FLIGHT COMMENT

ISSUED BY

DIRECTORATE OF FLIGHT SAFETY

R.C.A.F. HEADQUARTERS • OTTAWA, ONT.

THIRD QUARTER • 1954

RESTRICTED

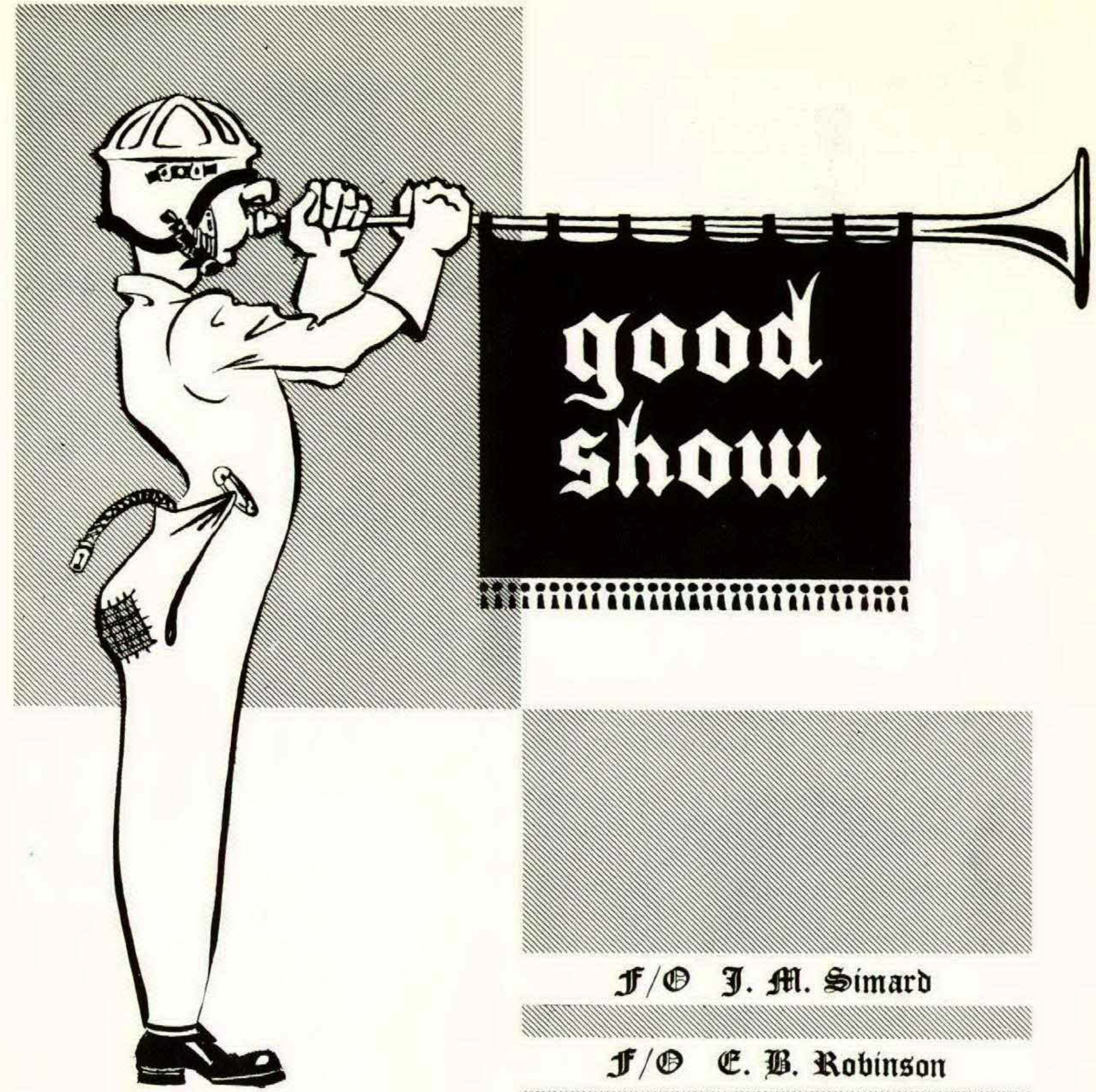
FLIGHT COMMENT

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

THIRD QUARTER 1954

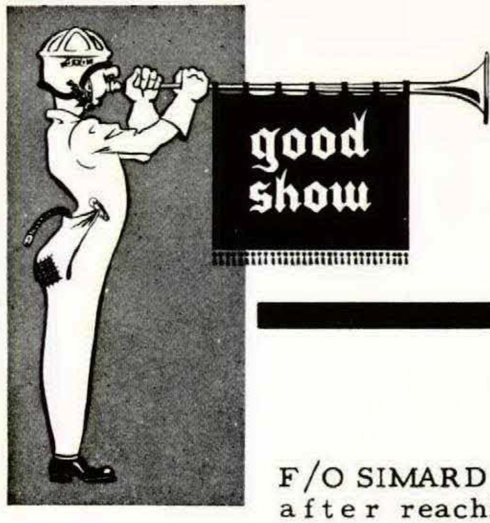
C O N T E N T S

★ ★ ★



F/O J. M. Simard

F/O E. B. Robinson



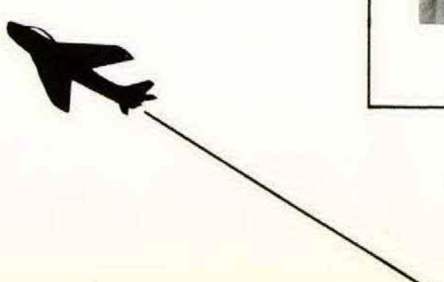
40066 F/O J.M. SIMARD

F/O SIMARD was about to begin a briefed exercise after reaching 24,000 feet in his Sabre when the aft fire warning light came on. He retarded the throttle to "idle" and the light went out. By careful throttle manipulation the pilot discovered that both fire lights came on at 75% rpm and went out at 65%. He promptly made a high-speed descent. Just as he reached the circuit the aft fire light came on again. While he was in circuit, the surface control normal hydraulic system failed, so he switched to the emergency system to maintain control.

With both forward and aft fire warning lights on, F/O Simard made a tight circuit. To keep control he was forced to approach at 170 knots with speed brakes in. On touchdown he selected speed brakes out and braked to a stop. Because the aft fire warning light was still on, he turned off the runway and shut down.

Technical examination revealed that damage to the engine occurred when the interconnector tube burned away between number one and two engine combustion chambers.

F/O Simard demonstrated exemplary airmanship in landing his Sabre safely and preventing further damage to the aircraft.

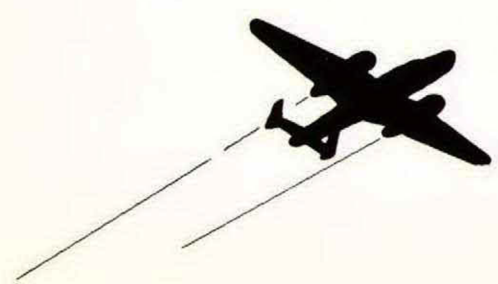


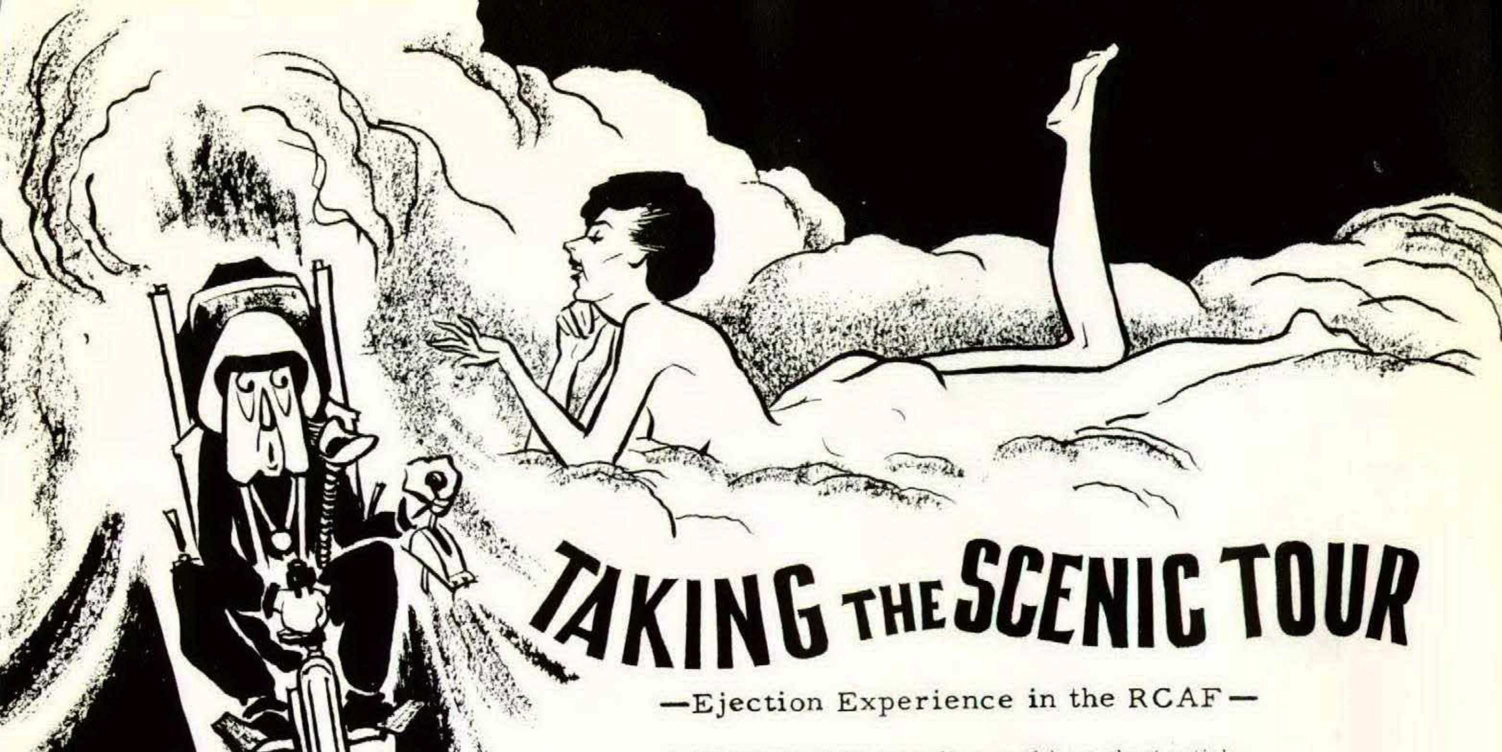
39937 F/O E.B. ROBINSON

F/O ROBINSON was captain of a Mitchell on an instrument training flight from Saskatoon to Toronto and return. Upon arrival at Lakehead on the return flight, the aircraft's nose wheel refused to lock in the "down" position. At length, while his co-pilot orbitted the aerodrome, F/O Robinson entered the nose tunnel and tried to lock the gear in place by extending a hook through a small opening.

He discovered the "down" latch jammed too tightly to be moved with the hook so a screwdriver was bent to suitable shape with the aid of a hammer and used as a drift to force the latch far enough into position to guarantee a safe landing. Subsequent inspection revealed that the "down" latch spring had failed, permitting the latch to move out of place.

F/O Robinson's above-average technical knowledge of his aircraft permitted him to effect repairs in the air and thus avoid a possible serious accident.





TAKING THE SCENIC TOUR

—Ejection Experience in the RCAF—

EJECTION SEATS were discussed in a short article which appeared in the Third Quarter issue of Crash Comment for 1951. As these seats had only been introduced in the Service at that time, the article merely outlined the general operating procedures and did not reflect any RCAF experience. Since then a number of RCAF aircrew have, through necessity, made good use of the ejection seat. We feel, therefore, that a summary of their experiences would be interesting and beneficial to readers of FLIGHT COMMENT in case they may one day be compelled to use this seat in an emergency.

NINETEEN EJECTIONS have been made by RCAF personnel—eighteen from Sabres and one from a Canuck. Ten of these ejections were executed either without injury or with only minor bruises; five resulted in fractured vertebrae, although no permanent injuries were sustained; and four resulted in fatalities.

Safe ejections were made at altitudes from 2000 feet to 9500 feet and at speeds of from 150 to 500 knots. The fatalities all occurred on those ejections which took place at altitudes below 300 feet. In three of these cases—involving Sabre aircraft—it is believed that each of the pilots had inadvertently ejected his seat while attempting to jettison the canopy prior to a forced landing. Action has been taken to modify all seat triggers in these aircraft to prevent unintentional ejections in future.

In all cases where the pilot suffered either a fractured vertebra or a bruise, the cause of the injury was IMPROPER POSITIONING IN THE SEAT prior to ejection.

*

It is interesting to note that the USAF—with a far greater number of ejections than the RCAF—has had markedly similar experiences and has reached similar conclusions about the use of these seats. The conclusions are as follows:

- Ejection seats will successfully and safely remove flying personnel and carry them clear of the aircraft under any known conditions.
- The "G" forces produced during ejection will NOT cause death or spinal injury if seat posture is correct.
- With present seats, ejection should be made at a safe altitude to allow time for aircrew to release the seat and open their parachutes.
- More training is necessary on both the maintenance and use of ejection seats.

Certain points of interest arise out of these conclusions. Because of the fact that cockpits have not been standardized, the procedures for ejection vary slightly from one type or model of aircraft to another. Pilots' Operating Instructions, of course, detail the steps to be followed on your particular aircraft. There is one step in the bailout cycle, however, which is the same for every ejection procedure: the correct posture to assume. The feet should be in the stirrups; the body should be centered; the spinal column must be straight and firm against the rear of the seat; the arms must be close to the body; and the shoulder harness should be locked. False rumours have been circulated occasionally to the effect that some pilots who have ejected have had their feet cut off or suffered other damage to their extremities. Nothing could be further from the truth. The majority of pilots have not followed the correct procedure to the letter—and yet they generally get off with only a few bruises to show for their carelessness.

*

AT LOW ALTITUDE the ejection problem is complicated by the time factor. Seconds lost in deciding whether to eject or ride the jet down can mean the difference between life and death for the pilot. Generally, between 7.5 and 11.5 seconds are required to go through the ejection procedure. Since considerable height could be lost in this period of time, it is imperative that pilots realize they must not waste time debating whether to get out or stay with the aircraft. Future development of these seats will permit automatic release of the pilot from the seat after ejection has taken place. This provision, coupled with an automatic parachute release will obviate the necessity for the

JETTISON CANOPY

pilot to take any action other than the initial ejection and will also enable him to eject safely at much lower altitudes. Until such improved equipment is available in the RCAF, aircrew members can go a long way toward ensuring successful emergency ejections at low altitude by regularly running through the mechanics of the entire operation to make certain that each action is performed correctly in the proper sequence and with a minimum of delay. Should a low altitude ejection be unavoidable, the pilot—if he can maintain proper position on the seat—should unfasten his lap belt before proceeding with the ejection sequence. Obviously the determining factor in this situation will be flight conditions, from the standpoint of turbulence and aircraft attitude.

CORRECT POSTURE

One RCAF pilot, who successfully ejected at 3000 feet while his Sabre was diving at 500 knots, had this to say after the experience:

> "Tumbling and rotation of the seat was so fierce that I was almost incapable of thought and action . . . . . After jettisoning my canopy I found that the combined effects of detonation of the charge, decompression of the cockpit, and the roaring of the air stream stunned me so much that all further procedures seemed to be carried out involuntarily as the result of good training rather than as a result of conscious thought on my part".

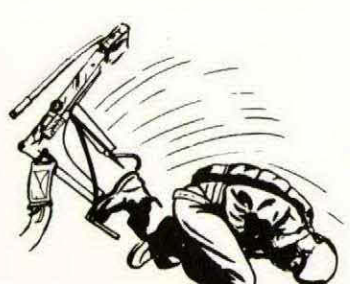
*

LEAVE AIRCRAFT

Despite a few evolutionary shortcomings, the present ejection seats are mighty handy in an emergency. Pilots can increase the range of their usefulness by acquiring a thorough knowledge of how they operate and by suggesting, from experience, how some of their shortcomings may be eliminated. The pilot's safety in an ejection will depend largely on two factors:

His own familiarity with the functions and purposes of the entire ejection apparatus

The rapidity and accuracy with which he can go through his emergency drill.



UNFASTEN SAFETY BELT—
KICK AWAY FROM SEAT

NOTE: "Taking The Scenic Tour" is a Sabre-pilot colloquialism for "seat ejection bailout from jet aircraft".

PULL RIPCORD

NEAR MISS

This issue of FLIGHT COMMENT introduces a new section called "Near Miss" which will henceforth appear as a regular feature. It will occupy a somewhat unusual position compared to other sections, for its progress and worth will depend solely upon our readers. We are counting on each of you for support. The plan is one whereby you can make a personal contribution to the RCAF's Flight Safety program. To put it bluntly—WE ARE ASKING YOU TO SAVE A LIFE.

