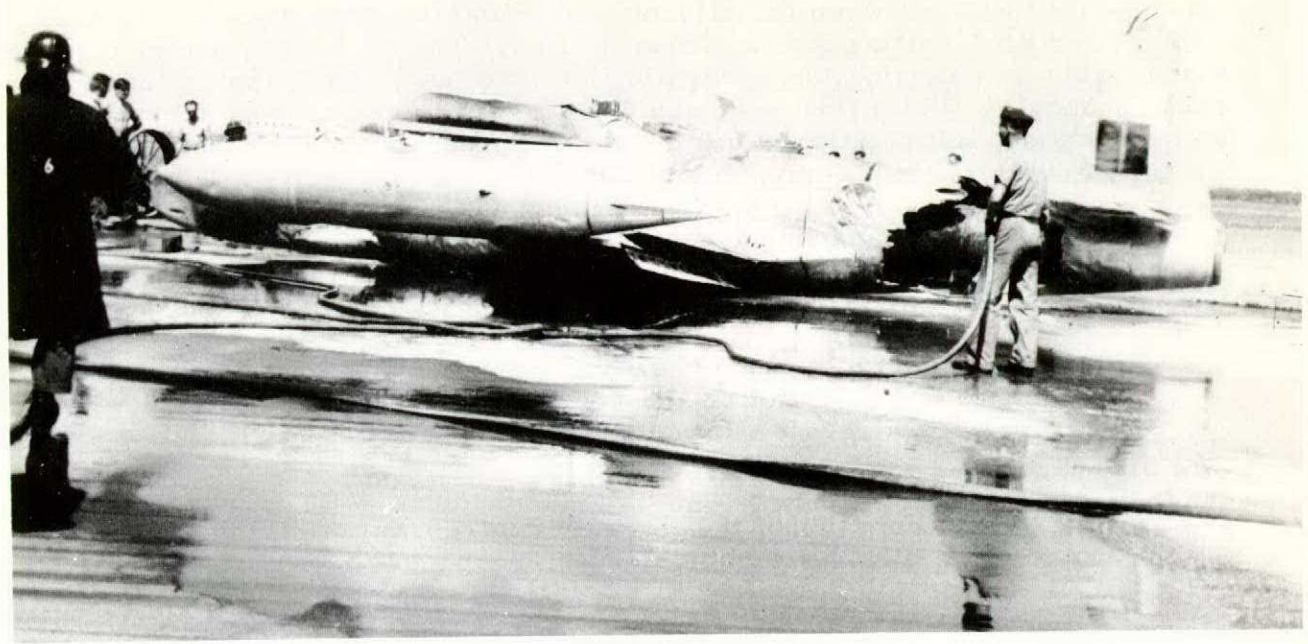
Too bad we have to have a near accident before such situations are rectified. All concerned—and maintenance particularly—look bad on this one.

T-33

Remember the Wheels

The student returned to the field for his final landing prior to graduation. As he lined up with the runway he heard from the tower "order to overshoot for aircraft landing". He started to open the throttle but closed it again when blue smoke filled the cockpit. When the aircraft had come to rest he stop-cocked the engine, cut the switches and left the aircraft, as it was now on fire.

The runway controller who sounded the warning had just been requested to check another aircraft for hanging gear when he noted this T-33's approach: gear up, dive brakes down. He advised that the air-



craft was clean except for dive brakes; but when the approach and round-out continued, ordered an overshoot which the student failed to complete before striking the ground. Dive brakes wearing off on the runway were the source of the blue smoke mentioned by the student. A small blaze occured in the dive brakes area shortly after touchdown and could not be controlled by the fire fighting equipment available. Foam fire fighting equipment is a requirement at flying training schools.

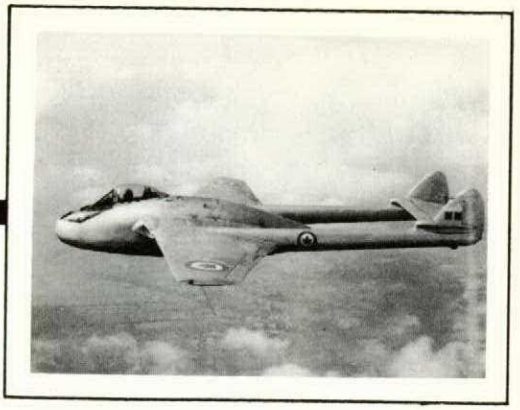
A carefully completed drill of vital actions prior to landing is a must if wheels-up arrivals are to be prevented. Only by careful attention to such little details can you avoid that heart-to-heart with the CO.

