FLIGHT COMMENT

ISSUED BY

DIRECTORATE OF FLIGHT SAFETY
R.C.A.F. HEADQUARTERS • OTTAWA, ONT.
NOVEMBER · DECEMBER · 1956

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C O N T E N T S

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Articles, comment and criticism welcome.
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MIXED CIRCUIT

By

F/L R. E. MONCRIEFF

WHEN A VISITING FIREMAN hits the Trenton circuit for the first time, he's hardly a "stranger in paradise". Unless some old campaigner has previously taken him aside for a briefing, he's very likely to find himself as busy as an egg in a beater and wishing he'd hangared the thing and walked. Since such conduct doesn't really become an intrepid birdman, however, his best bet is to develop the chief characteristic of Trenton-based types—a head like an owl. Ever seen them pivot?

The safe control of a variety of piston and jet aircraft at the same aerodrome throws quite a strain on man's ingenuity in the field of traffic management. Some of the problems encountered are unsnarled only after a long period of trial and error. So that stations adopting the mixed circuit may minimize their own period of adjustment to this system, and in order to familiarize pilots with what they can expect when visiting such aerodromes, Station Trenton's experience is worth a cocked ear.

Control Tenders As An Aid

Whenever piston aircraft are taking off and landing on runways which converge on, diverge from, or cross a radio-controlled jet runway, employing an aerodrome control tender and visual signals is the best procedure if traffic intensity has reached a stage wherein delays are being caused through the use of radio control exclusively. The saturation point will vary, depending upon the type of flying being done; however, when landings and takeoffs exceed a total of six or seven hundred in an eight-hour day, it's time to call in the control tender.

On the field, top co-ordination between tower and tender is imperative; the tender controller acts entirely upon instructions from the tower. When requested to do so, he will hold (or resume) all traffic when crossing runways are in use; or he will hold takeoffs if a converging runway is live.

Switching arrangements in the tower which enable the controller to broadcast simultaneously to an aircraft and the tender (assuming the latter to be on a different frequency than the aircraft) will greatly reduce repetition. If, for example, the tower has received an initial call from a jet, the controller may pass the landing sequence to aircraft and tender at the same time. The latter will then acknowledge, prepare to restrict or hold piston traffic, and so advise the tower.

Tender control on a mixed aerodrome is only desirable when traffic conditions become unwieldy. Its main disadvantage is that it is a second-hand control, thus adding one more possibility of error to those potentially existing in the pilot and the tower. Both tender and tower controllers, and the pilot, must remain constantly aware of these possibilities, keep on the lookout for them, and be ready to correct them.

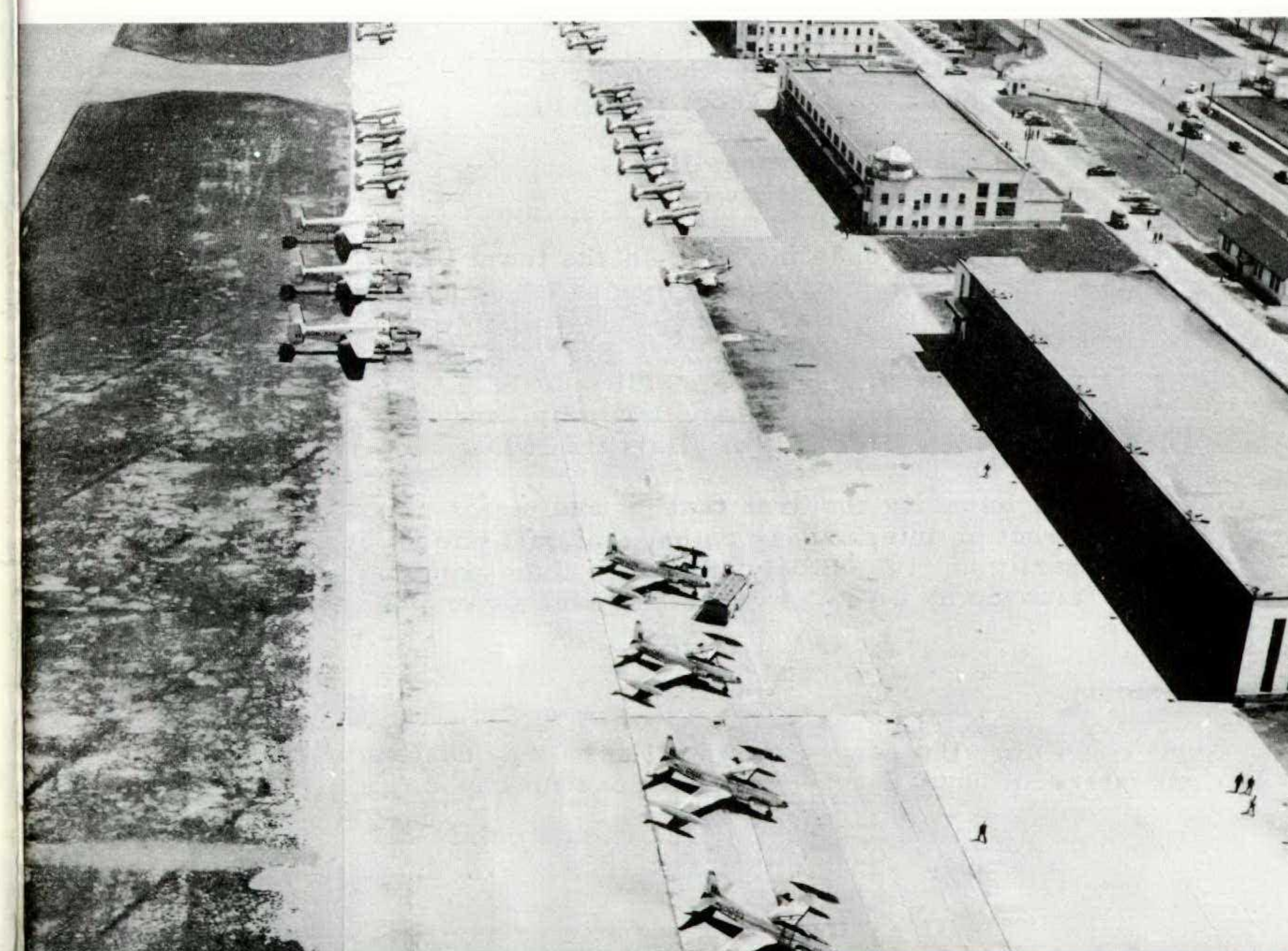
Converging Runways

When converging runways are used, takeoffs have to be strictly controlled. The lack of manoeuverability after takeoff—particularly of heavy aircraft—increases the hazard created when aircraft, through error, take off simultaneously on converging paths. Inadvertent overshoots should be made known immediately to the tower controller so that he will have time to suggest corrective action and warn other aircraft. Intentional overshoots and touch-and-go landings, of course, must be cleared by the tower. Full-stop landings, when completed, present no problem on converging runways.