The plan is this: When you have a "close shave" or a "hairy brush" or a "Near Miss", we want to hear about it if you have the slightest reason for thinking that it might keep another pilot out of trouble—or save his life if he finds himself in a tight corner. When you read over the first two "Near Miss" reports in these pages you will understand why we are so enthusiastic about their potential. Their chief value lies in this—that a man had a very narrow escape and that he was spared to tell us what happened and what he did about it.

We need this information. If it saves the life of just one man a year, then we want to get our hands on it. Does your "Near Miss" answer the requirements mentioned above? Get it on paper. Set down all the details. Then turn the story over to your Flight Safety Officer for forwarding. There is no need to sign it unless you want to. The important thing is to GET THAT REPORT IN CIRCULATION.

Detailed instructions on the handling of these reports will be published soon in the revised AFAO A6/3. In the meantime, as a guide for you, we are reproducing below a sample "Near Miss" report form. Learning from the mistakes of others will prevent us making our own. BY RELATING AN INCIDENT YOU MAY PREVENT AN ACCIDENT.

N E A R M I S S

DATE & HOUR . . . . AIRCRAFT . . . .

TYPE OF FLIGHT: Training ☐ Routine ☐ Operational ☐

CLEARANCE RECEIVED: VFR ☐ IFR ☐ ACTUAL WEATHER . . . .

STAGE OF FLIGHT: Taxiing ☐ Takeoff ☐ In Flight ☐ Landing ☐

Engine(s) On, Not Taxiing ☐ Go Around ☐

CREW DUTY . . . .

DETAILS: What occurred? Under what circumstances? Causes? Your remedial action? Outcome? Your response in a similar, future situation? How would you reduce or eliminate similar hazards? You may save a life by telling your story. Sign it if you wish.

SAVE A LIFE—SEND A "NEAR MISS"

WHY WEAR A G SUIT

by S/L J.H. Murray

THE ANTI-G-SUIT is a device designed to combat the effects of positive "G" stress in the human body. Positive "G" is experienced while an aircraft is either pulling out of a dive or banking in a turn. During these manoeuvres there is a feeling of induced heaviness as one's weight multiplies enormously. Every movement becomes clumsy and infinitely slow. If this "G" force is permitted to act on a body in sufficient strength, or for a period of time, the following conditions will result:

- Fatigue
- Mental confusion—poor judgment
- Loss of peripheral vision
- Loss of central vision—blackout
- Unconsciousness

It is quite apparent that any of the above conditions will reduce the efficiency of an aircrew member—even to the point of being hazardous to life. A brief consideration of the body's reactions to positive "G" will help us to see how the above effects are induced and how the G-suit combats them.

*

The arteries and veins between the heart and legs may be considered as tubes filled with fluid. As in any such tube, the fluid exerts a pressure against the sides and bottom of the tube which is proportional to the height of the column of fluid, to the density of the fluid, and to the "G" force acting on the fluid. Thus, when a man of average height is standing erect, the pressure on the walls of the arteries and veins at ground level exerted by the weight of blood above them is almost two pounds per square inch. This is the pressure exerted by normal gravitational attraction of 1 "G". If during flight a person is subjected to 5 "G", the pressure imposed on these blood vessel walls may be close to 10 pounds per square inch. These walls are not made of glass or metal—they are composed mainly of muscle. In order to resist applied pressures the muscles must contract; under high "G" stress the large muscles of the legs and abdominal wall also contract in order to support the blood vessels and prevent distension of their walls. Muscular contraction in any form constitutes work and work is fatiguing. So much for the first-mentioned effect of "G"—fatigue.

*

Now, if the efforts of these muscular contractions are insufficient to overcome the pressure of the fluid within the blood vessels, then their walls will be distended and their volume increased and blood pooling will result. Once blood becomes pooled in the legs it cannot be

S/L J.H. Murray

THE AUTHOR

S/L Murray has been with the Flying Medical Establishment of the Institute of Aviation Medicine since Aug 53. His home town is London, Ontario. He first enlisted with the RCAF in Jun 42, graduating as a navigator from 1 AOS, Malton, in Apr 43.

He joined 77 Sqn RAF in Mar 44 and flew in Halifaxes. Shot down over Denmark a month later he evaded capture, escaped to Sweden, and returned to the U.K. in May 44. By September he was with 428 Sqn, RCAF, flying Lancasters. He completed a tour of operations in Mar 45.

S/L Murray returned to the University of Western Ontario to finish an education that had been interrupted by the war. He graduated with a B.A. in 1946 and went on to his M.D. degree in 1950. Re-enrolling in the RCAF in 1949 he subsequently did a tour of duty as SMO, RCAF Stns St. Johns, P.Q., and Aylmer, Ont., prior to joining IAM.

returned to the heart and so will not be pumped to the head. A continuous lack of an adequate supply of blood to the retina of the eye and to the brain will bring about loss of peripheral vision and blackout, and mental confusion and unconsciousness. Needless to add, all of these symptoms will reduce a pilot's efficiency.

Aircrew members are often given to claiming that they do not need anti-G-suits because they never pull enough "G" to black themselves out. The man who makes such a statement is overlooking the fact that ill effects of "G" stress may occur at "G" levels below those required to produce complete blackout. First there is the loss of peripheral vision—vision out of the corner of your eye. Without it the amount of information reaching the brain through the eye will be greatly reduced, consequently decreasing the pilot's awareness of his surroundings. This reduction of efficiency is all the more hazardous in that it may go unrecognized. Similarly, at sub-blackout "G" levels, the blood supply to the higher centres of the brain may be so reduced as to impair finer degrees of judgment. This condition results in faulty decisions which may go unnoticed because self-criticism itself has also become faulty. Finally, the muscular effort required to withstand recurring "G" stress is so tiring that the result is again reduced efficiency.

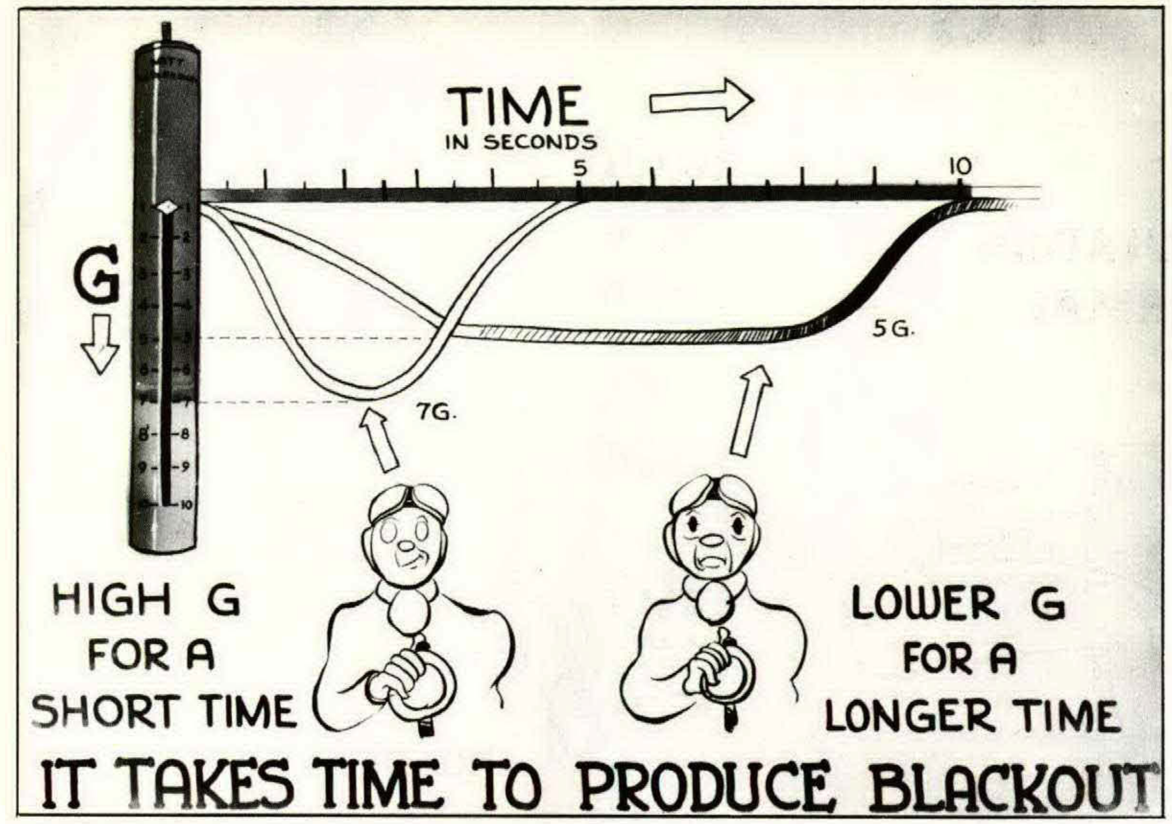
*

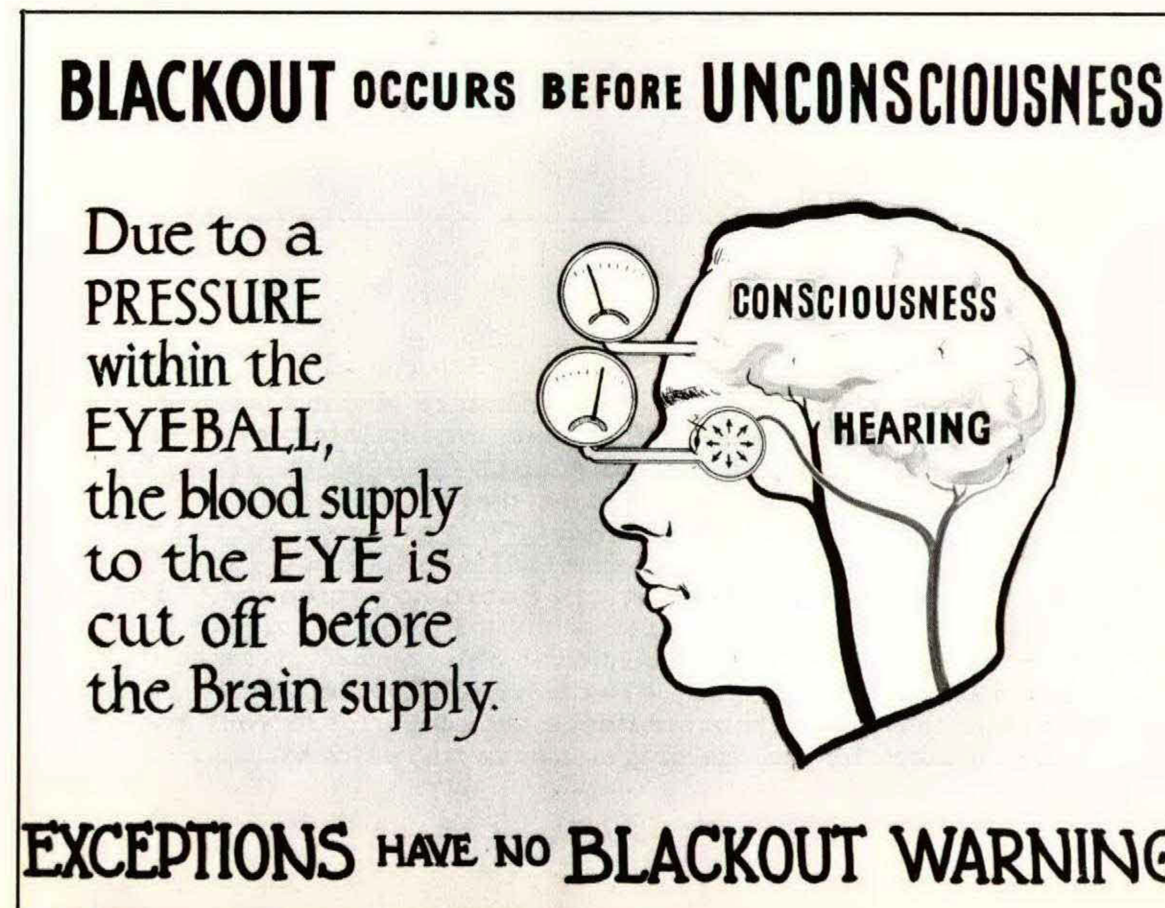
As with a parachute, a G-suit in an emergency may be a life-saver. Although a pilot may fly for many hours without ever having to use a parachute, he nevertheless continues to wear it in case of emergencies. A G-suit is worn for precisely the same reason.

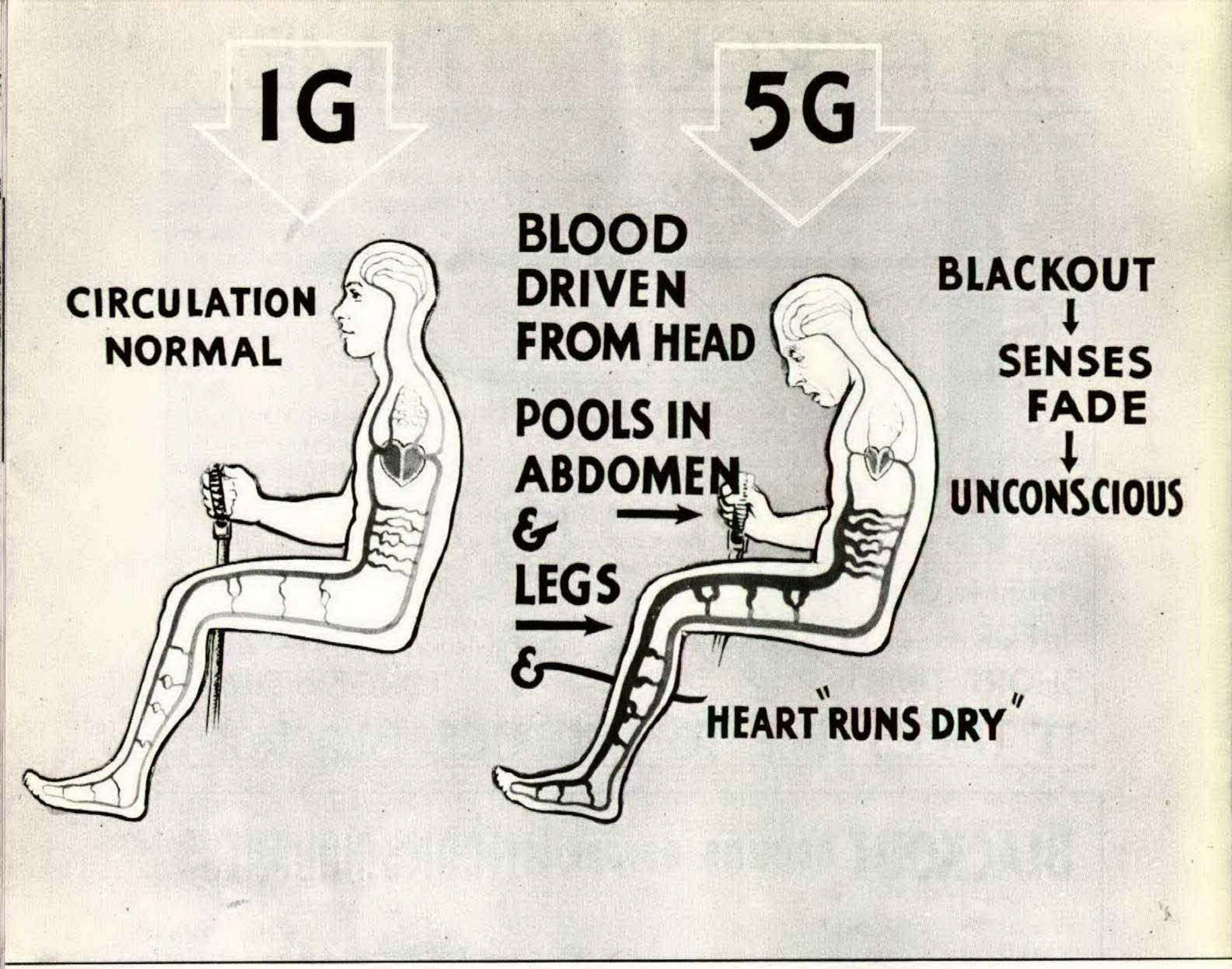
The pilot may fly many hours at sub-blackout "G" levels when he does not require his suit. But then one day it happens. Picture it. You're in a tight spot. You have to make a violent manoeuvre. During it you pull more "G" than you could ever normally stand. But either you don't black out at all or you don't black out long enough to crash and kill yourself. Because you were wearing that suit, and because that suit enabled you to pull more "G" than your body could possibly endure by itself, you stayed on the happy side of the fatal statistics ledger. Remember that a person's normal "G" tolerance is unpredictable because it may vary widely from day to day. Slight illnesses such as a head cold, upset stomach, or hang-over may reduce tolerance sharply and produce blackout at levels far below normal. Fatigue, lack of sleep, and an empty stomach are three other factors that will seriously cut down your tolerance. It is in abnormal situations like these that the protection of a G-suit will make the difference between a successful flight and failure.