*

In another T-33 wheels-up landing, the pilot's own words convicted him. "On the break I cut the horn, and on downwind I forgot to put the undercarriage down. On the base leg the tower cleared me for a full stop landing and told me to check my undercarriage down and locked. I acknowledged and made a wheels-up landing."

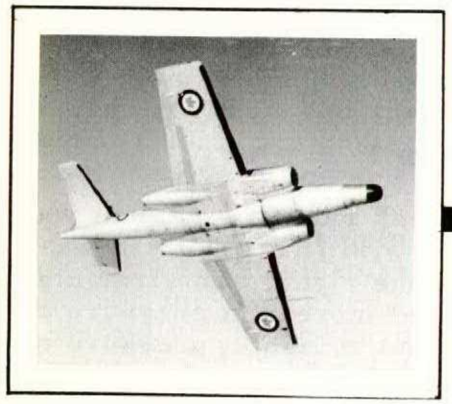
Cutting out the warning horn was the initial error. The horn cut-out has its place—but not in the circuit. Let the noise remind you to get that undercarriage down. The phrase "check undercarriage down and locked" was inserted in tower control patter as an added safety feature to remind you of that very important item of your drill of vital actions. Stay alert and you'll keep out of trouble.

VAMPIRE



Restricted Vision

The windscreen and canopy of a Vampire frosted over during the descent from a high level exercise. The pilot was unable to clear the frost before a shortage of fuel forced him to land. A misjudged landing damaged the wing tip and aileron. The exercise had been flown higher than the briefed altitude and caused excessive frosting on descent. Sufficient time had not been allowed for adequate clearance of frost prior to landing. The pilot had sufficient jet experience to be aware of the correct precautions to be taken in preventing frost formation.



CANUCK

On Keeping Current

At an airspeed of 120 to 125 knots during takeoff run, the pilot felt that he was not going to become airborne, so he aborted the takeoff. He closed the throttles and high pressure cocks but the aircraft ran off the end of the runway before it could be stopped.

On his part the pilot demonstrated lack of knowledge about his aircraft in being unaware of information contained in POIs:

▲ He neglected to use the 25° of flaps required by POIs

▲ He neglected to allow for a snowcovered runway

▲ He neglected to allow for a downwind takeoff

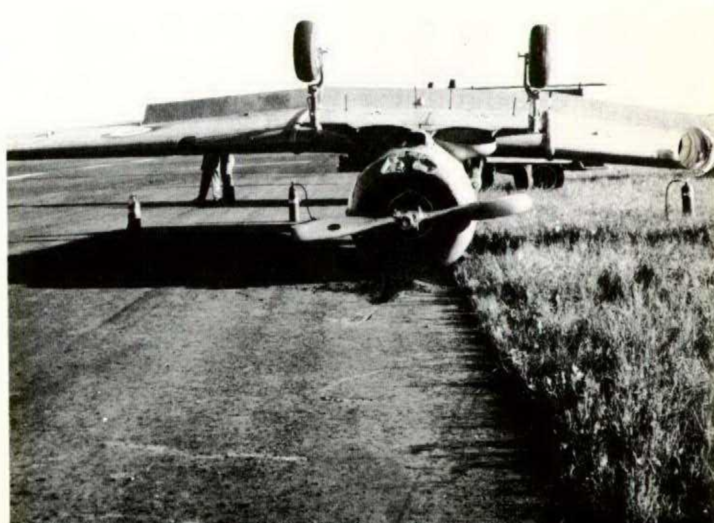
▲ He aborted the takeoff at too low an airspeed.

Supervision has been tightened to require written examination as a means of ensuring that pilots are fully conversant with the type before flying.

HARVARD

Control or Confusion?

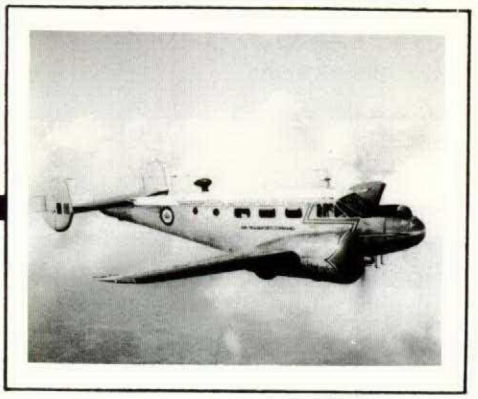
During a check ride the student was slowing the aircraft with the brakes when it started to swing to the right. To straighten the swing he applied increased pressure on the port brake without releasing pressure on the starboard brake. At this point the instructor, without informing the student, also applied port brake, thus causing faster correction than the student anticipated. The student then released the port brake and increased the pressure on the starboard brake. However, with the instructor applying port brake and the student applying starboard brake, each was fighting the other. The Harvard came to rest on its back. When an instructor is taking control of an aircraft he must inform the student or confusion will surely result.