Diverging Runways

Takeoffs create no difficulties while diverging runways are in use—except when a piston aircraft, taxiing to takeoff position, ambles across the approach of a landing jet. To sidestep this sort of trouble, painted lines can be put down to represent an extension of the jet runway beyond which the piston aircraft will not taxi until cleared for takeoff.

Diverging runways, however, mean converging approaches. In this situation the degree of control must be even more precise to provide the measure of safety required. When two or more aircraft are observed making an approach from varying positions in their relative circuits, their request for landing clearances is often answered by the phrase "continue approach". In addition the pilots are warned of the locations of the converging aircraft. When it becomes possible to determine beyond a doubt the relative positions of the aircraft at the cross-over point, landing clearance or overshoot instructions are then provided.



To employ a tender to overshoot converging aircraft would be difficult, if not dangerous. Visual signals are not sufficiently explanatory in a situation such as this. Voluntary overshoot by pilots who are fully aware of the conflicting traffic would minimize—and almost eliminate—the problem inherent in converging approaches.

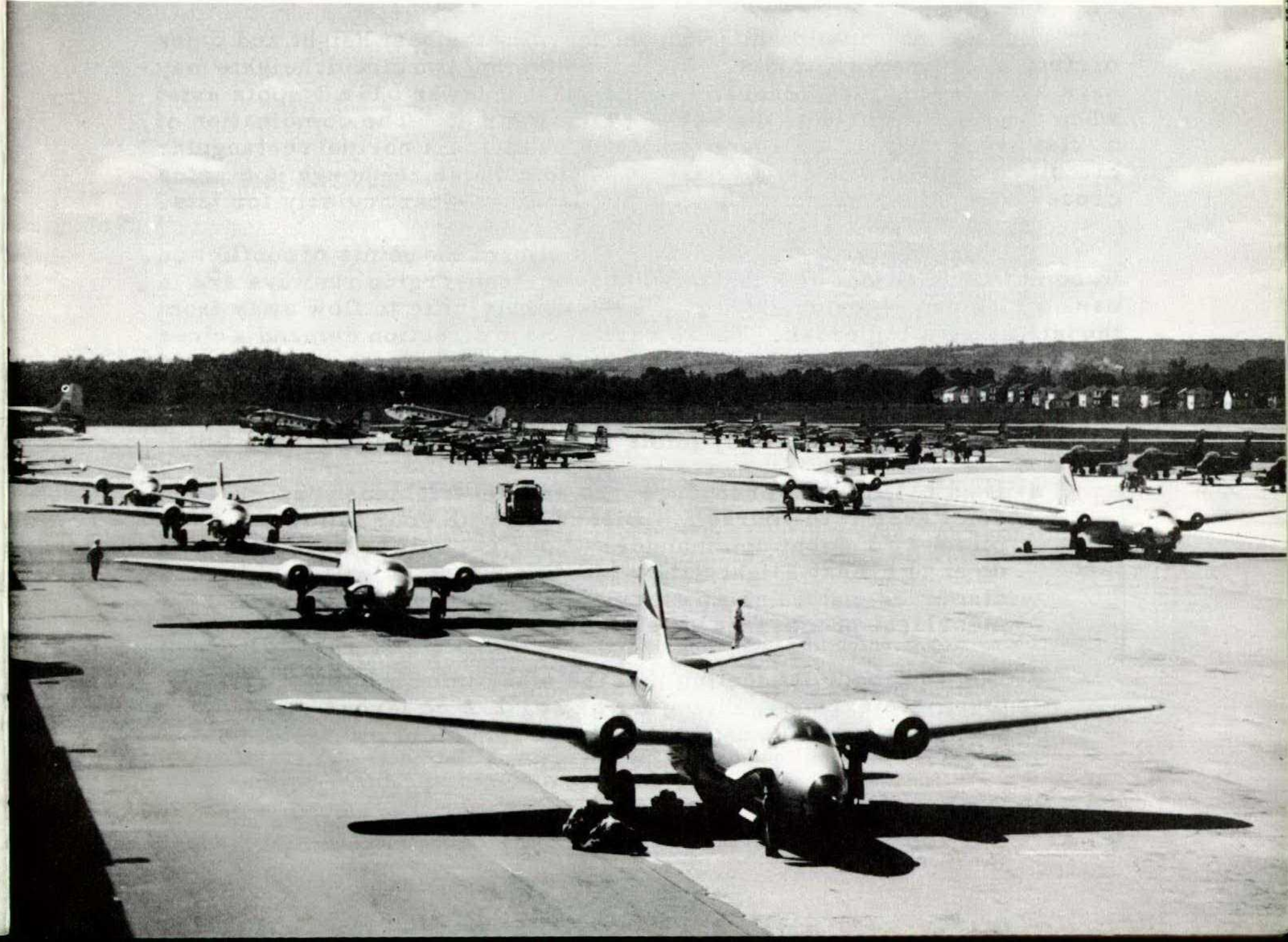
Crossing Runways

Intersecting runways are probably responsible for a greater number of actual "near misses" than any other runway combinations. This is so—despite the fact that landings and takeoffs under these circumstances can be handled with the most positive control possible at an airfield—because of the possibility of error on the part of the tower, the tender controller and—particularly—the pilot. Cases of pilots taking off or landing without clearance, visual or otherwise, are well known and sadly remembered; and the result, when another aircraft has been cleared on a crossing runway, if not injury, death or simply material damage, is at best one of those oft-discussed "moments of stark terror" for all concerned. This type of hazard can be minimized—by both pilots and flying control—through observance of a few rules:

- Avoid using crossing runways when surface wind velocities permit safe handling on another piston runway;
- Take overshoot action early when a prohibitive signal or an overshoot is given;
- Ensure that the tender's signalling equipment is operating at its best;
- Acknowledge, by repeating back to the tower, any instruction other than a clearance to take off or land—e.g., "314 holding" or "314 overshooting";
- When confliction is apparent, identify the aircraft involved more fully than normally, and use such terms as "Jet 273" or "Harvard 2693";
- If traffic intensity requires that jet and piston must be overshot on intersecting paths, restrict one type temporarily until the other subsides. Such grouping may also be necessary during takeoff periods.

The Single Runway

Right about here the reader may well ask, Why contend with converging and intersecting traffic? Why not use one runway for all aircraft?
(see page 6)



The pros and cons of using this system have been much discussed and some aerodromes find it preferable to others. Basically the deciding factor is the number of different types using the same aerodrome—and the consequent variety in landing speeds and landing runs. If the piston training commitment is large, delays will result from excessive overshooting of aircraft. Blind spots, created when different types join the final approach at a number of points; the high overtaking speed of the jet aircraft; and the jet blast—all are undesirable features of the single-runway setup.