Just how does a G-suit operate for your protection? Briefly, it counteracts the effects of "G" by producing, against the legs and abdomen, a pressure to balance the increased hydrostatic pressure of the

BLACKOUT TIME



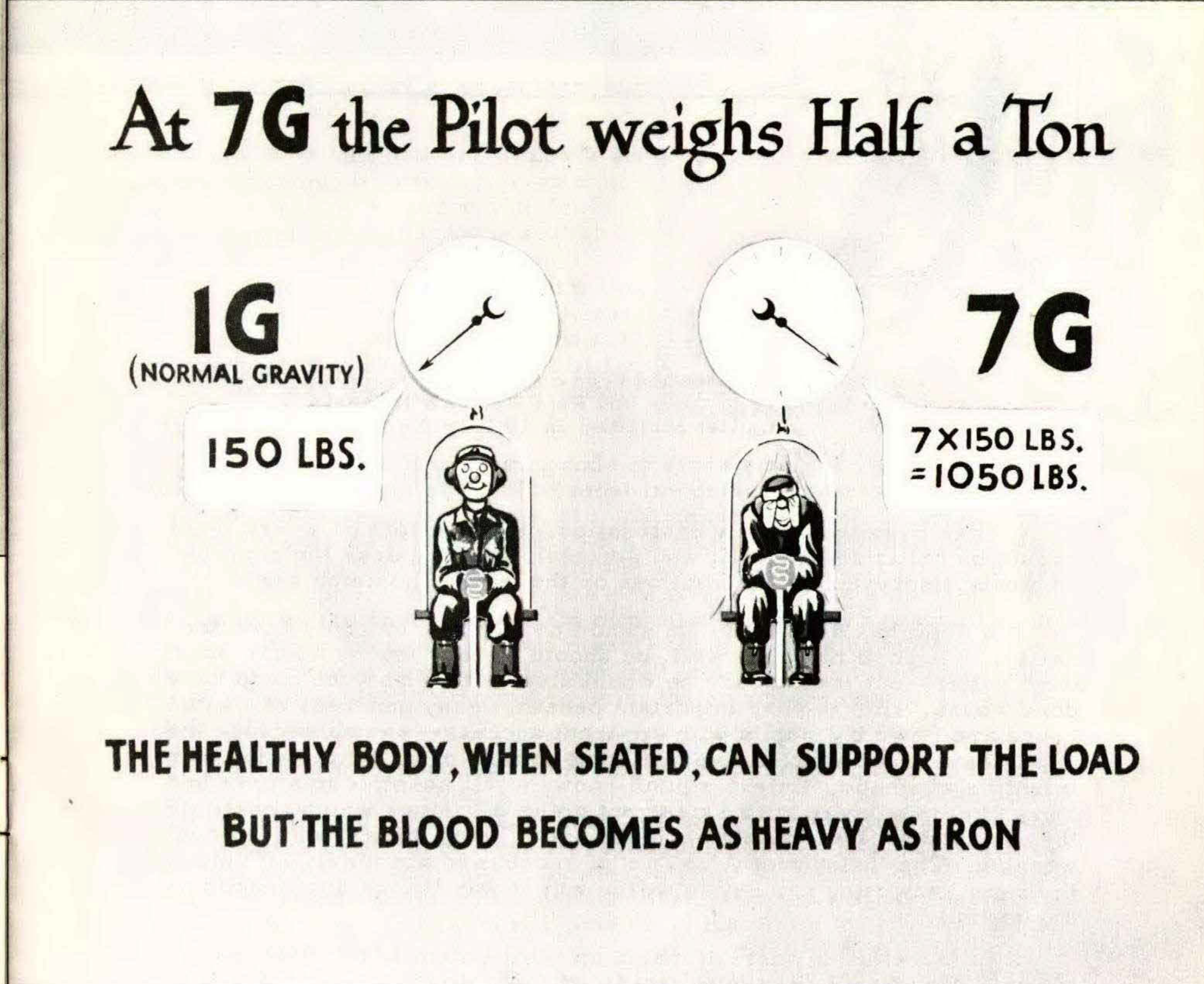


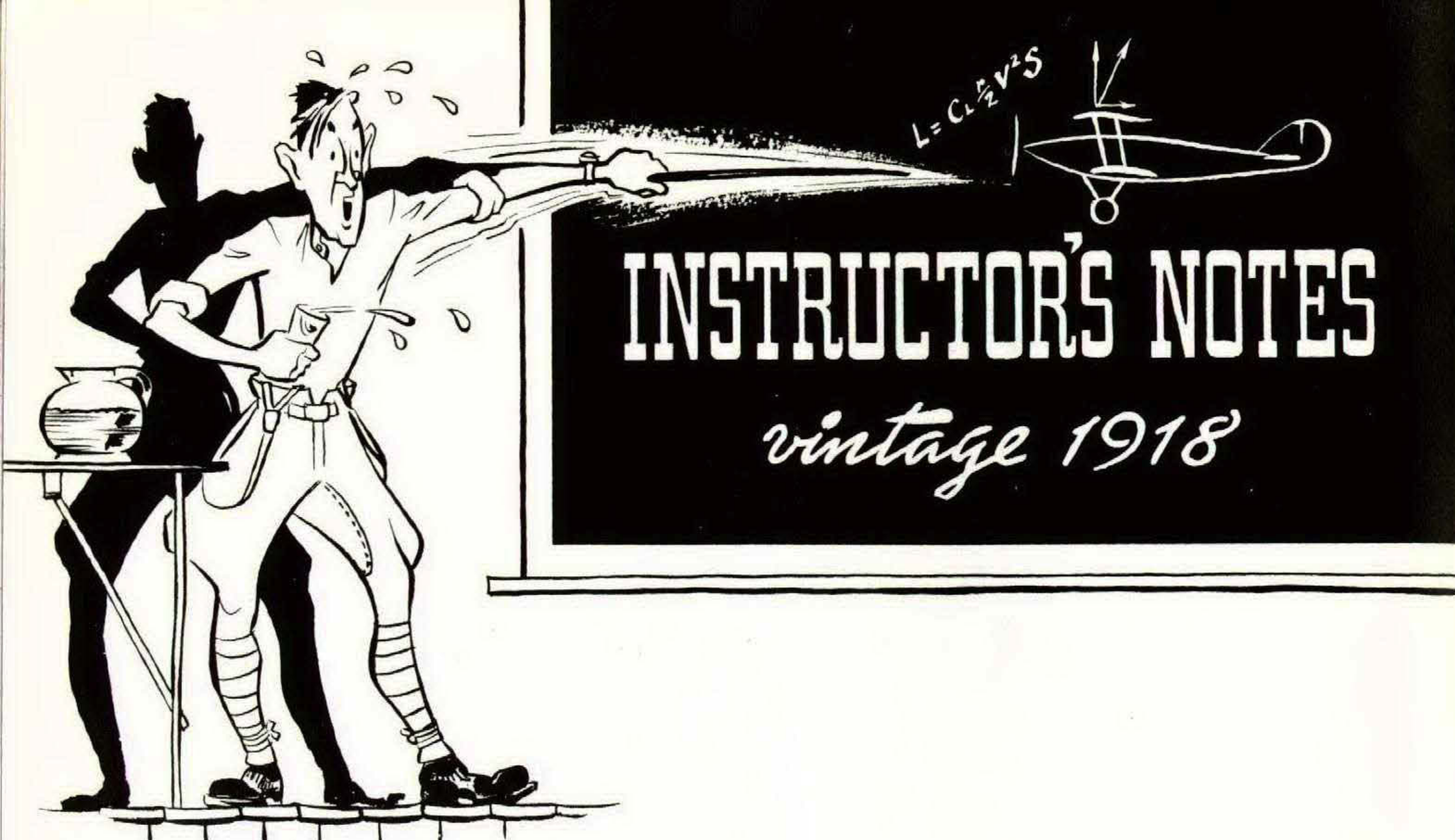


blood within the blood vessels. The pressure within the suit rises automatically with an increase in "G", thus maintaining the resistance required to prevent distension of the blood vessel walls and pooling of the blood. External pressurization makes it unnecessary for the muscles to do the work of combatting "G" forces. By this means muscular fatigue is avoided. To be fully effective, a G-suit must be properly fitted. If it is too loose it will afford no protection. The only safe bet is to have your suit fitted by a Flying Personnel Medical Officer or a Safety Equipment Technician who has been trained for the job. On the initial fitting, some slack should be left in the lacing adjustment so that, as the suit stretches and conforms to your body, the slack may be taken up and the original snug fit restored.

*

Use your G-suit. It was designed to protect you from fatigue, mental confusion, poor vision, blackout and unconsciousness—the conditions which occur normally when the human body is exposed to positive "G" forces. A G-suit will increase your efficiency in the air—and it may save your life!





INSTRUCTOR'S NOTES
vintage 1918

The following article has been extracted from "A Guide to Instructors and Pupils in the Northern Group", a pamphlet published in 1918 by the Royal Flying Corps.

Criticism is the basis of instruction. Every effort of every pupil should be criticized verbally and dispassionately, unless the pupil has wantonly disobeyed his instructions or the laws of common sense.

If a pupil has done badly, he should be told how he could have done better. If a pupil has done well, he should be told how he could have done better—but in this case he would also be told how he could have done worse. This is very important because many hundreds of wasted hours are flown by pupils with apparent success—wasted because the pupils have unconsciously avoided some dozens of mistakes which they might have made. Unless a pupil knows of all possible mistakes and can give reasons in words for not doing the things which constitute these mistakes, he is liable to make one of those mistakes without warning. The instructional value of success is absolutely nil unless the pupil knows and can say in words why it was that he succeeded and did not fail.

It is therefore a waste of machines and petrol to let solo pupils take off, fly round, and land again at their own sweet will, uncriticized, because with criticism much more value would have been obtained from the flight. The fact that the aeroplane is intact after a solo flight is no proof that all has gone well. The pupil may have made in a small degree (or shown a tendency to make) several mistakes, which could be checked by criticism from an instructor watching from the ground. If he is not checked, the pupil will some day make the same mistake to a greater degree and wreck a machine simply because he did not know that such a mistake was standing ready to be made.

In M.F.'s (the Mills-Fulford 2-seater monoplane trainer), some instructors show a tendency to leave a pupil too long in the back seat so that he may be reassured by seeing that it is possible to fly an aeroplane with two feet and half of one hand. After that, the instructional value of the front seat is much greater than the value of the back seat, and the pupil should therefore be put in front.

A very clear and unvarying code of signals should be arranged between instructor and pupil. The most important signal is the signal for the pupil to leave go and allow the instructor to take full control. No attempt should be made to take the air unless the pupil has practised obeying signals on the ground. In the air, the instructor should not correct the pupil's mistakes by use of the aeroplane's controls. He should make the pupil correct his own mistakes either by signalling to the pupil by touch or by word of mouth, using a speaking tube or trumpet. This method is quite safe over 500 feet high, and immeasurably more valuable than the method of using the aeroplane controls to overpower the pupil.

It is very important that pupils of M.F.'s should not be allowed to get into the habit of doing things which they will not be able to do on other machines. They must therefore be prevented from putting the nose down in order to get into an aerodrome, since this habit will be harmful to them later on. Likewise, a pupil should not be allowed to think that he has achieved unqualified success when he has learned to land a machine on a big aerodrome at an indefinite speed. He should be reminded that he is allowed to do so as a temporary expedient in order to save the M.F. and that he will not be of any use as a pilot until he can land on a particular spot at a particular speed—the slowest.

by

F/O D.H. MCNEILL

Safety and precautionary measures in flying are important at all times to everyone associated with RCAF flying operations. The arrival of winter presents many extreme hazards associated with flying and aircraft handling which can only be reduced or avoided by a thorough understanding of their nature and of the additional safety and precautionary measures necessary to neutralize a potential danger. This article is an illustration of how these hazards are tackled at 105 Communication and Rescue Flight.

AIRPORT MAINTENANCE

During the winter of 1953-54, snow conditions did not at any time delay operations at Namao Airport. Runways were cleared immediately after every snowfall. The constant use of heavy, front-mounted brooms kept both runways and parking areas bare most of the time so that ice had very little chance to accumulate. On the few occasions when runways did become icy, the temptation to use sand and cinders was resisted because of the damage these materials could do to the turbines of Namao-based jet aircraft. Various types of jet fighters used the field all winter with little or no trouble, carrying out regular precautionary landings whenever conditions were icy.

Throughout the winter months it is important that the control tower operator be provided with an up-to-the-minute assessment of braking conditions so that he may pass on such information to incoming aircraft. Pilots can be of real assistance here by informing the tower of the braking action encountered on each landing. Another sound practice is to extend and widen the runways when ploughing. In the event of an undershoot, overshoot, or groundloop, this additional clearance could mean the difference between a major and a minor accident. The same prudent foresight will demand the proper marking of runways, taxi strips and parking areas. The edges of these should be outlined with spruce trees, preferably one at each runway light and across both ends. Besides defining runways these trees are of great value to a pilot in providing him with reference points for landing in "whiteout" conditions.

HOAR FROST

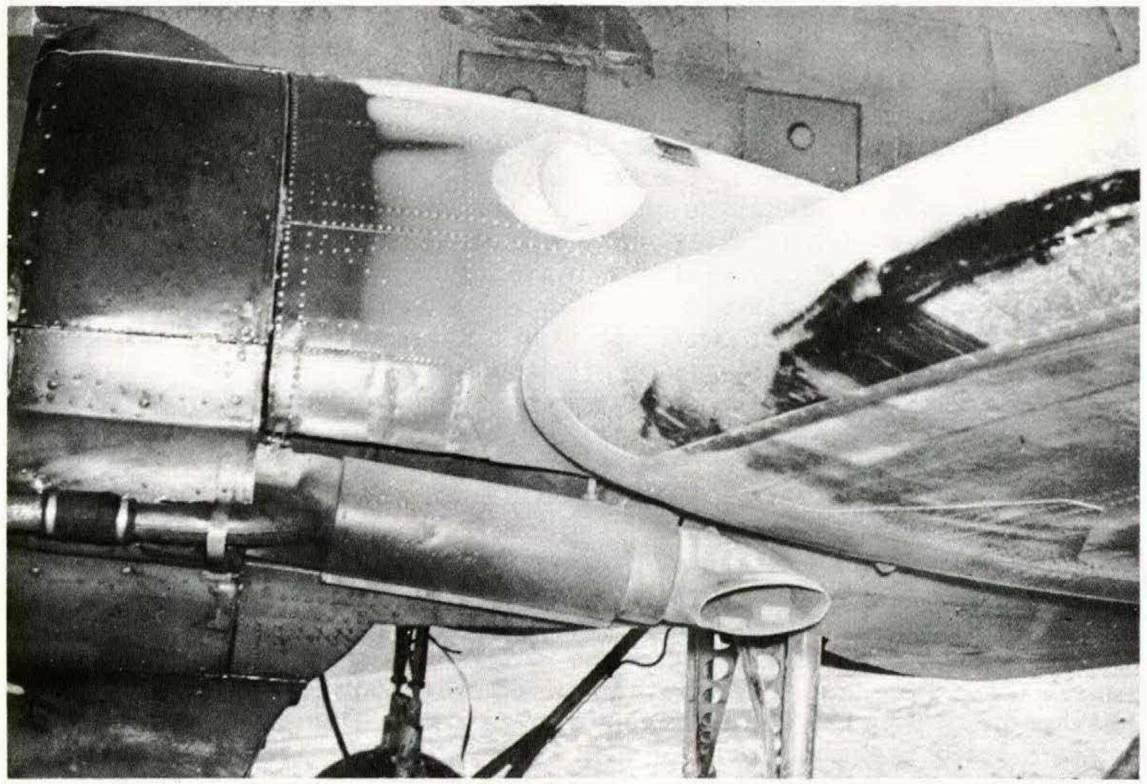
Despite continued efforts to impress on aircrew the dangers of ice, snow and hoar frost accumulation, many pilots still ignore the warnings and blissfully take off into the blue with their aircraft coated in hoar frost or snow. Two recent accidents in this area occurred when these hazards were ignored. The pilots involved were both experienced flyers. Their aircraft stalled and crashed on takeoff. One of them had been parked outside and was covered with hoar frost; the other was taken from a warm hangar into a heavy snowfall, with the temperature just at freezing level.

F/O D.H. McNeill

THE AUTHOR

F/O McNeill is at present a pilot with 105 Communication and Rescue Flight at Namao Airport, Edmonton, Alberta. He is engaged in flying operations on Expeditors, S-51 Helicopters, ski- and wheel-equipped Dakotas, and Otter and Norseman aircraft on wheels, skis and floats.

F/O McNeill was born in Yorkton, Saskatchewan. He enlisted with the RCAF in January of 1942 and after graduating from SFTS, Yorkton, he served as a staff pilot at No. 1 CNS, Rivers, Manitoba, until he left the Service in 1945. He re-entered the RCAF in November of 1951 and since then has been with 105 C&R Flight.