Unusual

On the downwind leg of the circuit a solo student thought he heard the tower operator telling him to shut down. (Actually the transmissions referred to another aircraft already on the ground.) He was worried by the popping noises (normal after-burning) coming from the exhaust when he throttled back the engine. Checking with the tower the student again misunderstood, raised his wheels, cut fuel and switches, and made an unnecessary forced landing. It is doubtful if there is another such case on record.

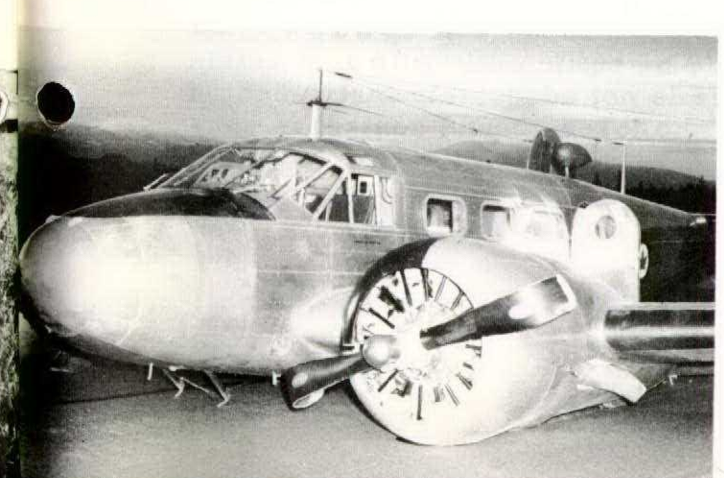
EXPEDITOR



You Can't Fool the Experts

Two pilots on a mutual flying exercise returned to the circuit for landing practice. On the downwind leg the normal checks were completed when the designated captain, in the right hand seat, reduced power on the starboard engine to simulate engine failure.

The pilot's single engine procedure was incomplete. However, considering himself to be in a good position, he elected to continue the approach for a practice, single engine landing. The Expeditor landed on its belly. In spite of the fact that he had experienced no difficulty maintaining altitude and that he had to increase the flap setting because of being high on the approach, the pilot did not appreciate the situation until the aircraft touched down. And neither pilot did a visual wheels check.



The undercarriage had operated properly for three landings prior to the accident and had also worked correctly when the aircraft was raised subsequent to the accident. Yet both pilots claimed that the undercarriage was down. A popped circuit breaker indicated that the undercarriage selector lever had been placed in the "down" position _after_ the belly landing.

Three or four other instances come to mind in which technical investigation and Boards of Inquiry have proven the facts to be other than as stated by those involved. The purpose of such investigations and boards is not to persecute anyone but to get the facts of an accident in order to prevent a recurrence. Under circumstances like these, a true statement of facts would preclude unnecessary and costly investigation. Invariably the investigation establishes the truth. The folly of falsifying evidence or of making misleading statements is obvious. An adequate pre-landing check will prevent that sinking feeling!

(It can happen to all types of aircraft. See "Remember the Wheels" on page 35 under the T-33 section.)

PIASECKI

Stay Out of the Clag

The helicopter was on a ferry flight through mountainous terrain, carrying two pilots, two crewmen and a passenger. The captain had been briefed to remain VFR. Weather which caused delay in departure on the second leg of the flight was still marginal at the time of takeoff. Cloud was an additional important consideration because the route to be followed was along a highway which rose to a considerable altitude.

While following the road to the summit of a mountain the pilot entered cloud and lost control of the helicopter which crashed into the bush and burned. The pilot, one crewman and the passenger were killed but the co-pilot and the other crewman escaped with injuries.

The cause of the accident was "Pilot Error" in that the pilot entered cloud while on a VFR flight plan. Probably he thought that visibility in the base of the cloud would be sufficiently good to retain some ground reference. The helicopter is not adequately instrumented for other than VFR flight and the pilot who loses ground contact is asking for trouble.

FLIGHT COMMENT

CONTENTS 1955

JAN · FEB

MAR · APR

MAY · JUN

JUL · AUG

SEP · OCT

NOV · DEC

DFS