A sudden jet emergency requiring an immediate landing would obviously be a dangerous situation if the one runway was already occupied. Many of these disadvantages would be non-existent in the case of dual runways long enough to accommodate all types. However, even where single-direction traffic is the normal system, prohibitive crosswinds for piston aircraft must be considered.

The Circuit

Here again, opinion may vary concerning the best height and types of circuit for pistons and jets. While maintaining two circuit heights may have advantages, it is generally conceded that fewer blind spots exist when the circuit height is the same for all aircraft. The combination of a "flat break" type of approach for jet aircraft and a normal rectangular circuit for pistons is one workable system which, although it creates cross-over paths, appears to expedite landings—particularly for jets.

Varying the circuit direction will minimize the points of confliction in some combinations. For example, when converging runways are in use, a right-hand piston circuit will allow the traffic to flow away from the jets using a left break. These variations in direction demand a close study at each aerodrome because the apparent advantages of the system may prove to be an illusion in practice. Avoidance of blind spots is the essential element. The maintenance and development of safe, efficient control may be greatly aided by pilots if they will think along these lines:

- If an established procedure irks or even frightens you, don't keep it to yourself. Discuss it with your fellow pilots and flight commander. Your OC will bring it up at the next Flight Safety Meeting where it will be discussed and perhaps remedied. Remember that most local procedures have been developed in this way.

- Don't harbour the feeling that the other pilot is being given preference. Flying Control has no favourites—nor has it any love for the impatient pilot.

- In the circuit do your utmost (unless you are busy avoiding another aircraft) to follow the pattern the other pilot expects of you. And above all: LISTEN AND LOOK OUT!

*

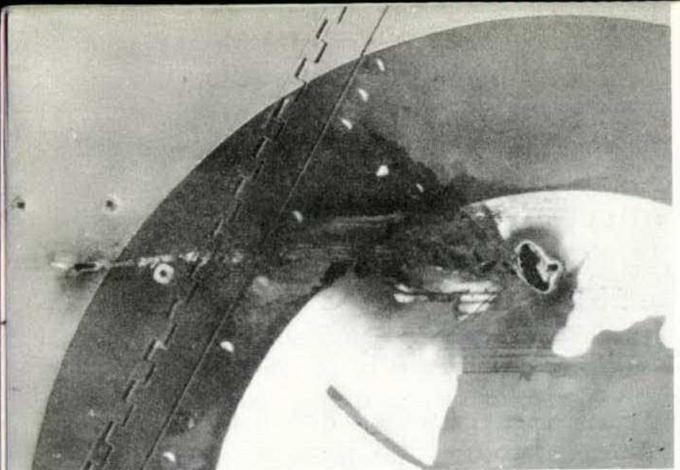
THE READER is not expected to agree entirely with what has been said here. On the other hand we have endeavoured to provide a representative cross-section of opinion that has been advanced on the problems and solutions peculiar to this particular phase of flying activity. In the end, regardless of what procedures your unit adopts, their success will depend mainly upon the unremitting vigilance of both pilot and flying control.

THE AUTHOR

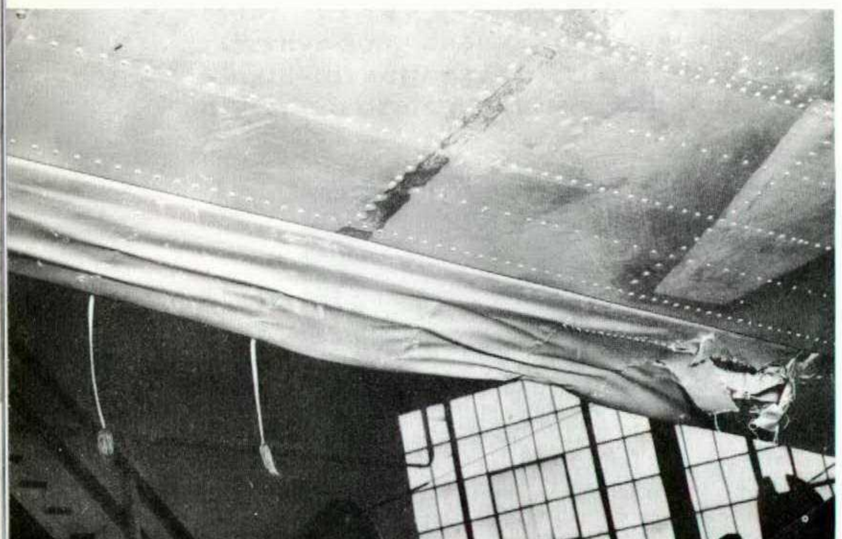
F/L R.E. MONCRIEFF has been Senior Flying Control Officer at RCAF Station Trenton for the past four years. He enlisted in the RCAF at Trenton as a meteorological observer in September 1939. As a corporal in this trade he remustered to aircrew in April 1943 and was commissioned as a navigator in February 1944. In this capacity he subsequently served with 6 Bomber Group, 408 Squadron, until the latter flew to Canada in the summer of 1945. After a brief period with Winter Experimental Establishment at Stations Gimli and Edmonton, he reverted to NCO rank and Met observer and served at Rockcliffe and Trenton.

Upon being commissioned in the flying control branch of air services in January 1951 he attended the flying control course at Centralia, becoming a controller at that station following graduation. In May of 1952, F/L Moncrieff was transferred to Trenton to take over the flying control position he presently occupies.

How's YOUR *Judgment?*

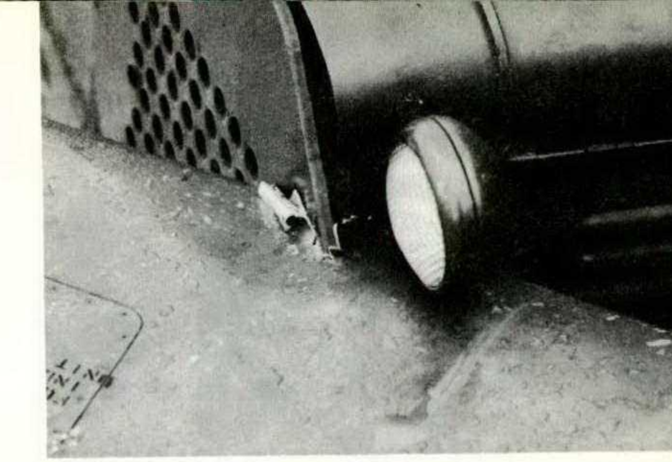


Torch, or cannon fire? Neither. A Sabre rolled into a faulty energizer and suffered third-degree burns.