During the winter months it will often be impossible to obtain hangar space, and therefore the use of wing and tail covers should be mandatory. These covers are best made of light materials (preferably nylon) and equipped with ropes and fastenings which can be easily handled in cold weather. At this unit the fastenings consist of a steel hook and a large steel loop, rubber parachute cord being used in place of rope. To protect aircraft surfaces the hook and loop are covered with a small felt "mitt". With the full crew co-operating it is an easy matter to put these covers on within five minutes.

When snow, frost, or sleet freezes to an aircraft—even in a minute quantity, it must be removed before takeoff. This is best effected with stiff brooms and a generous dose of alcohol. Another method is to sling rough ropes over the wings, tailplane or fuselage and then run them back and forth until the surfaces are clear. Any loose snow adhering to the wings must be brushed off because the slipstream may not remove it during takeoff, and its presence will dangerously increase stalling speed. A careful check must also be made to ensure that no ice or snow formation has jammed the controls or is likely to jam them in flight.

Remember: Even if an aircraft has been hangared, hoar frost is liable to form when it is brought out into the cold air. Use caution in bringing an aircraft from a warm hangar into a snowfall. If possible,

leave the hangar doors open long enough to cool the aircraft to the outside temperature. Examine those control surfaces. Ice and snow may immobilize them despite the use of wing and tail covers. Your aircraft should be aerodynamically clean when you take off. If there is any doubt in your mind as to its fitness, or if you feel there is danger of ice reforming, then stay on the ground.

COLD WEATHER SERVICING

Dakota and Otter aircraft are used by 105 C&R Flight in its northern winter operations. Following is a resume of the methods employed here in operating and maintaining these aircraft successfully despite the rigors imposed by intense, prolonged cold.

Because the explosive range of saturated fuel vapor present in partially-filled fuel tanks lies between -10°C and -40°C, there is a distinct danger of explosion during refuelling. Static electricity can be easily induced by such action as removing wing covers or sweeping wings; and there is always the possibility of a spark from the electric refuelling pump. It can be seen therefore that great care is necessary during refuelling. Throughout the process a fire guard stands by in case of emergencies. As for the components involved in the task, synthetic rubber hose is very apt to break or crack and has therefore been found unsatisfactory. Only a good grade of rubber hose is used for refuelling operations. Flashlight batteries exposed to extreme cold will last only a few minutes so that, for illumination, we carry a long extension cord and lamp which can be hooked up at the A.P.U.

Spare oil is kept in the aircraft adjacent to heaters. In the event of an overnight stop we remove it and store it in a warm building. Five-gallon oil containers are used in winter as they are quicker to heat and easier to handle. The oil may be poured directly into the engines rather than pumped through a hose, because even warm oil will congeal quickly inside a hose in cold weather. Personnel servicing and repairing aircraft must wear heavy clothing and should not expose themselves for more than short periods. When it becomes necessary to work a longer time, we invariably rig a shelter utilizing a tarpaulin or an engine or wing cover. The unit is then heated with a Herman Nelson or a blow-pot.

COLD WEATHER FLYING

One of the most common conditions encountered in the Arctic is "whiteout"—a state wherein, despite good visibility, a high overcast blends with the endless snow- and ice-covered tundra causing the horizon to disappear. This condition is most dangerous when one is flying low on a supply drop or making a landing. The horizon may disappear with surprising suddenness, and, as it is impossible to judge height over the open snow, the pilot may quickly lose control. He must learn to recognize this condition and be prepared to go on instruments as soon as it is encountered. Landing during a whiteout calls for a power-on approach, reduced air speed, and a rate of descent of no more than 150 feet per minute. Blowing snow is an everyday hazard in the Arctic. It can quickly reduce ceiling and visibility to zero and the effects are similar to whiteout. Forecasts should be carefully noted for predictions of strong winds, the almost certain fore-runner of blowing snow.

*

If a landing is to be made at a strange place where there is no prepared strip, it is advisable to have someone on the ground mark one out by any means possible. Fuel drums and spruce trees are satisfactory for this purpose. If these are unavailable, then orange smoke generators might be dropped from the aircraft. After an area has been selected for landing, one generator may be dropped to assess the wind velocity. Another run will serve for dropping approximately five generators in a row to provide a good landing path and reference points for judging height. These generators are of eight minutes' duration and should be dropped from the cargo door by a crew member using the aircraft intercom to guide him. Ordinary black soot, funnelled out the cargo door, can be used to mark out a landing path. It will also indicate any rises and depressions on the landing surface.

Selection of a suitable landing spot in an uninhabited area presents a problem. Ice strength varies and a good rule of thumb is a requirement of one inch of ice for every thousand pounds of weight—with six inches as the minimum. Sea ice in early winter calls for twice this thickness. It is never advisable to land on sea ice unless the approximate thickness is known. Cakes of ice as much as thirty feet high are often found on the surface of sea ice when they may not be discernible from the air. Sheltered bays and smaller lakes are generally the best landing areas but successful wheel landings have been carried out on the gravel ridges found along the shores of some of the Arctic Islands.

The use of wheel versus ski-wheel equipped Dakotas in the Western Arctic areas served by 105 C&R Flight has been given careful study. One of our main arguments against the use of skis on Dakotas is that, where so many long trips are involved, the extra weight of skis, the reduced air speed, and the limited number of refuelling points unite to cut

down considerably the effective range of the aircraft. Fortunately the prevailing westerly winds in the Western Arctic pack the snow so tightly that by the first of January it is unusually firm. The pilots of 105 are of the opinion that wheel Dakotas can be successfully used in the western area of the arctic from the first of January on. Wheels sink very little in the hard-packed snow and the many drifts are not high enough to impede our aircraft.

Here are a few examples of locations and landing areas used by this flight in the operation of wheel-equipped Dakotas. A trip to Desalis Bay on the southern tip of Banks Island was carried out in mid-May and landing made on a lagoon. There was some difficulty in turning the aircraft around—an obstacle that could have been avoided if power had been applied and a 180° turn made before the end of the landing run. On another occasion—it was early May—landing was made on a sand bar in Sacks Harbour on the west coast of this same island. Snow was so firmly packed that the wheels sank in only a few inches. On still another flight (this time in mid-January), the aircraft landed on sea ice in a narrow bay off the west coast of a small island, 125 miles southwest of Cambridge Bay. Small drifts were encountered but proved to be no problem. A 180° turn was made before the end of the landing run and the Dakota returned to the touchdown point without trouble.

These examples demonstrate the feasibility of wheel operations in the Western Arctic and also provide a picture of the types of terrain on which landings can be effected safely. We recognize, of course, that it may be impossible to carry out similar operations in the Eastern Arctic and further south, where snow on the lakes is quite deep.

SNOW TAKEOFFS, LANDINGS AND TAXIING

Snow takeoffs are made in a tail-down position, the aircraft being held level after takeoff to permit air speed to build up. Landings are handled in a tail-down attitude also, a power approach being used all the way. If the alighting area is unknown or deep snow suspected, power is applied right after landing so that the aircraft can do a 180° turn and retrace its landing path to the touchdown point. This precaution reduces to a minimum the chance of getting stuck.

Several incidents of damaged tail wheel assemblies have occurred on both RCAF and civilian operated Otters. The pilots of 105 C&R Flight have found, when operating these aircraft on skis, that it is expedient to raise the tail ski as soon as possible on takeoff. This procedure does not increase the takeoff run and definitely eases the strain imposed on the tail structure. For the same reason it is advisable to make ski landings in a tail-up attitude and to hold the tail ski up during the landing run.

We also recommend full carburettor heat for landings in the Otter at temperatures below $0^{o}F$. Momentary loss of power is more than compensated for by the awareness that, if overshooting becomes necessary, the engine will respond at once to the throttle. It has been found that if carburettor heat is applied on final but returned to cold before touchdown, the engine will react sluggishly to the application of overshoot power and in most cases will backfire.

Handling the Otter on skis in confined areas can be best accomplished by taxiing at a walking pace and allowing the crewman to steer the aircraft by the use of a rope attached to the tail ski. Great caution must always be used. If there is any doubt in the pilot's mind of his ability to maintain control in strong winds, on icy surfaces, or in other adverse conditions, he should not hesitate to shut down. JATO units should always be carried on Dakota aircraft if there is a possibility of running into heavy snow conditions while operating from unprepared strips. Because these units lose a great deal of their efficiency in cold temperatures, care should be taken to see that they are carefully stored in a place where the temperature will not drop below freezing.

Needless to say, it's a good idea to carry a good pair of sun glasses at all times. The human eye was not designed to stand the blinding glare from snow and sky that is a characteristic condition in the Far North during winter months.

WEATHER INFORMATION

Our unit is fortunate in having a specialist team of Arctic forecasters based at Edmonton with whom arrangements can be made to have forecasts sent to any point in the north for any required period of time. It is advisable to place requests early so that the forecasters will have sufficient time to gather all information from their far-flung reporting points.

Although these forecasts are generally quite accurate, it is difficult to give a precise prediction as to the conditions to be expected at any specific, isolated location because of the limited number of reporting stations in many areas. In view of this, pilots proceeding to isolated areas may elect to carry on with a flight despite adverse weather forecasts for destination, as long as they carry an adequate fuel load and are assured of a suitable alternate airstrip with homing facilities. A great deal of time can be wasted waiting for a favourable forecast for destination and there is always a good chance that the weather will be satisfactory. On one occasion an aircraft from this flight was held at Norman Wells for three days, waiting for a suitable forecast for a point on Banks Island. When the flight was finally made on the fourth day it was found that the weather had been clear for the previous four days on Banks Island.

NAVIGATION

Map reading becomes a ticklish problem when one gets above the tree line. Everything is an endless expanse of snow and rocks and the outlines of lakes all appear to be the same. The best method of map reading in this area is not to try and pick out every detail but to concentrate on large lakes, rivers and coast lines which show up moderately well. Dakota pilots ought to have a set of their own maps, read them at all times, and pass information along to the navigator. Because of the need for using grid navigation, the weather is unsatisfactory from the navigator's point of view unless he can see the ground or sky for at least two-thirds of the trip. In twilight periods it is best to be flying in VFR conditions the whole time.

The gyrosyn compass has proved itself almost entirely accurate but making constant heading checks with the Astro compass is a wise habit to adopt. The pilot of an Otter must be an expert map reader and should also be proficient in the use of both the Astro compass and the sextant. Due to the limited range of Otter aircraft, a pilot is well advised to remain VFR at all times. If bad weather is encountered and a 180^{o} turn is not possible, or if one is in doubt as to his position, then the soundest course is to land and establish position with a sextant when the weather clears.

The radio compass is still a faithful friend but one should remember that beacon facilities in the north are limited. Some northern ground stations employ CW frequencies in the low frequency band (mostly 100-200 kcs). If these stations are alerted beforehand, this frequency can be used effectively

for homing where no beacons are available. In cases where beacons are listed as "available on request", confirmation should be obtained prior to takeoff that they will be turned on.

CLOTHING AND SURVIVAL

All personnel have access to the necessary winter clothing and survival gear and it is one's own responsibility to see that his kit is complete and that it accompanies him on all trips. Adequate clothing should always be worn when one leaves an aircraft to attend to refuelling, unloading and similar tasks. It is foolhardy to go out in sub-zero temperatures inadequately clothed. Painful frostbite may easily result and will impair your efficiency. Before an aircraft departs it is the captain's job to check that his crew and passengers are properly equipped and that a full complement of survival gear and rations is on board.

The majority of aircrew either have been or will be given a survival course. This valuable training (together with keeping in mind the points we've included here from our own experience) should make survival a certainty in the event of a forced landing. One last word of caution: We believe at this unit that when an emergency rises in northern areas the aircraft should never be abandoned unless such a move is unavoidable because practically all the equipment requisite for survival is carried in the aircraft.

* *

THE HAZARDS INHERENT in northern operations cannot be sidestepped. However, careful study of the many problems and their potential solutions should enable us to reduce these hazards to a minimum. The pilot who understands the difficulties ahead of him and painstakingly lays out his plans in detail before proceeding, will doubtless still be with us come spring.

PXing

LETTERS TO THE EDITOR

APATHY AMONG THE TROOPS?

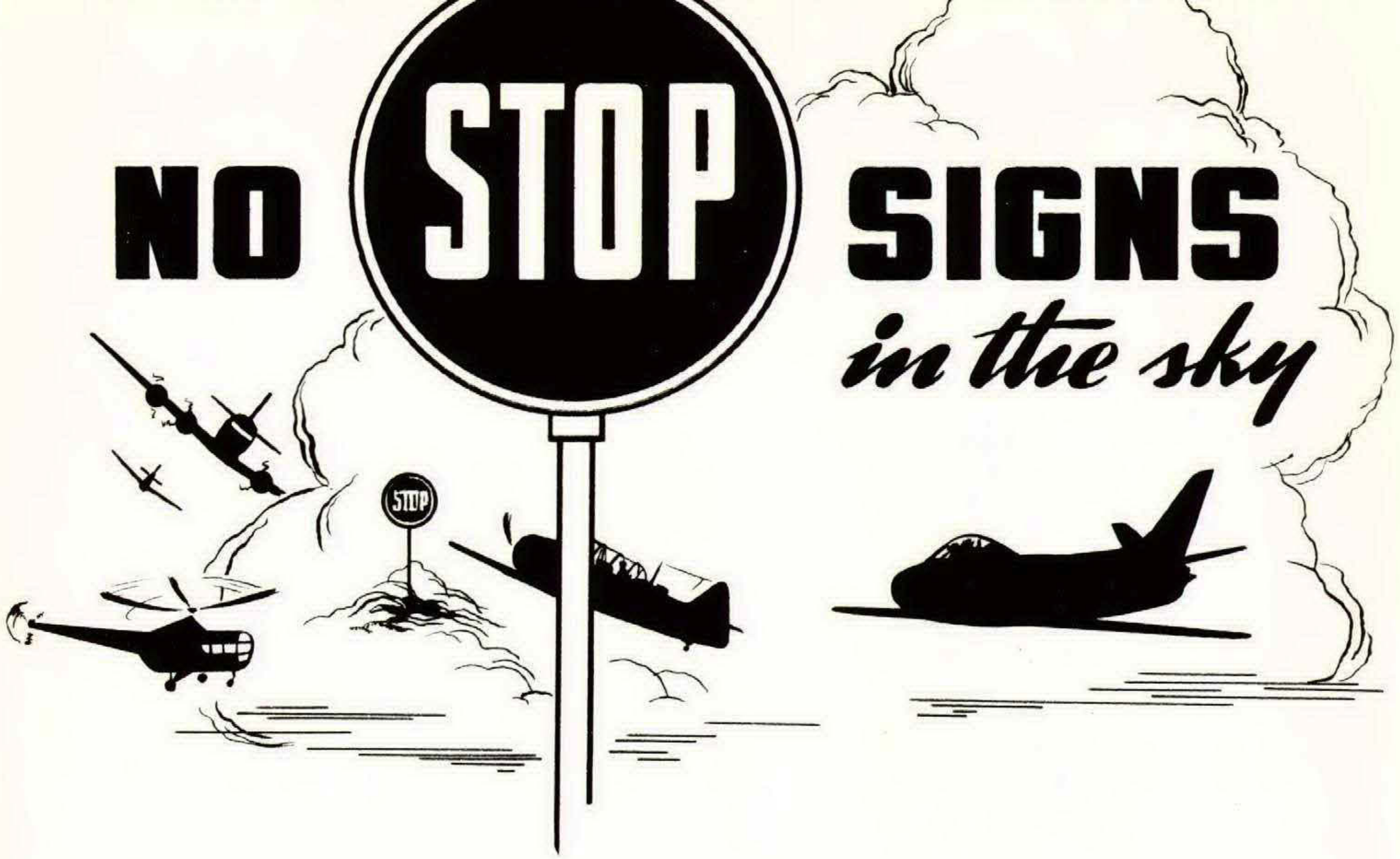
WHEN FLIGHT COMMENT sallied forth on its maiden voyage to the field in the first quarter of 1954, this page carried a real challenge. We literally begged for your comment and criticism "on all subjects having any connection whatsoever with Flight Safety". Our plan in canvassing your opinions and suggestions was to ensure that the new publication would be a joint product of the field and AFHQ. If FLIGHT COMMENT fails to measure up to the demands and expectations of our readers, then the entire venture is pointless. Unless we serve you we serve no one.

By now you will surely have guessed what happened. We were hardly snowed under. We received two letters. Two. Where are all the guys who keep yelling, "One of these days I'll put AFHQ straight!" or "I'd like to give headquarters a piece of my mind!"? We expected to get at least mildly blistered and a little roughened up. You're too good to us, lads. You've left us to infer that we've created the only flawless Flight Safety magazine in all Creation. It makes us feel terrific. Buy you a drink?

This is a complaint, all right—but we should qualify it because 50% of the letters reaching us (the one just mentioned) did exactly what we were hoping: caused a stir. The author was W/C D.D. Cunningham, CTechO at 6 Repair Depot, Trenton. He dealt provocatively with the article "Storage and Handling of Jet Fuels", which appeared in the first quarter issue of FLIGHT COMMENT for 1954. Considerable discussion was stimulated by his queries and we decided there was too little space in PX-ing to deal adequately with the correspondence generated.