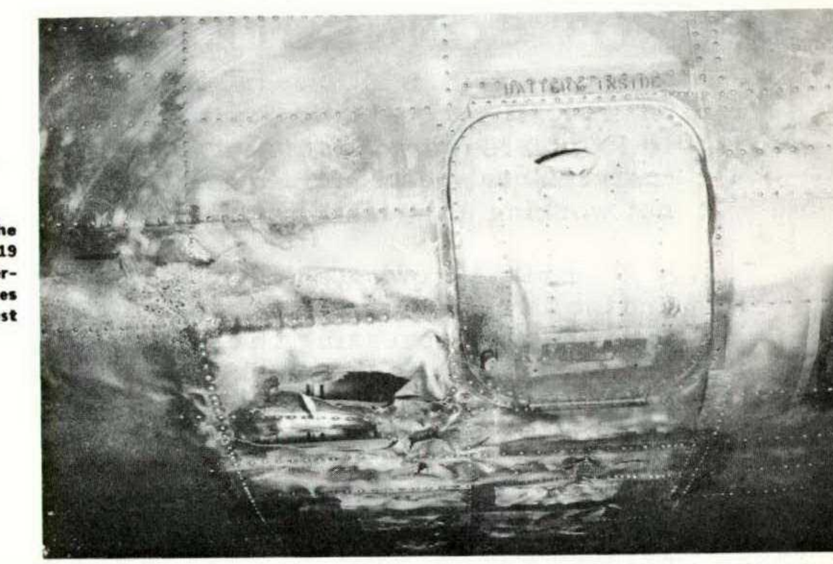


He was an ME driver. (Hurrah!) Comin' into the hangar. (Boo!) Spots propeller on the floor. (Hurrah!) Swerves hard to miss it. (Boo!) Misses it. (Hurrah!) And hits an Expeditor wing. (Boo!) He was no driver! (Silence).

Shall I cut 'er fine or leave lots of room? The guy towing this Harvard gets a big goose egg for the wrong answer. But who left the snow pile there?



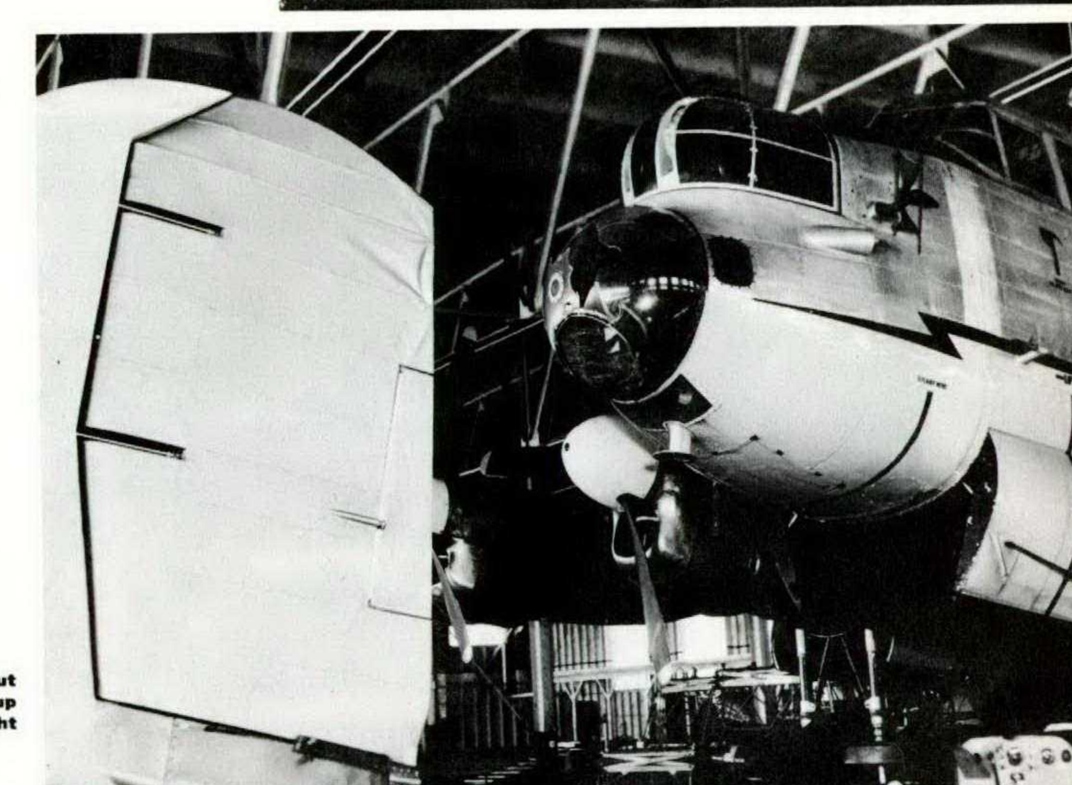
Beware the mule! This one went into a skid and took a long deep bite at the leading edge of a Sabre wing. Remedy for Sabre-gouging by mules: Good judgment and careful handling.



There was some gas on the ground, see. So this here C-119 backfires on starting. Y'understand? So then the gas ignites and burns the 119, see. Just the facts, ma'am.

Hard stuff is rough on props. Here's a Chipmunk propeller after a ground run. Could be nose went down? Could be tail went up? Could be stick not back hard? Could be somebody doing poor job? Could be, Hell! WAS!

They sure pick on these Lancs! The tow bar could be a shade longer, yes. But why didn't the man on the mule notice he was sliding into that rudder?



A Lanc has received a bust in the snout from a Dak's tail. Dead-Eye Dick up front on the mule was angling for a tight fit. He made it, all right.

NOT CONNECTED

Waiting in a Canuck with my squadron I received orders to climb to 35,000 feet and intercept a B-47. At about 25,000' I was checking instruments when I noticed for the first time that my oxygen blinker was not working although I had the system turned onto 100%.

I made a quick check of the oxygen connection between my helmet and the aircraft hose and found it to be correctly fastened. Then I checked the regulator, pressing the high pressure test button. No oxygen was coming through to the mask. My next action was to pull the emergency oxygen release toggle on the seat rack to supply oxygen while an attempt was made to sort out the trouble.

Suspecting that the oxygen lead on the right side of the seat might have become disconnected from the aircraft supply, I groped blindly around until I located it. Sure enough the line was open. As soon as it was connected, the oxygen supply flowed normally.

During scrambles it is easy to forget.

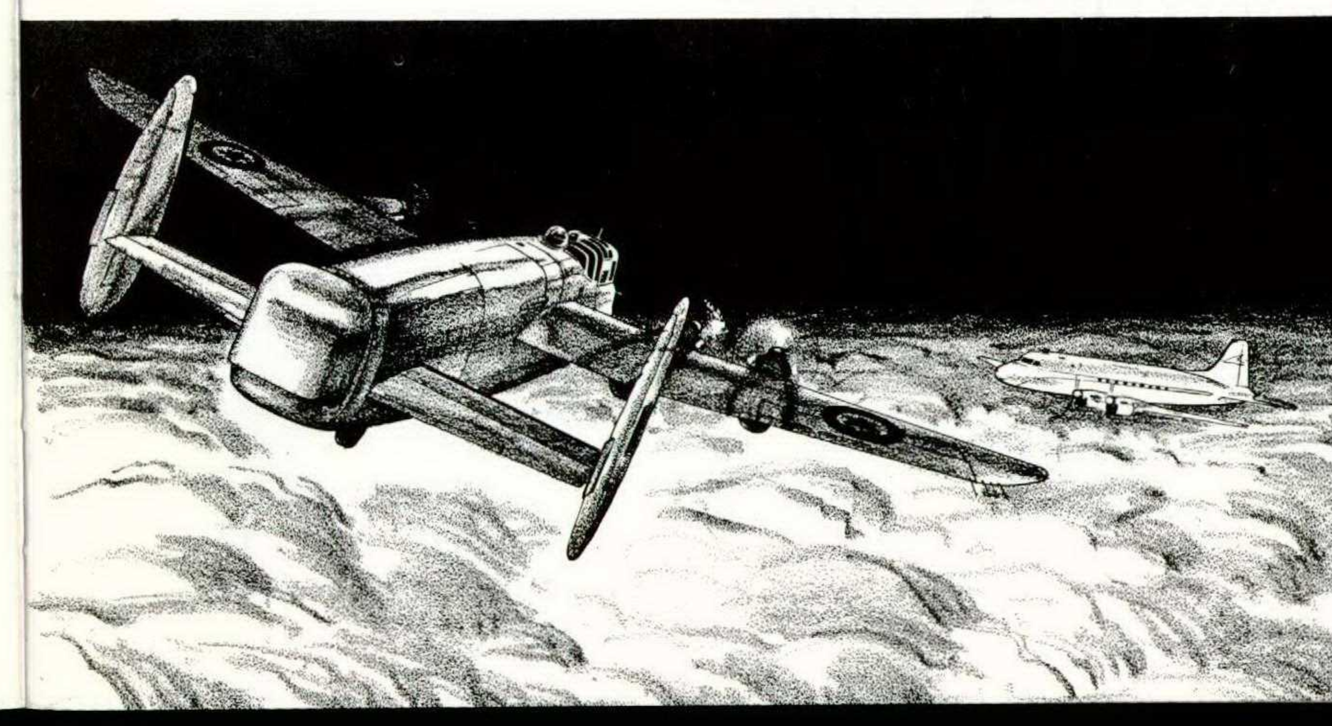
In my opinion this was an exceedingly dangerous situation. Particularly during scrambles it is quite easy to forget to look at the blinker. If there was a lot of activity in the air, an inexperienced pilot might forget to check the blinker at all—with disastrous results. The seat of my aircraft had apparently been previously removed and then re-installed. An armament technician had marked it "serviceable" on the DI. Unfortunately, the oxygen connection was forgotten.

Recently a Nav/AI in the same squadron passed out at 40,000 feet for the same reason. (Luckily it wasn't the pilot.) I don't believe the remedy is to expect the pilot to carry out a pre-flight check to ensure that this oxygen connection is correctly fitted. Pilots are practically DI'ing aircraft at the present time. Some positive procedure should be adopted to ensure that when a seat is taken out and then replaced in the Canuck, a responsible NCO will personally check the oxygen hose connection prior to signing the L14. Maybe an entry to this effect in the L14 is necessary. Whatever the solution, I urge that this incident be brought to the attention of all Canuck units and that some remedial action be taken.

COLLISION COURSE

Cleared to the airport for a standard range approach, the Lancaster pilot descended to the minimum enroute altitude of 2000 feet and held his inbound heading of 200°. Just then he heard the tower clear a civilian DC-4 to take off on runway 07 and climb to cruising altitude on the same heading.

When the DC-4 broke cloud, the two aircraft were on collision courses.



Suspecting that the tracks of the two aircraft would cross each other, the Lanc pilot at once queried the validity of the clearance. The tower advised that the aircraft were set up on diverging headings and therefore had adequate separation. Unconvinced, the pilot took emergency action by climbing just over a thousand feet to a thousand on top. When the DC-4 broke cloud, the two aircraft were on collision courses and evasive action was necessary. Alertness on the part of the Lanc pilot averted a possible disaster.

The moral of the story is: A little skepticism goes a long way. The pilot of the Lancaster managed to keep half an ear open for transmissions being sent to aircraft other than his own. It was just a small, extra precaution, but because he was smart enough to see its value and put it to work, he was able to eliminate the hazard introduced by another person's error and prevent a mid-air collision which would have reduced him—and a lot of other people—to an awfully dead statistic.

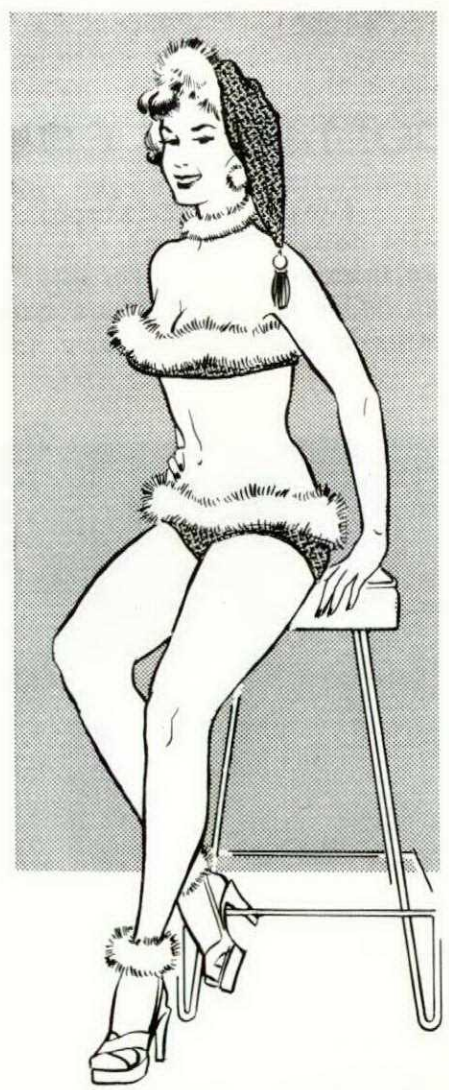
Season's Greetings!