So keep an eye out for "Static Phenomena" in the fourth quarter 1954 FLIGHT COMMENT. It will incorporate W/C Cunningham's questions and an interesting look at static through the eyes of the Directorate of Materiel Maintenance. In the meantime, drop us a line. We would still like to have your views on what this magazine should accomplish. You send us the pattern and we'll tailor the suit.

NO STOP SIGNS *in the sky*



Stop signs and other traffic warning devices are used extensively to prevent collisions on our roads. We have all seen them—and the wise among us heed their warnings. In the sky there are no such devices to warn of danger. A man's safety upstairs depends largely on two factors: his respect for air traffic rules and his use of a lot of common sense.

Collision with other aircraft will always be a potential flying hazard and the responsibility for avoiding it lies with pilots. Strangely enough, statistics prove that most collisions have occurred by day, in clear weather, when one would least expect them. Obviously, then, it is vitally important for pilots to be aware of all aircraft in their vicinity—a condition which makes continuous lookout absolutely essential. How easy it is to have a collision if one pilot is occupied within the cockpit and the other's vision is obstructed by blind spots—a compass, a wind shield brace or a radio mast!

No relative motion is apparent to the pilots of two aircraft flying a collision course. This fact is menace enough by itself; but if an aircraft on a collision course is also behind a blind spot, then it will never be seen unless someone is keeping a very thorough lookout. The rates of closure are startling. For example, a T-33 and a Mitchell flying head-on along a collision course will cover a mile every 7 or 8 seconds. Not much time to think, let alone change course! Aircraft in a climb or descent are particularly vulnerable to collision. A sound

precaution is to change heading periodically—10° on either side of a course, so that a scrutiny can be made of the air space lying ahead. Altering course in this way will also momentarily shift blind spots and possibly reveal unseen aircraft.

With these problems in mind, the following anti-collision precautions will serve as an example of the safeguards which constitute safe flying:

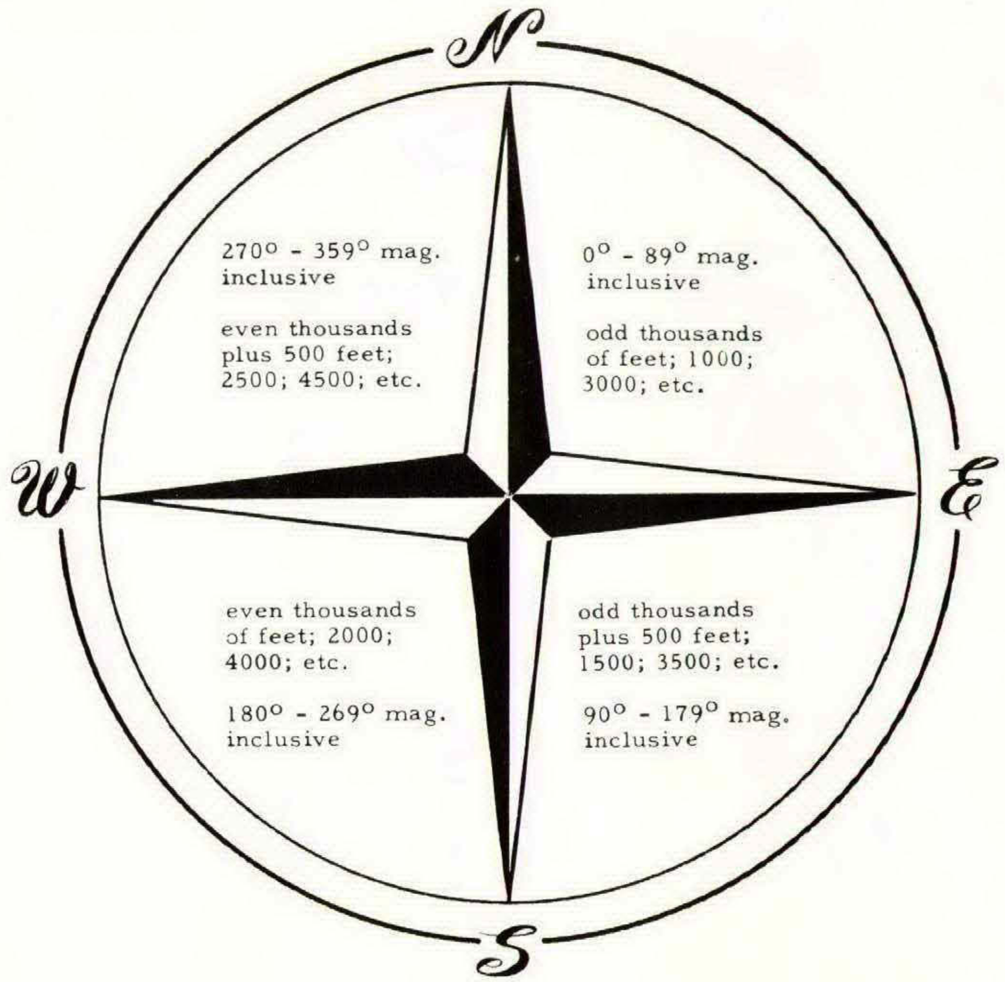
CONTINUOUS LOOKOUT - Keep a continuous lookout whenever and wherever you're flying. Climbing away from an airfield, forget about your paper work until you are out of the congested area and have reached your cruising altitude—or at least until you are above normal traffic. The same treatment applies with equal importance when you are descending into a congested area.

CIRCUIT TRAFFIC - While the normal circuit is to the left, some airfields vary their traffic pattern to keep aircraft from flying over populated areas. The same procedure is used where a double circuit is being operated to handle jet and piston aircraft separately. Always ascertain circuit direction prior to entering the local area. The hazard of flying against a circuit surely needs no emphasis. Once in the traffic pattern, keep an eye out for warning signals from the ground and KEEP CHECKING THOSE BLIND SPOTS.

OVER-FLYING AN AIRFIELD - Whenever you fly past an airfield, ensure that you are well above circuit height or at least well out of the traffic pattern.

FLYING THE AIRWAYS - The airways are the nearest things in the air to our highways, and traffic is increasing in density all the time. While they are used by both IFR and VFR traffic, only the IFR traffic is controlled. Clearances are issued solely on the basis of known IFR traffic. The controlling agency (ATC) cannot and will not accept responsibility for VFR traffic on airways. It can be readily understood that IFR-controlled traffic and uncontrolled VFR traffic on the same airway could provoke a serious situation. Where visibility is good and the ceiling high, the difficulties are markedly reduced. Whatever the conditions, the smart pilot keeps his eyes open all the time and flies at assigned altitude or that appropriate for his direction of flight. When the ceiling is low, VFR traffic is naturally confined to a shallower air space. The result is a greater density of traffic and a consequent increase in the chances of collision. However, if pilots obey airways flying rules, the dangers are held to a minimum. VFR limits are imposed for the benefit of all—the very least pilots can do is abide by them.

CLOUD CHASING - This is a well-established pastime and can be fun if you have no imagination. Whenever a pilot plays that little game he should keep in mind that someone else may have exactly the same idea about that particular cloud.



(TRACKS MAGNETIC)

PRACTICE CLOUD-FLYING - Practice cloud-flying is essential if one is to become a proficient pilot, but this type of exercise should be performed only in the practice area. Pilots should obtain clearance from their local control before entering the cloud—and, once in the cloud, remain within the allotted air space.

WINDSHIELD - Always insist upon a clean windshield and windows before starting a flight. Dirty windshields and a course directly toward the sun are a deadly combination where visibility is concerned. Dirt will reduce visibility and increase the number and size of blind spots. A word of caution in the use of so-called "blind flying" equipment is necessary. A good lookout is essential and pilots should ensure that the Lumerith is clean and free from scratches or vision through it will be impaired.

NIGHT FLYING - The collision hazard is greater at night because of reduced vision and many conflicting lights on the ground. A pilot should make sure that his own navigation lights are serviceable and operating, for without them he is himself a major hazard. He should never assume that all steady lights in the sky are stars. Someone's flasher unit may be unserviceable—or it may be an aircraft that is not regularly equipped with one. If a light changes bearing or increases in brilliance you have company and must keep the whereabouts of another aircraft in mind. Should the light not change bearing you are on a collision course and evasive action is indicated. Interior lighting should be kept to a minimum. If the aircraft is equipped with red lighting, then it should be used exclusively. Finally, when flying off airways stick to the altitudes laid down for Quadrantal Headings.

The ingredients of intelligent, anti-collision insurance are basically two: Common sense and compliance with a few simple rules. For a long life and a pleasant old age, keep those eyes open, that head turning, and that brain working.

WHY THE COLORS

Your A.I. Briefs are issued in two colors—red and blue. Ever wonder why? Well—in the RCAF, injuries resulting from aircraft accidents are rated in severity by color code. White means "No Injury", Blue indicates "Minor or Major Injury" and Red denotes "Fatal". Since we're unable to use a white border on a white sheet too effectively, the blue briefs occasionally deal with accidents in which there were no injuries.

Incidentally, all A.I. Briefs are produced by DFS from two sources—actual accident files and the records of its statistical section.

Winter Accidents

DID YOU KNOW that winter flying conditions during 1953-54 were a major contributing factor in 48 of the RCAF accidents which occurred in the winter period? And that figure is almost 50% higher than the total number of similar accidents reported during the same period in 1952-53! The fact that roughly the same number of flying hours were logged for the two periods indicates that accidents occurring in winter can and should be substantially reduced.

*

Pilots will be most interested in HOW these accidents happened. Because "forewarned is forearmed", knowing the causes of these mishaps before the 1954-1955 winter closes in will help to keep us all out of trouble between now and spring. The ideal—the performance peak we should aim at—is an accident-free winter. Without the co-operation of the individual pilot, however, we're licked before we start—a conclusion confirmed by the accident statistics section of DFS. For in "stats" we discovered that the human element—the man in the driver's seat—is still by far the most potent source of winter flying accidents.

Among major contributing factors, the one in the lead was "icy runways and taxi strips resulting in poor braking action". This menace showed up in 37% of these accidents during the winter of 1953-1954. Handled with kid gloves, ice may not turn on you. Mix it with poor

judgment or carelessness though, and BANG!—well, you've just read it: 37%! Harsh application of brakes, poor drift correction, landing too far down the runway—add ice to any of these and you're in for trouble. The "ounce of prevention" lies in touching the brakes lightly and intermittently rather than slamming them on; and the intelligent pilot goes around again when he sees he's getting short of runway.

Runner-up to the ice factor was "poor visibility" which contributed to 17% of these accidents last winter. Detailed weather checks should be made prior to every flight—IFR or VFR. The pilot setting out on a VFR trip should also make certain that his flight will be completed under VFR conditions. If these conditions cannot be maintained, a pilot should turn around and go home—unless he determines that the area of reduced visibility is a purely local condition and can be circumnavigated.

*

A further 13% of the "winter condition" accidents were caused about equally by a variety of factors. Fast, careless taxiing on icy runways and taxi strips resulted far too often in aircraft piling into snowbanks, other parked aircraft and various equipment. Whiteout was the next most serious offender. Whiteout is simply a "lost horizon"—a condition produced, for example, when low cloud or snow showers merge with a snow-covered ground. There is only one known "cure" for whiteout: Go on instruments pronto—get up fast—and stay on instruments. If you must land in whiteout, use a gradual approach, power on, and extreme care—the glassy water type of approach.

Finally, in this group, there were the accidents caused by undercarriages becoming inoperative through water freezing on the raising and lowering mechanisms. The best insurance against this hazard is to run the undercarriage through a few complete cycles immediately after take-off, a routine which will remove most of the water. Not enough will remain to freeze solid and the whole system will work later when you select "wheels down" for a landing.

In this same vein, the cycling of flaps is another safety measure the wise pilot does not overlook. Regularly changing propeller pitch will prevent oil congealing in the dome. Oil dilution, of course, should be done carefully and in accordance with local unit orders. Carburettor air intake shutters may be kept from freezing open or closed in cold weather if they are periodically exercised.

*

Flight Safety is meaningless unless each one of us looks upon it as a personal responsibility. We could make the winter of 1954-1955 a record-breaker for safe flying. All it requires is a little more care and concentration on the part of the individual.

EVERY ACCIDENT HAS A CAUSE. DON'T YOU BE IT!

accident inspector

Periodically FLIGHT COMMENT will carry articles concerned directly with the functions of the Directorate of Flight Safety both at AFHQ and at RCAF units wherever they are located. The following article, then, is the first in a series and will serve to introduce our readers to the work of this Directorate.

Those of you who have operated with flying units will be familiar with the terse signal message that is a normal sequel to a serious aircraft accident. For those who are unfamiliar, here is a sample: "AIB WILL INVESTIGATE(.) INSPECTOR ARRIVING SA 2200 hrs 25 DEC(.)" Undoubtedly many of you have asked yourselves, "What is an AIB Inspector? How does he fit into the picture? What does he do? How does he do it? What dividends does the RCAF reap from his work? In order to answer this barrage of questions we want you to come with us and meet the small group of men who constitute the Accident Investigation Branch of the RCAF.

The Accident Investigation Branch (AIB) is one of the two branches within the Directorate of Flight Safety at AFHQ whose responsibility it is to conduct investigations of all aircraft accidents occurring in the RCAF. No, AIB does not personally investigate all our accidents. You in the field assist them in this task through your crash signals, D.14s and Boards of Inquiry. The pains you take to do a thorough job of reporting an investigation materially assist them in their efforts to reduce our accident record to a figure commensurate with our flying task. You see, your D.14s and Boards of Inquiry are processed by AIB, and in this way your experience and your recommendations are used to add a measure of flying safety to future operations.

Normally you may expect to encounter an AIB inspector in the neighbourhood of a fatal accident or investigating a crash which has been caused either by an obscure material or structural defect or by factors which AIB terms "epidemic". You will also find inspectors ready to assist AOsC and COs in the investigation of accidents outside these categories when requested to do so.

*

For those of you who are impressed by large staffs and elaborate offices your first glimpse of AIB at home will be disappointing, for the inspectors number a mere eleven individuals and they occupy a most unpretentious office buried in a remote corner of the basement in one of the NDHQ buildings. As you might expect, each inspector's desk has its mound of accident case files and its quota of grim reminders of the nature of the AIB task — burned-out flame tubes, an oleo leg that failed, an undercarriage pin that did not live up to its requirement, or an oxygen mask that could not perform its function correctly because the wearer had neglected to re-install the inhalation valves when it was returned from the

telecom section after installation of a new microphone. You will find that an inspector's hours (those not spent on actual accident investigation) are taken up with processing your accident reports, discussing and arranging tests of defective parts with government testing agencies, attending strip inspections of engines, or in writing up reports of their own investigations.

Truly this is one office where when times are bad (lots of accidents) there is more than enough work for all hands; and when times are good—well, the staff is still waiting for good times to come in order to record an opinion of what happens. The direct result of all this behind-the-scenes activity is normally reflected in a change of a pilot's order, a modification to an aircraft or its equipment, or an alteration in training or operational procedure. Since none of these changes bears a tag identifying an accident and AIB as their originator, it is only natural that the results of painstaking research by AIB rarely become apparent to you in the field.

*

You might like to know something about the background of this group of men. The average inspector has served in the RCAF for sixteen years and has flown 4000 hours as an Air Force pilot. He has just celebrated his thirty-sixth birthday, is married, and has one child. His wife is a long-suffering soul who must list these among her tribulations: answering midnight telephone calls, packing suitcases, greeting and saying good-bye to her husband at unearthly hours, and

never being able to plan in advance any activity for the family.

The AIB inspectors presently attached to the staff of the Directorate of Flight Safety came from duties representative of every phase of flying activity in the RCAF. Their backgrounds as technical tradesmen and wartime and peacetime pilots are as varied as you will find anywhere in the Air Force; yet, despite this, they have many qualities in common. First and foremost is their desire to remain current in their flying and to keep their hand in on the latest aircraft types in service. Evidence of this is the fact that nine of the eleven inspectors have qualified on at least one jet aircraft.

Of equal importance in maintaining the AIB inspector's proficiency is that faculty so often referred to as the "inquiring mind". Even though he brings both technical and aircrew experience to his investigations, all would be worthless if the individual could not apply to his work that attribute of patient, tenacious curiosity that drives a man to explore every avenue, every possibility, in his quest for the cause of a difficult accident. Finally, this same quality of perseverance must carry him beyond the solution of an accident to the action necessary if similar mishaps are to be avoided in future. This is the severest test of an inspector since neither amendments to procedures and orders nor modifications to equipment appear at the snap of his fingers. He must convince those having the authority to make these changes that his investigation is comprehensive and his recommendations sound—that accidents will be prevented and that the air will be made safer for man and man safer for the air.

FLIGHT SAFETY and Mr. St. Laurent

THE PRIME MINISTER'S C-5 tour around the world early this-year carried Mr. St Laurent 28,000 miles in 122 hours' flying, visited 13 countries in 42 days—and brought him safely back to Canada.