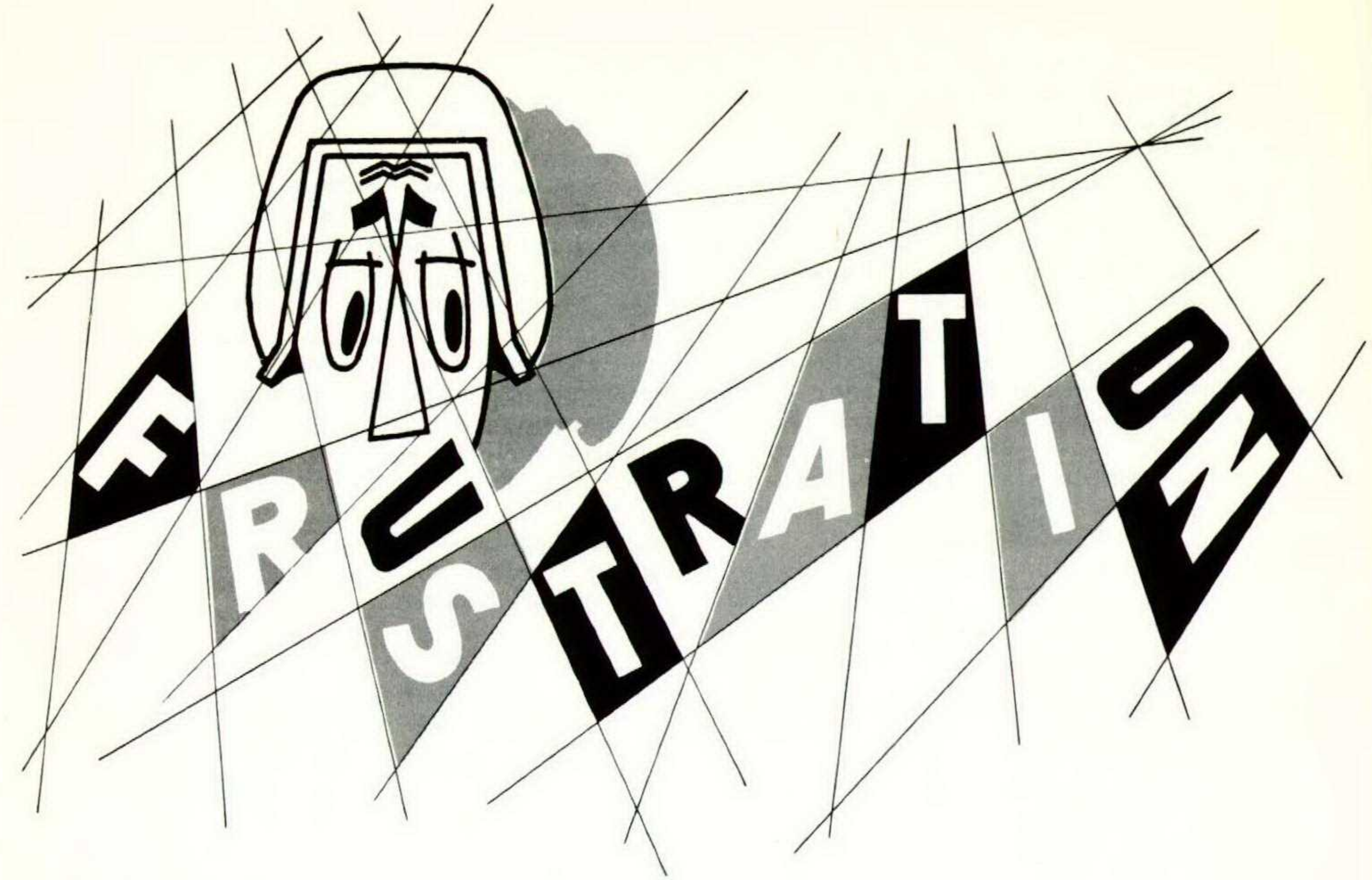
we join this little lady in wishing all our readers a

Merry X-mas

and a

Happy New Year





". . . To be or not to be, that is the question . . ."
Even Hamlet was a victim of this age old malady.

EVERYTHING WAS GOING FINE. The coffee tasted good—a little cool, but good. In-flight lunches were passed around. Not exactly a Waldorf smorgasbord, but no complaints were heard from the crew. They were heading south, and best of all—HEADING HOME.

The engineer was digging for the mustard in his lunchbox when he heard the first groan of a prop trying to show off with a few extra rpm. The propeller warning light was blinking like the "tilt" on a pinball machine. Glancing at the tachometer, the engineer noted No. 3 pointer was having fun dancing around No. 4. He pushed his chow aside and slipped No. 3 prop lever into the fixed pitch position. This didn't cure the situation; the prop rpm continued to fluctuate. After running the gamut of known remedies, the engineer called to the aircraft commander, "Can't do much with it, Sir."

"Yeah," nodded the aircraft commander, looking over at the co-pilot. The co-jockey caught his glance. "Don't look at me," he blurted, "I didn't do it!"

Amidst the drone of the engines, punctuated by a periodical grunt from the ailing prop, the aircraft commander felt the eyes of the other crew members focused on him. Pressure had begun to build up. "What's the decision? Shall I try to nurse this sick prop to destination," the aircraft commander pondered, "or shall I turn around and take the crew back to that—that deep freeze?" His thoughts began to fly thick and fast: "That prop doesn't sound so bad. It could get worse..... Will the crew think I'm chicken if I abort? They're expecting me at my home base. I've already had one abort this month—promotions are tough enough as it is....." Our aircraft commander is now a victim of that common and inevitable part of human living—FRUSTRATION.

What is frustration? "All mixed up," is the usual reply. But it's not quite that simple. The psychologists divide frustration into three types: CONFLICT, ENVIRONMENTAL and PERSONAL.

Making adjustments in life's situations is a never-ending process of overcoming obstacles to the satisfaction of our biological drives, our appetites and our derived motives. These obstacles are of many different kinds. They range from a broken shoelace to physical defects or to situations such as we introduced at the beginning of this article: the propeller that won't behave. Regulations, Tech Orders and SOPs are aids —and AIDS ONLY—to the aircrewman who must make an adjustment to these continuing situations. The particular reaction any given person will make to a frustrating situation depends first upon the nature of that situation, and second upon the many factors in the individual's life history—i.e., training and emotional experiences.

First, let's talk about the brand of frustration stamped "conflict". This type arises when an individual has opposing drives and must choose whether to satisfy one drive or the other. For example, between studying and playing ball, or between painting the house and going golfing with the boys. This is the brand of frustration our aircraft commander is now facing. He and his crew want to go home. They have just spent a few uncomfortable days at a northern base and are finally heading south. With a prop acting up, the aircraft commander must make a decision. What does he do? The record shows that he aborted and returned to base. "Monday morning quarter-backing" of the situation seems to belittle the magnitude of the decision; but at the time it took place it was very real and big to the aircraft commander. So much for "conflict frustration".

For an example of the second type of mental misery, "environmental frustration", let's follow the big bird as it pulls up on the ramp back at "Deep Freeze". The engineering officer met the aircraft commander as he climbed down the nose loading door. "Wha' hoppen?" he asked.

"It's that blamed No. 3 prop. Get some of your so-called specialists together—that's No. 3 engine there," the aircraft commander growled, pulling the parka over his head. "Better get the details from the engineer." With that he reached up and took his briefcase, which was handed down by the co-pilot, and headed toward operations.