Because of the considerable public interest generated by press coverage of the tour, it is thought more than likely that FLIGHT COMMENT readers would enjoy a backstage glimpse at Air Transport Command. Operation 451—as the PM's globe-circling junket was designated, was in the hands of ATC from beginning to end; and weeks of careful planning and preparation were directly responsible for the success of the entire tour.

by
F/L D.R. Adamson

In October of 1953, 412 Transport Squadron was advised that the Prime Minister intended visiting India and Pakistan early in 1954 and that he had expressed a desire to extend the flight to include a world tour. The squadron was provided with a list of the official state visits planned and the dates on which they were to take place. Using this information as a guide, the squadron planned a route and flight itinerary to commence on the 4th of February, 1954, and end on the 17th of March. Since the Prime Minister preferred spending his nights on the ground, flights were planned to terminate daily no later than 2230 hours local time. After numerous proposals, revisions and compromises, the itinerary was finally approved. Originally it was planned to include Australia and New Zealand on the tour but this phase was later cancelled because it would have coincided with Queen Elizabeth's visit to those two countries.

Selection of the routes and terminals to be used was governed primarily by the location of points to be visited. Also, on flights of this nature, where a number of different countries and aerodromes are to be visited, itinerant aircraft must be sponsored by one of the air lines regularly using a particular aerodrome. This precaution ensures that equipment will be available for the servicing and convenience of large aircraft and their crews. A sponsoring agency should be capable of supplying ramps to emplane and deplane passengers, auxiliary power units, refrigeration units, toilet facilities, all in-flight meals and drinks, flight and health clearances, meteorological and flight briefings, and crew transportation and accommodation. With these qualifications in mind the route was studied; and it was ascertained that Pan-American World Airways had schedules covering nine of the intended stops, while British Overseas Airways Corporation and Trans-Canada Air Lines had four and one respectively. The remaining aerodromes were military and arrangements were made through local military organizations for such services as might be required. The air line companies were then approached and letters of credit obtained from each of them for the procurement of necessary services. Fuel and oil were purchased by credit cards through two oil companies.

*

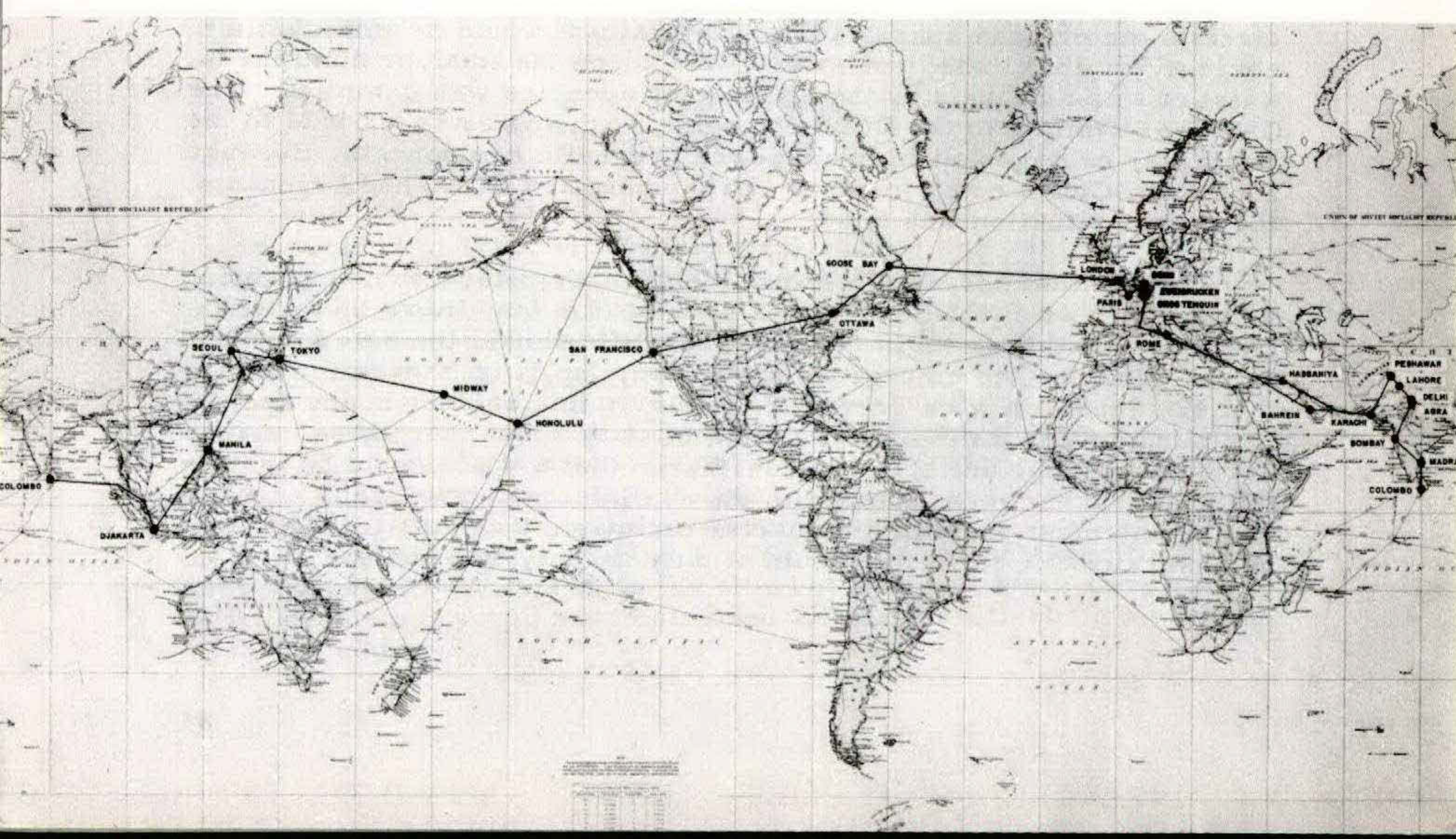
Because the trip would consume an estimated 125 hours' flying time and thus over-extend an inspection cycle on the C-5, a progressive inspection was begun after 50 hours had been flown and completed before 100 hours had elapsed. One thousand pounds of vital spares were carried: a carburettor, fuel pump, hydraulic pumps, and sundry electric motors and spare radios. Naturally it would be impossible to cover every anticipated eventuality; and so, on the trial, or dummy run, a list of spares held by the sponsoring agencies was compiled. The C-5 is as similar to the DC6B in engine components as it is to the North Star or Argonaut in fuselage and hydraulic components. Because PAA had DC6B's over most of this route, and BOAC had Argonauts, the spares situation was good.

The one item not available was an engine; therefore, in co-operation with ATCHQ and 426 Squadron, a schedule was drawn up to handle transportation of an engine from Rockcliffe should the need for one arise. Although the emergency never came up, it is interesting to note that 426 Squadron was prepared to deliver this engine to any spot on the tour route in a maximum time of sixty hours. As these engines are quick-change units, it was considered that a spare could be installed in less than twelve hours with the available manpower, and accordingly the most pessimistic quarter estimated that the aircraft might be unserviceable for a maximum of only seventy-two hours.

*

The crew was selected by the CO of 412 (T) Squadron, and all positions except that of first officer were double-banked—a vital precaution because of the threat of incapacity through illness in tropical climates. It is widely known that visitors to India almost invariably come down with one type of dysentry or another. This rule held true for both trial and final runs of Operation 451, for, almost to a man, the crews were bowled over one by one with what is commonly called the Aztec Two-Step. The severity of the disease was such that it would have been impossible to fulfil flying obligations had there not been qualified replacement personnel aboard. Once the crew was selected, names were submitted to AFHQ for passport procurement. This process took two or three weeks—after which innoculation parades began.

At about this stage of preparation, the Chief of the Air Staff decided that, for safety and security reasons, the crew should fly the entire proposed route using a North Star freighter. This decision called for a re-doubling of effort in order that the crew would be home for Christmas; and so the run departed on the 23rd of November and returned on the 17th of December. The trial run was originally to cover all stops on the tour proper, and Guam and Australia as well. The decision to postpone this latter portion of the tour was made after the dummy run was completed. The trial trip covered 30,000 miles and consumed 156 hours' flying time. Arduous as it was, it provided valuable information for the safe and efficient management of the



Prime Minister's tour. All airports to be visited were checked for the presence and efficiency of instrument landing aids, meteorological and flight planning facilities, food and accommodation for passengers and crew, aircraft spare parts, and security provisions for the Prime Minister and his party and for the aircraft itself. The crew returned from the journey with a sound working knowledge of the entire route and eager to get on with the tour itself.

* *

WHEN THE SCHEDULE was first planned, computations were based on average winds prevailing in the respective hemispheres during February and March. Of necessity, these calculations were subject to the influence of variables—namely, the highs and lows employed in arriving at an "average" condition. As events turned out, the exact opposite of the "average" condition was encountered on two legs of the journey. Consequently there were late arrivals, fortunately no more than thirty minutes behind schedule in either case.

*

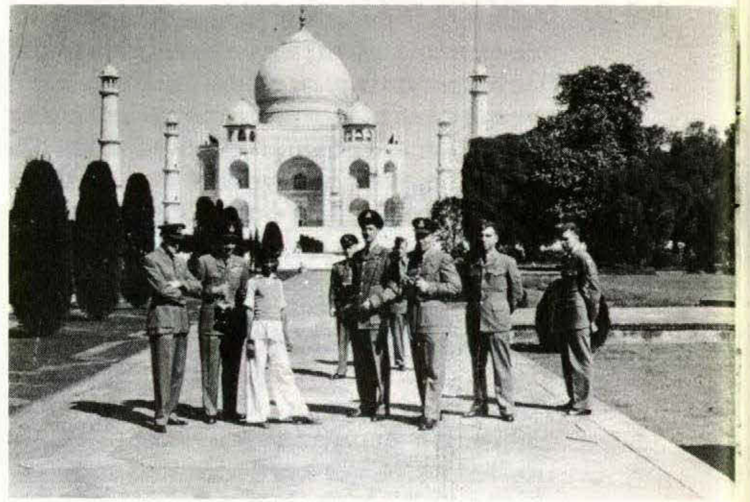
It would consume too much space to detail the navigational methods adopted for each particular leg of the tour. In general, the aircraft operated on pressure drift and sun lines where pressure drift was accurate, and on radio beacon headings where these were available. The night flight from Honolulu to San Francisco was done partially on astro with Loran Assistance, and the North Atlantic leg was flown on pressure drift sun lines, Loran and Consol. Radio beacons were not up to the standards of those on the North American continent. At high altitudes it was particularly difficult to use beacons over Europe because of the large number of them in operation. The seeming lack of plan in allocating frequencies was also an obstacle.

In this same vein, the dummy run's arrival at Rome coincided with a period of rather remarkable reception: the radio compass was picking up the Consol station from northwestern France, a unit on approximately the same frequency as the initial approach beacon to Rome airport. The signal came through when the aircraft was only twenty-five miles from Rome and caused the crew some consternation.

VHF/DF and VHF/Fixer service is excellent both in the United Kingdom and Europe but tends to peter out as eastward progress is made. Between Rome and Manila a minimum of radio facilities are available. The only aids to landing are radio beacon letdowns, and almost without exception the only VHF frequencies required are 118.1 and 119.7 megacycles.

*

Departures on the actual tour were punctual because Prime Minister St. Laurent always arrived early enough to ensure the aircraft leaving on time. In most cases this promptness made it possible for arrivals to be on schedule although, in two instances, heavy traffic delayed clearances, and diversions over Europe caused minor delays. The system adopted with respect to sponsoring agencies worked very well—in fact so well that arrivals and departures became almost as routine as though taking place at Rockcliffe.



Because the C-5 is pressurized, the tour was flown at an average height of 17,000 feet. Weather in general was good, although fog necessitated cancelling a projected visit to Zweibrucken. European weather early in the year is generally rather difficult, and it lived up to its reputation in the spring of '54. The very best of landing aids are available in Europe, however, and this portion of the tour was successfully fulfilled with that one exception. Between Rome and Manila the only factors affecting flight are air mass thunderstorms, which can be circumnavigated, and the occasional sand storm. Little of either was seen. From Ceylon over Singapore to Djakarta the inter-tropical front was encountered. This controversial phenomenon was quite in evidence on both the dummy run and the tour, manifesting itself as a line of large cumulus and cumulonimbus extending from west to east, varying in latitude with the seasons. It may be found, throughout the year, somewhere between five degrees north and south of the equator. The writer does not feel qualified to enter the argument over the genesis of this peculiar front. Suffice to say that it was there as forecast. On the dummy run a night flight was made on this leg and some spine-tingling clouds and lightning were seen. It was much quieter on the tour, however—and both flights through the front were uneventful.

On their routes between Rome and Djakarta most air lines operate on a flight plan of fuel-to-destination plus ten per cent for navigational and meteorological errors and two hours' holding at destination. Under this plan no alternate need be selected since the only obstructions to landing are local showers which soon pass. If two hours' holding fuel is carried no difficulty is encountered. As for night flying, Mr. St. Laurent was persuaded to fly from Honolulu over-night (for a noon arrival in San Francisco) so that the party could avoid the heavy fogs which gather on the California coast in the early mornings. This leg was the only over-night hop during the entire tour.

* *

THE C-5 BEHAVED itself throughout the journey—a performance for which much credit is due the aircraft's engineers and maintenance personnel. Their hours were long and they were sometimes required to work late; and in one instance they worked all night to have the C-5 ready for the following day's flight. On the equipment side, it might be of interest to the telecommunications branch to mention here that the modified ARC 3 VHF performed extremely well with only one minor unserviceability. The modified cabin blower installation also proved satisfactory, thus justifying the changes made by those who had criticized the original system.

*

Special Flight 451 was executed as scheduled without unfortunate incidents to mar the achievement. Generally, bouquets for the successful outcome of a journey of this complexity are tossed to the operating crews. However, just as much credit is due the maintenance and operations staff of 412 (T) Squadron and the staffs of the three sponsoring air lines. The aid received from various AFHQ directorates was superlative—as was the effort put forth by ATCHQ and 426 Squadron. Future operations of this nature will be faced with a high degree of confidence born of a big job well done. Prime Minister St. Laurent's round-the-world tour has added to the fund of RCAF knowledge and experience in the realm of long-distance flying. Most important of all, perhaps, it has provided a vivid example of how large a contribution may be made to the cause of Flight Safety by wise planning and careful preparation.

F/L D.R. Adamson

THE AUTHOR

F/L D.R. Adamson first joined the RCAF in 1941 at the age of eighteen. On completion of flying training, he was transferred overseas to Number 2 Group Tactical Air Force. After serving a tour of operations, he returned to Canada for flying duties at Rockcliffe, Mossbank, and Suffield. He remained there until February, 1951, when he was again transferred—this time to 412 Transport Squadron at Rockcliffe.

Throughout his 5300-hour flying career, he has accumulated time on eighteen different aircraft ranging from Tiger Moths to Mitchells, Dakotas, North Stars, and the C-5. During his stay at 412 Squadron, he has flown such notable personalities as the Governor-General and Chancellor Adenauer. He was one of the captains on the Hon. C.D. Howe's flight to South America in 1952 and served in the same capacity on Prime Minister St. Laurent's tour around the world.

near miss

NIGHT CROSS-COUNTRY

The following "Near Miss" was submitted by a staff officer who was on an IFR night navigation exercise with an AFS instructor.

"I was authorized to fly as second pilot in a T-33 from Portage la Prairie to The Pas, to Saskatoon, to Portage on an IFR night navigation training exercise. The instructor and I attended the night flying briefing and the met briefing. The met officer reported some CB clouds that would be south of Dafoe, but these were not supposed to interfere with our flight. He also stated that the upper air map was 12 hours old.

"We completed the first two legs according to flight plan. Station passage at The Pas and Saskatoon was confirmed visually, aurally and by ARC. The first part of the Saskatoon—Portage leg was uneventful. We checked our position both visually and by radio. A relative bearing was taken on Regina and we found ourselves approximately 35 miles south of track. We then altered course for Portage. Our position was again checked on passing Neepawa and we appeared to be on course.

"From Regina on, I noticed static interference on ARC in all positions, but the needle indication appeared to be reliable. About ten minutes west of our ETA, I p'xed to Portage and received a further clearance from ATC through Portage tower. The reception was loud and clear—and it was the last time we heard from Portage tower. We received no indication of station passage at Portage even though we utilized all facilities. Static interference was now severe due to electrical disturbances so we considered the ARC unreliable. We held our course for ten minutes past ETA and attempted to get bearings on Rivers and Winnipeg, but with no success. Radio reception was bad and as we were approaching a wall of CB clouds and lightning we decided to do a 180. We now tried to contact any station on 126.18, but again with no success. The instructor attempted to take a bearing on the radio broadcasting station at Carman but was unable to get a definite fix even though the needle indicated a station passage. The needle had been indicating

350 degrees magnetic which was parallel to the line of severe thunderstorms in that area. Aural null procedures were ineffective because of extensive static.

"Since we were clear of cloud the instructor decided to attempt a visual pinpoint. Our fuel was down to about 100 gallons and we had reduced power to 70% to conserve it. We began a gradual descent on a course of 330° magnetic after the assumed station passage at Carman. I began transmitting blind on 121.5 mcs and an answer was received from an unidentified station. A second reply was received from ....control which is located in North Dakota. However, this unit was unable to fix our position or give us a steer to the nearest suitable aerodrome.

"We then sighted a town and a rotating beacon about 60 miles to the southwest. On reaching the town we passed a description of the aerodrome to .... control but they were unable to identify it and we had no success in contacting the tower or range station at the airport. There was no lighted runway but red entry lights gave us the position of one. The instructor decided to make a belly landing on the assumed runway. We were looking the field over from approximately 4000 feet when to our delight the lights suddenly came on. The runway appeared to be of sufficient length so the instructor made our long-awaited landing. The aerodrome proved to be Bismark, North Dakota, runway length 5200 feet. Our T-33 was not damaged in any way and we had 58 gallons of fuel remaining after touchdown".

The pilot who submitted this "Near Miss" carefully analyzed his flight and listed his conclusions and suggested preventive measures. It is hoped that all pilots will benefit from his experience and never find themselves in a similar predicament.

"Through re-construction of our flight it is my opinion that the following errors and factors were responsible for this emergency landing:

(a) "It is considered that an incorrect estimate of position was obtained in the vicinity of Regina and that the subsequent alteration of course to port (approximately 15°) was not sufficient to counteract the increasing wind velocity from the north (estimated at 35,000 feet) and not forecast". (In this statement the pilot doubtless has reference to his own estimation of the wind velocity change on the basis of his 15-degree alteration of course).

(b) "While station passage was received at Neepawa, the static was severe and it is estimated that the aircraft was actually many miles south of the assumed position.

(c) "As the thunderstorm activity was east of destination and not forecast, it is considered that, while a steady course was flown and the automatic compass indicator showed the station to be ahead, the aircraft was actually drifting to starboard very appreciably". (The pilot's statement here must not be misunderstood. Thunderstorms were not forecast for his destination, but the aircraft was, in fact, far south of that destination and in an area for which no route forecast was required.)

(d) "After reaching ETA it is considered that the original course was held for too long a period of time and put the aircraft in close association with the thunderstorm activity; although visual flight was maintained.

(e) "The homing and station passage, on what was assumed to be CBW (Carman), was obviously some station much farther south as investigation has disclosed that Carman was not on the air at this particular time (approximately 0115 CDT).

(f) "It is difficult to understand why the DF net could not pick up the aircraft although this may have been due to the severe electrical disturbance close by".

*

"Don't be lulled into a false sense of security because the initial portion of a flight is according to flight plan especially under visual conditions at high altitudes. The radio compass may prove to be extremely unreliable in the vicinity of electrical disturbances which may also cause aural null reception to be very poor.

"It is suggested that on future training trips of this sort pilots be advised to get ADF bearings from any station having such facilities on hand, and to check extremely closely any radio compass needle indication by means of radio range signals, and visual indication if possible.

"In the opinion of the undersigned, it is considered extremely important to have two pilots on board the T-33 aircraft for extensive night navigation training, especially under IFR conditions, and that the difficulties of attempting to pinpoint visually from high altitudes be constantly emphasized throughout training".

A dry-swim on the last leg (Saskatoon - Portage) is impossible without the flight log which was used for the exercise. It was possible from the information given to reconstruct the final few minutes of the flight just before the landing at Bismark, but it would be of interest to see exactly how the aircraft arrived in this area. Since prevention is our business it is felt that, while mistakes were made and admitted, the two pilots involved deserve our thanks for having submitted this "Near Miss" with its inherent warning.

HYPERVENTILATION

Here is the first "Near Miss" report to be received by the Directorate of Flight Safety on the subject of hyperventilation. Following as it does the excellent article on this topic published in the First Quarter 1954 issue of FLIGHT COMMENT, it should prove interesting and educational to all aircrew.

While flying solo formation in a T-33 at an altitude of 25,000 feet, the pilot suddenly felt very hot and began perspiring freely. He lowered the cabin temperature and then experienced a tingling sensation in his legs, arms and back, accompanied by slight dizziness and a blurring of vision.

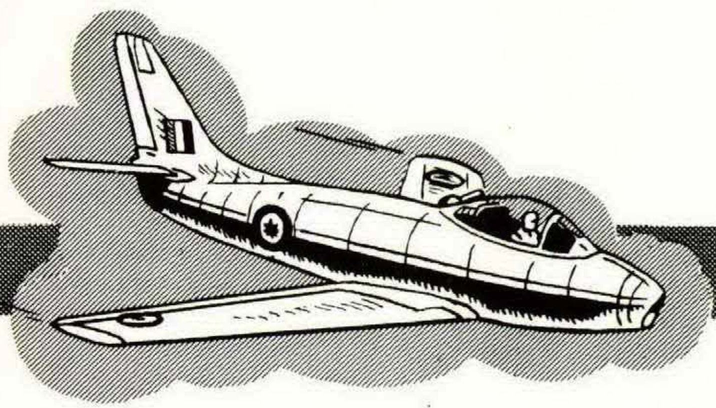
Just as consciousness seemed to be fading, the pilot broke formation and dived. Unable to think straight, he had trouble finding the dive brakes. Later he could not remember whether he had closed the throttle or left it on. All this time his oxygen was on normal and the blinker was working. One or two minutes before the occurrence, oxygen content was 300 pounds.

As the pilot started diving, his instructor followed him down and told him to switch to 100% oxygen, which he did. The instructor also told him to take a few deep breaths but he cannot remember whether he followed this advice or not. Descent continued until the T-33 was at roughly 4000 feet. The pilot began to feel normal again except for a slight headache which lasted about 10 minutes—after which he was able to continue with the exercise.

The evidence indicates that this was a case of hyperventilation which is considered to have been the cause of some unexplained accidents in the past. The pilot's action in descending to a lower level (while in itself not a cure for hyperventilation since altitude is not a factor) probably alleviated the condition which was causing him to overbreathe, and the return to a normal respiration rate restored his acid-base balance.

This "Near Miss" is surely convincing proof in support of the contention that every pilot who flies above 10,000 feet should be given a full oxygen indoctrination—a course in high-altitude physiology and training in the decompression chamber. There is not much we can add except to recommend that all pilots read the article entitled "The Facts On Hyperventilation", which appeared in the first quarter 1954 FLIGHT COMMENT. Particular attention should be paid to the last paragraph which states in part: "One must learn to suspect that certain symptoms in the air may be caused both by overbreathing and by lack of oxygen. If the oxygen regulator is working properly, then it is only necessary to hold one's breath for a short time or slow down respiration and the carbon dioxide which is always being produced in the body will restore the acid-base balance and effect immediate recovery".

Accident Resumé



SABRE

UNAUTHORIZED ATTACK

During a high-level, cross-country exercise the pilot sighted a naval aircraft some 15,000 feet below and he deviated from his flight plan to execute an "attack" on the "enemy". The naval fighter broke into the attack and when the Sabre pilot tried to follow, the airframe was overstressed to +9 G. The pilot erred in disregarding his pre-flight briefing and deviating from his flight plan in violation of Station and Command Orders and CAP 100. An overstressed aircraft resulted from his mishandling of the controls.

NORDO

After a climb to 20,000 feet the pilot noticed vibration and at once suspected undercarriage unserviceability. Unable to verify his suspicions he did a stall check and returned to base doing a gentle let-down. Three miles from home a thump was felt followed by VHF failure. With no radio it was impossible to get a tower check of the undercarriage or airframe so the pilot completed his landing. Examination revealed that the VHF had fallen out of the aircraft. The primary assessment is against maintenance because the equipment was not properly secured. Besides, the airman carrying out the DI had not checked the VHF panel for security as required. "Pilot Error" is the secondary assessment because the pilot did not ensure the security of this panel during his preflight inspection.

TIP TANK TROUBLE

During a routine training flight the pilot noted that his fuel state was down to 700 pounds. He requested a straight-in approach but, being high and fast, carried out a low circuit. He landed heavily, damaging the aircraft. The pilot committed a number of errors, the first of which was his failure to compare densitometer and totalizer readings during the early part of the flight in order to ensure that his drop tanks were feeding. Later, as he was coming in for a landing, he should have kept his approach speed high enough to take care of the weight involved in the full tip tanks which had failed to feed.

WET RUNWAY TECHNIQUE

Leading a two-plane formation in for a GCA landing in a heavy rain shower, the pilot knew that the runway would be slippery. His final approach speed was too high but, although both aircraft had plenty of fuel, the leader elected to land. The aircraft floated for a considerable distance before touching down, after which the pilot shut down the engine and attempted to stop the aircraft with intermittent brake. A skid to the left could not be controlled and the aircraft suffered category "B" damage when the wheels sank into the soft infield. A second attempt at a more reasonable approach speed would probably have prevented this accident.

FAULTY FEEDING DROP TANK

Number four aircraft in a four-plane formation was known to have a faulty drop tank. Practice interception exercises in marginal weather were flown and three fuel checks called: one after climb, one following the completion of the exercise, and one prior to letdown. The pilot of number four was low on fuel on the second check. He and his number three were given letdown priority but weather had deteriorated and they missed their approach on GCA. Having insufficient fuel for a second try, number four was told to climb and abandon the aircraft; but the aircraft crashed, and he was killed.

Primary cause of the accident was assessed as "Pilot Error" because the pilot took off in marginal weather in an aircraft having a known unserviceability. Furthermore he did not inform his flight leader of his low fuel state in time to avert an emergency. The secondary assessment of "Briefing" was made because the pilot had been authorized to fly, in marginal weather, an aircraft handicapped by a known unserviceability. Also, the flight leader himself erred in not keeping a close check on number four's fuel state during the exercise.

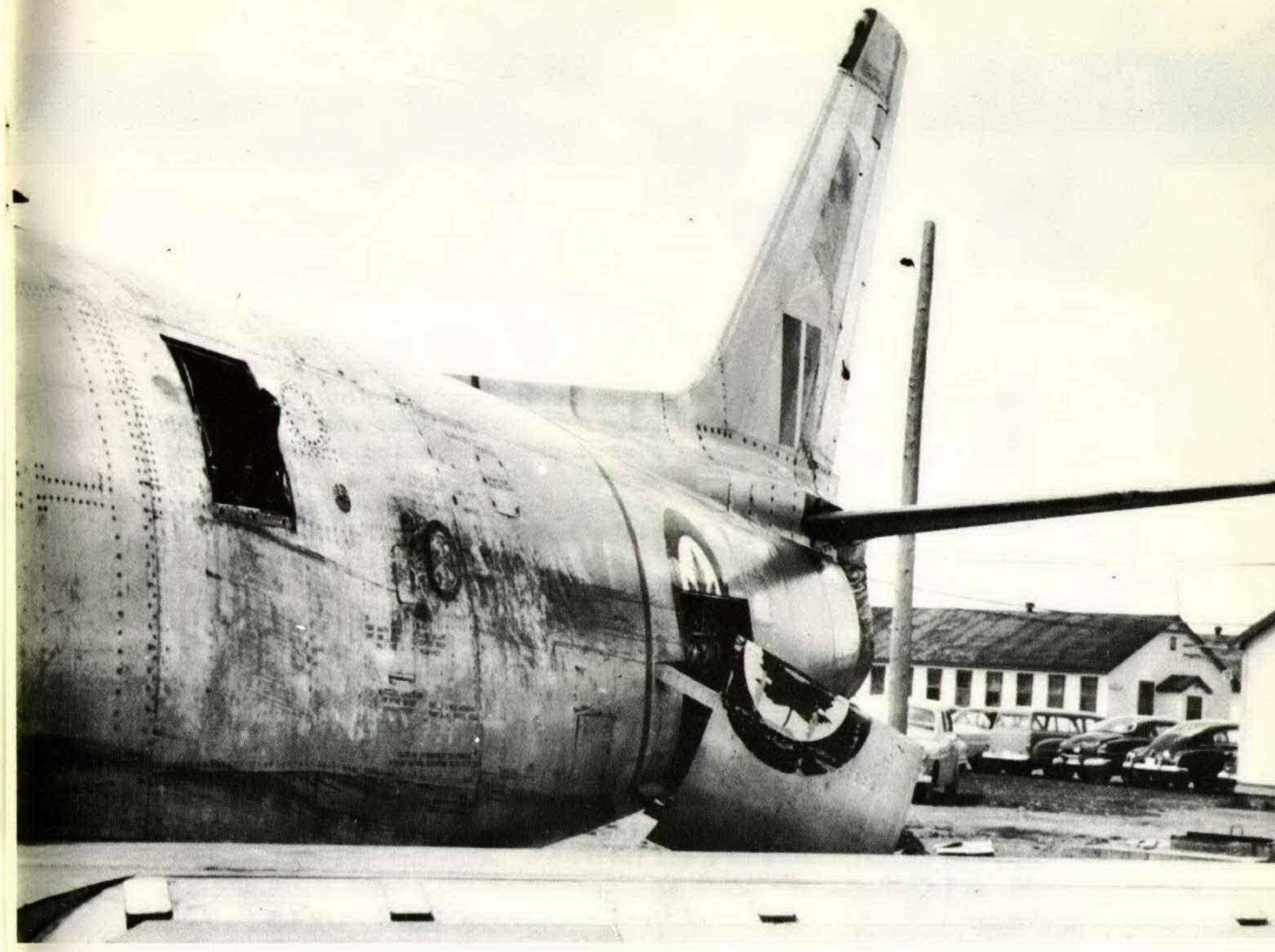
RELAXED TOO SOON

During a routine flight the pilot experienced aileron freezing at altitude. Since he was unsure of the cause of control restriction he requested an immediate letdown and a "straight-in" GCA which necessitated a slightly downwind landing. After touchdown the pilot acknowledged the GCA run, changed frequency and opened the canopy. He then realized that his speed was high and commenced harsh braking—but too late to prevent the Sabre from running off the end of the runway and through a shallow ditch.

Technical investigation revealed no control unserviceability. The pilot had simply failed to recognize aileron bungee icing. The accident could have been avoided had the pilot left his radio and canopy alone and concentrated his attention and energies on making a safe landing.

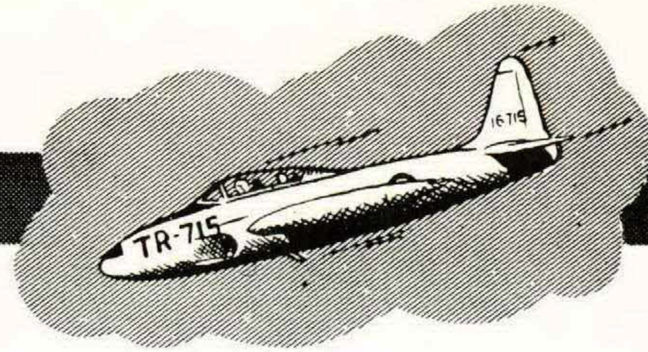
LOOSE DZUS—LOST PANEL

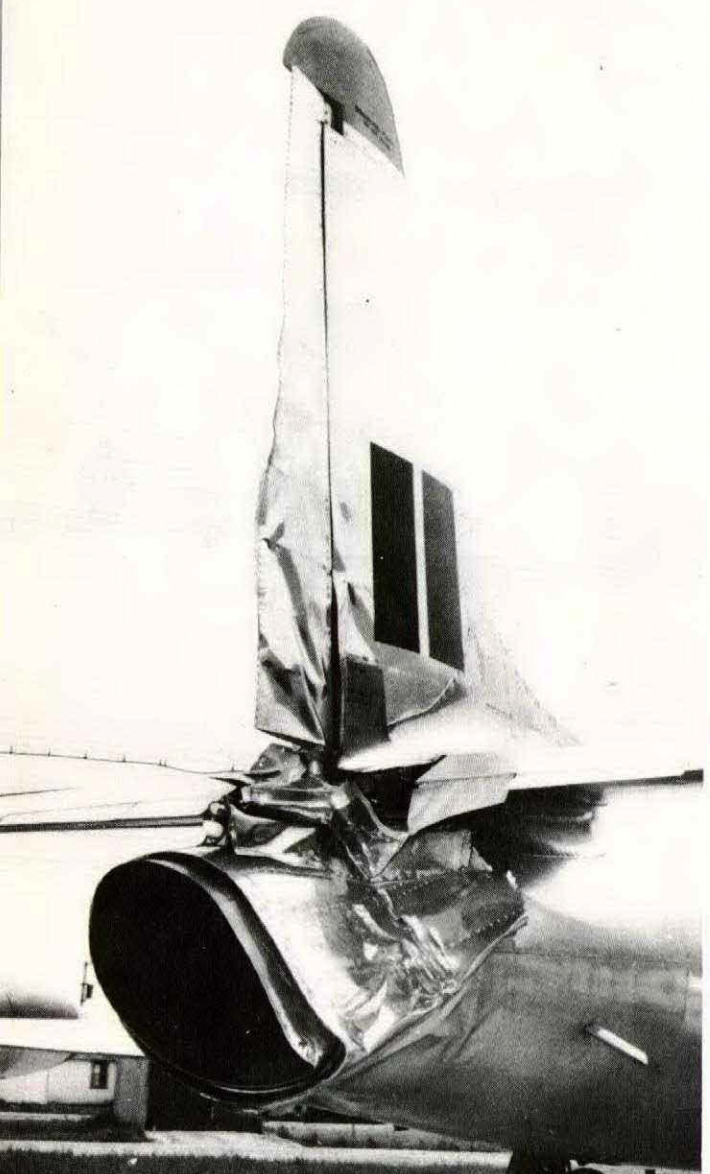
Upon landing after a formation exercise the pilot noticed that the engine access panel was missing from the port side of his aircraft. Further examination revealed damage to the port horizontal stabilizer which had been struck by the panel. Two of the six dzus fasteners were still in place but the other four were missing. Air loads had torn the panel loose, since only two of the fasteners were locked. Some one had failed to fasten the panel securely, a situation that was missed by the technician who signed for the pre-flight inspection. He stated later



that he had done a visual check but did not use a screwdriver. The pilot, in his pre-flight inspection, failed to detect the loose fasteners. The cause of this accident was assessed "Pilot Error" and "Ground" because of the division of responsibilities. However, had the pilot tapped the panel with his hand during the pre-flight check the loose fasteners would have been noticed.