The white stuff was beginning to drift across the field.

"What's eating him?" the surprised engineering officer questioned the co-pilot.

"We thought we were on our way home—not that we don't enjoy being here....."

"You can cut the guff," put in the engineering officer. "We love it here too! We'll do all we can to get you on your way again."

"Thanks," smiled the co-jockey and started for ops, stepping through the snow in the footprints of the aircraft commander.

Five hours, six cups of coffee, three sandwiches, and eight calls to the engineering section later the aircraft commander was in no mood for frivolity. Weather was deteriorating at about the same rate as his disposition. The white stuff was beginning to drift across the field intermittently. Finally the good news came.

"Sir," the cold, frostbitten crew chief began, "I thing we've fixed it. Would you run it up for us?" He jumped aside as the No. 1 driver made a dash across the ramp, through the access door and up to the cockpit. It checked out O.K.

"How about the snow on the wings and fuselage?" asked the scanner over the telephone.

"How much we got?" queried the aircraft commander.

"Quite a bit."

"O.K.—you boys brush it off while I run into ops and get the clearance going. Make it snappy," he added. "We've got to be off the ground in 25 minutes or we'll have to take another crew rest. Our duty time is running out!"

Was this crew ready to fly? By no means! Tempo was running extremely high. Rush-rush-rush was the order of the day. With their mental attitude, even the smallest emergency could easily have mushroomed into complete disaster. Our aircraft commander possessed a full dose of what is known in psychological circles as "environmental frustration".

Everyday examples of environmental frustration are not hard to find. Take the young college graduate who cannot find a job during an economic depression, the orphaned child whose need for maternal affection goes unsatisfied in an institution, the driver who gets a flat tire in the middle of nowhere. All these individuals have some drive or motive which is frustrated by circumstances outside themselves, conditions completely beyond their control.

Finally, here's a situation that demonstrates the third type of menace to aviation, "personal frustration". The pilot had just finished his checkout in a T-bird. It was his first experience in a jet, but he made it through the transition course in good shape. Two days later he requested, and was allotted, one each T-bird for a crosscountry and CRT purposes.

At 35,000 feet the world looked wonderful! The airspeed indicated 220 knots. "That's roughly 390 knots true! A B-25 was never like this," he thought. Then the lush green countryside disappeared suddenly. "Lots faster than a B-25," he again ventured. Ten minutes from destination he received the weather: "Six hundred feet obscured, visibility 2 miles with blowing dust, wind right down the runway at 15 knots." The jet neophyte mulled over the report. He possessed a green card and had over 4,000 flying hours. He had also busted worse landing conditions than those existing at his destination—but in a B-25, not a T-bird. How about fuel? Enough to make one, and only one, approach. And then, if he missed, it's head for the alternate.

By this time he was over the range. Beads of moisture dotted his forehead. This wasn't exactly a "no sweat" situation. Approach control called and asked if he was ready for his penetration; GCA was standing by. Write the ending to this little quandary yourself while the author makes a point.

Personal frustration didn't make its appearance with the jet age; its been here for a long time. For instance, there is the boy who wants to play football on the college team but is thwarted by his lack of skill. Another boy wants to be highly popular with girls but is hindered by superficial unattractiveness.

"O.K. Doc," says someone, "I'm on the couch; just how do I overcome these moments, or hours, of nerve-wracking frustration?" The first thing to remember is that thrashing about only muddies up the waters

of reasoning. It is certainly possible for a person, when he meets frustrations, merely to work blindly, using some technique poorly adapted for reaching his goals. Obviously, however, the most worthwhile results call for a realistic investment of hard work and training.

No football star ever made his record without strenuous training; no musician ever attained world acclaim without hours of patient practice daily; and no airman, pilot or scanner, can get the necessary mastery of good techniques and judgment without proper training, study and hard work. An airman well prepared mentally and physically is ready to meet the situation—head on if need be. The chief mark of a well-adjusted person is his ability to recognize the demands of reality and to meet them willingly. The rationalizer and procrastinator will always run into trouble.

Sometimes the frustration which a person suffers is a product of his own analysis of his situation, rather than any defects in the situation itself. It sometimes happens, therefore, that the main thing which the person needs—but often not an easy thing—is to get a more sound interpretation of the situation. This would apply in many maintenance delay problems the pilot often encounters.

Instead of wearing out the rug in base ops and burning up a week's supply of "fags", he could relieve the high frustration pressure by participating in solving his problem. Why not find out just what aircraft parts fouled up? Maybe the crew chief needs some rank to help obtain the necessary repair parts a little faster. Sometimes transportation is a problem. Use your influence as an aircraft commander to get a vehicle. You will be surprised how well folks will co-operate if you do your part. Be careful not to turn your frustration on an innocent bystander. This is known as the "scapegoat" mechanism. Did you notice how the aircraft commander took a bite at the helping hand of the engineering officer? This is a sure way to lose friends and confuse things from the very beginning.

Another suggestion for subduing frustration: DON'T FIGHT THE PROBLEM! If the tire is flat, ranting and raving won't pump it up. If a prop is uncontrollable, don't get the everybody's-agin'-me complex; get on the ground and get it fixed. If the weather and your proficiency are both pretty low, give the gray cells and the blood pressure a break. Many a frustrated pilot has found an aid for making up his mind by remembering the old saying, "When in doubt, cancel out."

And don't expect to make a drastic change in your personality overnight. Remember, it took years to develop the one you now possess. But here's a bit of philosophy that might help the next time the whole world—including weather, operations, and maintenance—turns against you: " 'Tis better to light a candle than curse the darkness."