T•33





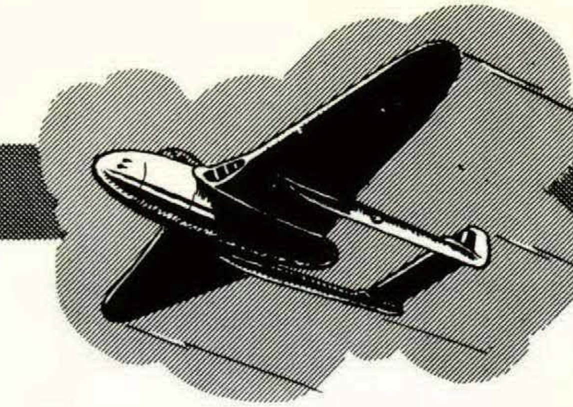
CLOSE SHAVE

A four-plane formation had completed an air-to-air gunnery exercise and was returning to base. The leader called for echelon port from a finger four right formation. Number three and four crossed under the lead section. Number three overshot his position and applied bank to move into close formation on number two. Number four moved in with number three but failed to notice number three take off his bank. The starboard tip tank of number four's T-33 struck the empennage and tail pipe of number three. Fortunately, both pilots were able to land safely at base. There is a paramount need for constant attention to the movement of the aircraft on which you are formating.

DRIFT CORRECTION—CRAB OR WING DOWN

The student pilot made his approach in a crosswind condition using the crab method of counteracting drift. Because of excessive speed the aircraft again picked up drift during roundout and touched down with the port wheel in the rough off the left side of the runway. Collision with runway lights caused damage to the dive flaps. The drift correction recommended by the unit is the wing down method but is not compulsory. Extra care is necessary in crosswind conditions.

VAMPIRE



POST-LANDING CHECKS

After landing, the pilot turned left off the runway onto the taxi strip and, without coming to a full stop, reached to select ''flaps up''. He inadvertently selected ''gear up'' also and the undercarriage retracted. The aircraft was light on fuel, which, coupled with a left turn, extended the left oleo and compressed the right one so that the scissor microswitch on the port oleo broke contact. With the gear selector in an unsafe position the undercarriage retracted, causing ''C'' category damage. A complete stop for post-landing checks is a good safety rule.

HIGH AND FAST

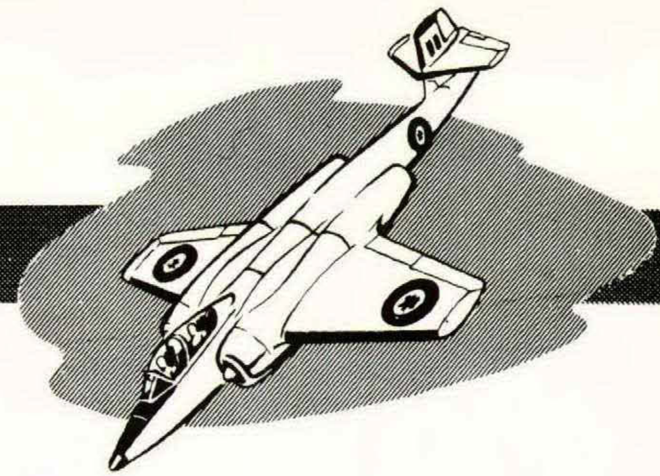
During his approach the pilot had been warned of construction equipment at the touchdown end of the runway. For this reason a steep approach was used, together with a higher-than-average air speed. The aircraft landed one-third of the way down the runway. The wind was calm. Realizing that his speed was excessive, the pilot applied brake and attempted to turn off in a wide sweep onto a taxi strip. The aircraft failed to make the turn, went off the end of the runway, and struck a shallow ditch where the nose gear was sheared.

The pilot erred in maintaining too high an air speed in spite of a calm wind condition and steep approach. Nor did he try a go-around, despite a ''long landing'' and high air speed. A secondary assessment was made against ''Ground'' because heavy equipment was operating close to the approach end of the runway while flying was in progress, and also because of a ditch which fouled the overshoot area. A third factor contributing to the accident was a downhill gradient on the runway.

LOW AND SLOW

The pilot had been warned by flying control of gusty wind conditions. On final approach the aircraft sank rapidly. The pilot applied power but was unable to stop the descent and the aircraft struck a knoll short of the runway and bounced, receiving ''B'' category damage. The approach was too flat and speed too low for gusty wind conditions.

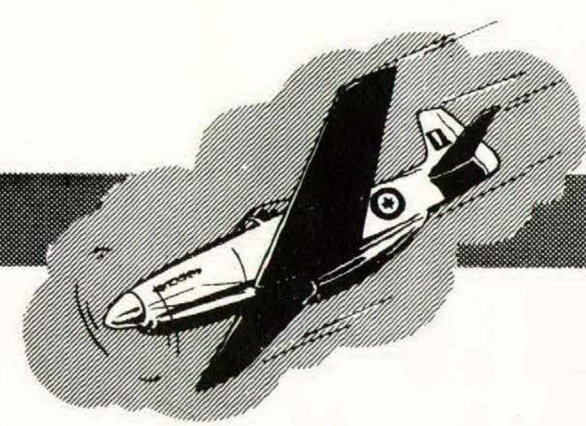
CF•100



FORMATION COLLISION

During a formation training flight in echelon starboard the signal was given to change to line astern. Number 3 was flying so close to Number 2 that his port wing tip struck the other's aileron during the manoeuvre. Formations must be close but not so tight as to constitute a hazard.

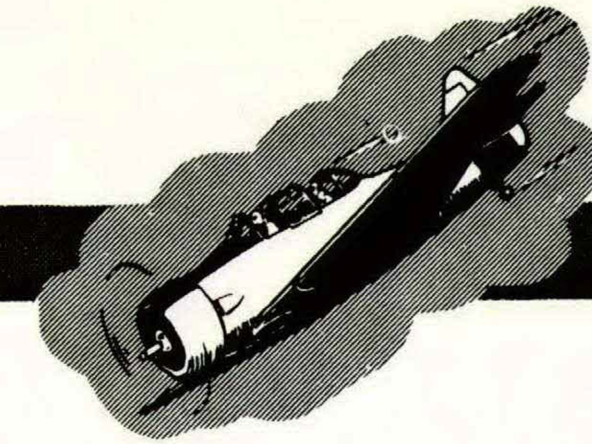
MUSTANG



THE TARGET THAT STRUCK BACK

During an air-to-ground rocket-firing display the pilot made his final run on the target. A detonating party had been briefed to blow up the target after the last aircraft in the detail had fired. The charge was prematurely detonated and the aircraft received damage as it flew through the debris. The accident has been charged to "Ground".

HARVARD



BEWARE OF POWER LINES

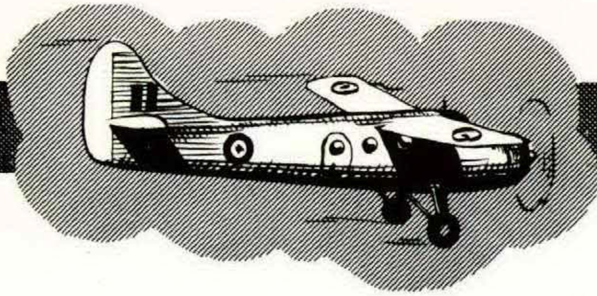
The instructor was demonstrating "operational" low flying to his student. After the exercise it was discovered that the propeller was badly nicked and the bottom engine and wheel-well cowlings damaged. The instructor had failed to locate accurately the low flying area. Furthermore, both he and his student had failed to keep an adequate lookout as neither was aware that the Harvard had struck a power line. The instructor had failed to clear all obstacles by 50 feet as required in CAP 100 para 125 (2) (c). The two-fold lesson is obvious: Make sure you know the boundaries of the low flying area and, even in the low flying area, maintain a vigilant lookout.

KNOW YOUR FUEL STATE

A student pilot on a local solo flight neglected his fuel checks until fuel starvation stopped the engine. After selecting another tank the pilot re-started by means of the wobble pump. The engine ran intermittently until over the field when it stopped again and could not be re-started. The student accomplished a forced landing short of the aerodrome causing "D" category damage to the aircraft. Constant awareness of tank contents and selections can eliminate this type of unnecessary accident.

TWO TIPS - BOTH BENT

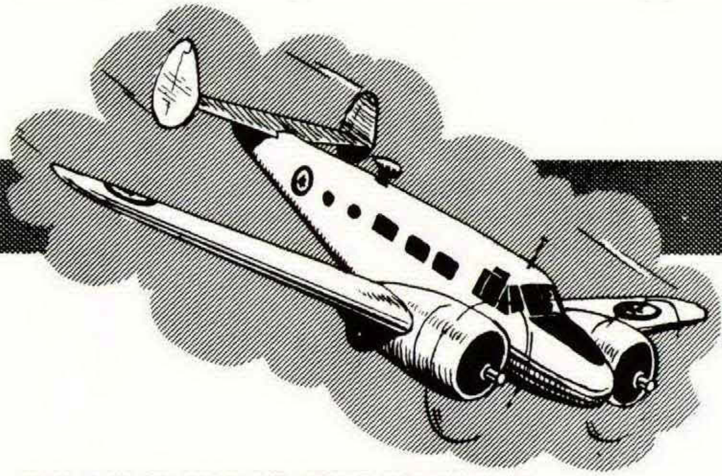
The student was receiving a solo check and had completed four good landings. Following the fifth circuit and a three-point landing the starboard wing came up and the aircraft started to swing left. The swing was stopped but not before the port wing tip had scraped the runway. At this point the instructor took over but was unable to prevent a further swing before the starboard wing tip scraped the ground. This accident again points up the perennial problem for the instructor—"How far to let the student go before taking over"?



OTTER

CROSSED UP BY CROSSWIND

The pilot was receiving dual instruction in a slight crosswind. The aircraft was levelled off too high and began to drift. A bounce resulted. Before the second touchdown, drift again developed, the port wing dropped and struck the runway, and the aircraft groundlooped to starboard. Are you sure of your crosswind landing technique?



EXPEDITOR

TOO COLD FOR FEATHERING

The pilot feathered the port propeller of this Expeditor while on a test flight. When he subsequently tried to unfeather, all electrical power failed. Then, on the first approach, pilot and co-pilot were unable to lower the undercarriage by the emergency lowering system. On the second approach they got it partially down but not far enough to be seen from the cockpit. The pilot was committed to land and, on touchdown, the unevitable happened—the undercarriage collapsed.

The initial mistake was made when the propeller was feathered in sub-zero temperatures and left feathered for approximately three minutes, with the result that the congealed oil in the propeller dome constituted too great a load for the electrical system. Having failed to unfeather his propeller, the pilot then neglected to ensure that the feathering switch was in the "out" position—an oversight which drained the battery. Insufficient knowledge of the aircraft's emergency systems prevented the pilot from fully lowering and locking the undercarriage by the emergency method.

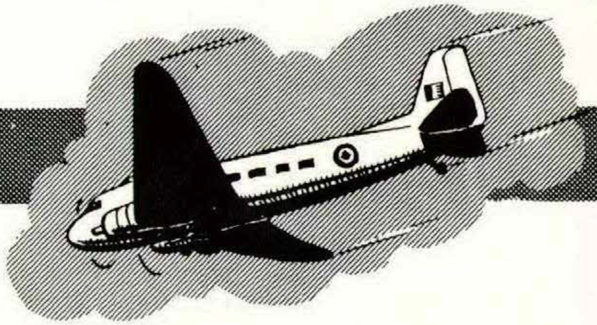
BE READY FOR TROUBLE

Soon after touchdown the Expeditor swung to port. The pilot applied starboard brake and port throttle but the aircraft ran off the runway into snow where it tipped up on its nose. Anticipation of a swing can assist the pilot in applying immediate corrective action at the first indication of a swing—but beware of over-correction!

BEWARE—SNOW GLARE

The pilot was authorized to practise low flying. While on a heading into the sun, he noted his depth perception becoming increasingly unreliable. Just as he decided to climb, the Expeditor struck a power line, receiving "C" category crash damage. When the glare from snow is bad, get up to a safe altitude.

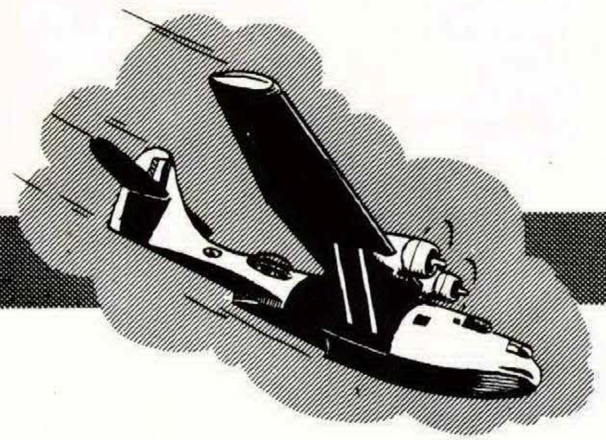
DAKOTA



WOULD YOU RECOGNIZE "WHITEOUT"?

The pilot was making a precautionary approach because of restricted visibility and poor braking conditions due to a light snowfall. On reaching the approach end of the runway he closed the throttles and attempted a three-point landing. The aircraft undershot by some 90 feet, struck an upgrade to the runway, bounced, and stalled with the left wing low. When the pilot opened the throttles and attempted to overshoot, the Dakota bounced a second time and stalled. The right wheel hit the soft snow to the right of the runway and aggravated a starboard swing sufficiently to cause a cartwheel. The nose section and both wing tips of the aircraft were severely damaged. Fortunately the passengers and crew were uninjured.

What happened to cause this accident? A number of factors combined to produce the final result. The captain had had more experience landing on snow than the co-pilot, yet he permitted the latter to make the landing. The captain did not attempt either to take control or offer advice when it was evident that his co-pilot was in difficulty. When the latter elected to overshoot he failed to apply the proper procedure and the Dakota went out of control after the initial bounce. The pilot's vision was partially obscured by the alcohol spray used on the windscreen as a de-icer. The major weather factor involved was the likelihood of "whiteout". There had been a fresh snowfall on the field so that runway markings were rendered inadequate; and a 1500-foot overcast had blended into the snow, eliminating the horizon. Finally, both pilots stated they had difficulty in judging their height at roundout.



CANSO

CANSO vs LANCASTER

Taxi accidents continue to take their toll in the form of damage to aircraft. The pilot of this Canso was taxiing his aircraft past the front of a hangar when the port float struck the plexiglass nose of a parked Lancaster. The pilot erred in taxiing in a congested area without the assistance of a marshaller.

UNMARKED SHOALS

Two Canso captains, one experienced and one relatively inexperienced, were practising circuits and landings, beaching, mooring and anchoring. They were using a large lake with miles of deep and open water. The captain had operated in and out of the lake for some time and knew the location of the only two shoals in the lake. Nevertheless, during a takeoff run the hull of the Canso struck a shoal. The takeoff was completed and a landing was made on an aerodrome. Primary cause of the accident was "Pilot Error" because the pilot knew the approximate location of the shoal and there was other space in which to practise safely. The secondary cause was ground error because the two shoals—known to the squadron—were unmarked, although the lake was being used as a training base.

priceless prose

Seen on a signal:

"The pilot approached too fast, landed too far down the runway, and was unable to stop at this unit".

Conclusions from the evidence:

"It is noted that the statements of the pilots . . . . . do not indicate who had control. It would appear that both pilots were attempting to control the aircraft and that the methods used were not necessarily the same".

DFS