USAF: Mats Flyer

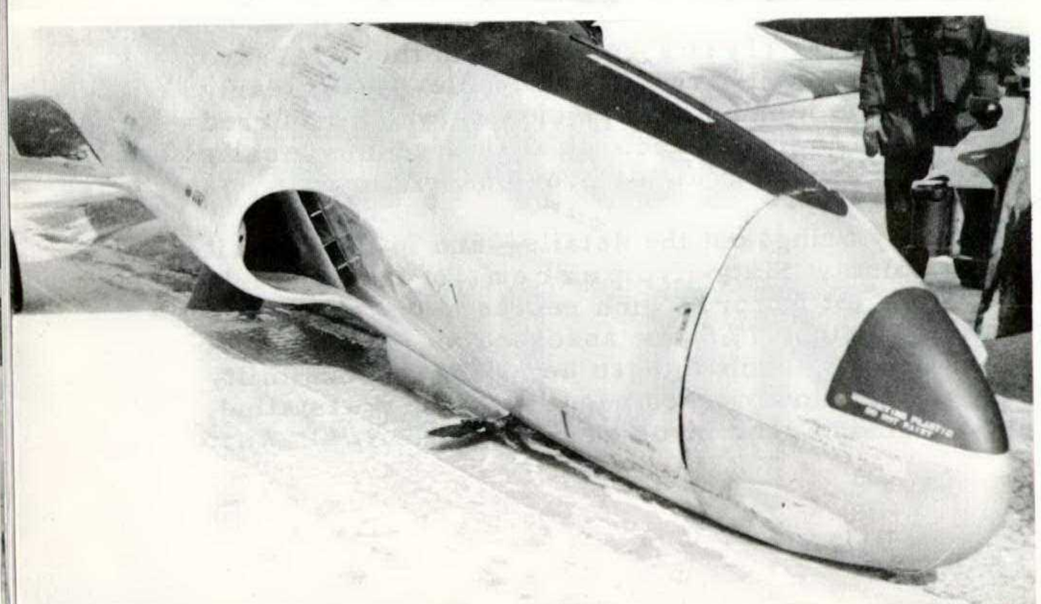
A BACKWARD GLANCE

LIKE DEATH AND TAXES, winter flying conditions in the RCAF are inevitable. However, winter accidents are NOT inevitable—as is clearly shown by the decided drop in the incidents and accidents which occurred during the winter of 1955-56. At first glance the news seemed really good: Number of accidents down 40% over the previous winter!

A closer look invariably brings out the details—and in this case it introduces a few sobering points. Sixty-five percent of last winter's accidents were assessed as Pilot Error, which represents a slight rise over the previous year. A further 7% were assessed as Maintenance, 8% as Briefing and 12% as Ground, each of these being the responsibility of some individual. The biggest blow of all comes when these are totalled, for they then show that the Human Error involved amounted to 92%! What

92% of last winter's accidents were caused by Human Error.

The pilot pulled off early and had a wing stall.



This undershoot was caused by whiteout.

this means is that winter conditions were entirely to blame in only 8% of the accidents. Perhaps it is stressing the obvious to say that there appears to be some room for human improvement.

Nevertheless, the most important conclusion to draw from this survey is one of optimism: The statistics for last winter demonstrate conclusively that our accident rate can be greatly reduced. So the question arises, How do we go about it? Possibly the answer can be found by reviewing exactly what happened last year.

Pilot Error

The accidents which resulted principally from Pilot Error are set down under four headings: takeoffs, landings, taxiing and whiteout conditions. "Running off the runway" pretty well covers the accidents that happened during takeoffs and landings. In many cases aircraft drifted to one side of the runway where a wheel or a wing tip caught a snowbank or loose snow. Both students and trained pilots ran into this sort of trouble. It may sound trite and unconstructive, but there's no other way to suggest a remedy than to repeat again: KEEP YOUR AIRCRAFT IN THE CENTRE OF THE RUNWAY.

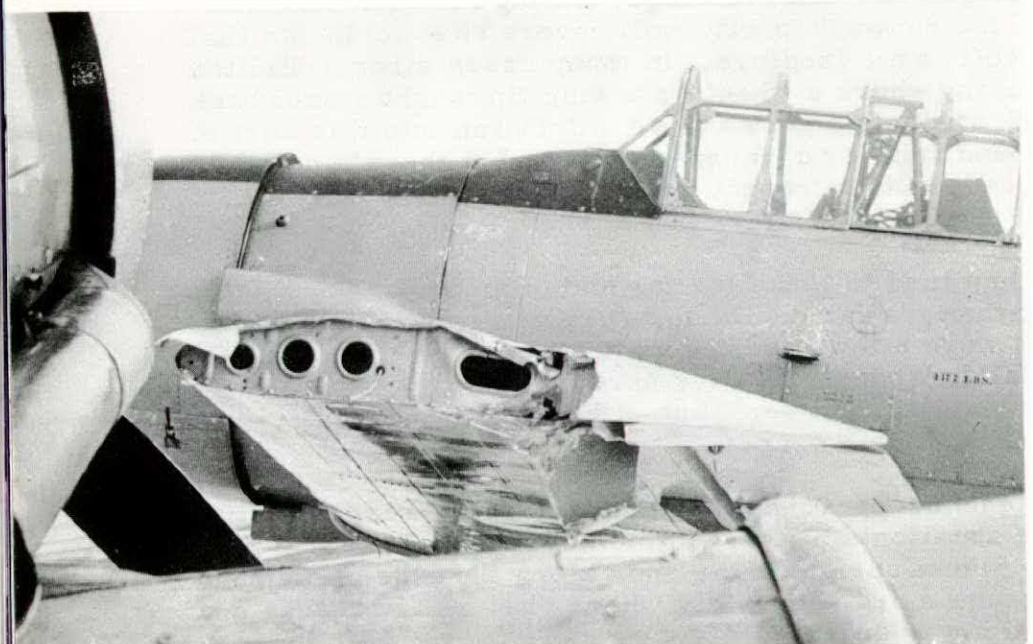
Winter conditions tend to make the far end of an ice or snow strip come up a lot faster than the far end of an asphalt runway. Under these circumstances there were a few cases of aircraft being pulled off early and having a wing stall. What is the cure here? There isn't one of our readers who doesn't know the answer, but—like onions and garlic—we repeat: USE THE WHOLE RUNWAY.

Airfield maintenance personnel have considerable responsibility here for the safety of a station's pilots. Remember that light evergreens (or other indicators) placed upright in the snow along the edge of the runway help a pilot to gauge more accurately where the centre line is and show him where the runway ends.

Taxiing was a major source of accidents (as usual!) last winter. Looking over the records one is appalled at the frequency with which "too much hurry" appears. This haste factor, in several guises, stands out in almost every taxi accident reviewed: taxiing too fast, not waiting for a marshaller, and ploughing through a snow drift because the pilot was sure his aircraft would clear it. If most of the pilots involved in these taxi accidents had taken just a few minutes more they'd have avoided a Pilot Error accident.

Whiteout conditions figured in a variety of accidents from undershoots on landing to just plain confusion on the ground when pilots landed alongside rather than on the runway or, after landing, turned off onto the infield rather than along a taxi strip. Be concious of what whiteout can

Met failed to warn the pilot about the presence of freezing rain.



One of the taxi accidents caused by too much hurry.

Students and trained pilots hooked wheels and wings in snowbanks on takeoff.

do—and stay alert to its treachery. Remember that a few minutes' extra checking may keep you out of trouble.

Briefing

Eight percent of the accidents occurring in the 1955-56 winter period were caused by poor weather briefing. Inadequate Met information was the direct cause in one case, for the pilot had not been told of the presence of freezing rain. Since that event, all personnel concerned with briefing have been urged again to get complete Met information to aircrew prior to and during flight.

Supervision, too, came in for censure when several accidents occurred because both students and trained pilots had been inadequately briefed on problems peculiar to winter operations. The boards conducting the investigations pointed out that appropriate lectures, drills and briefings prior to the onset of the winter season provide the surest means of eliminating this particular problem.

Maintenance was responsible for 7% of last winter's accidents.

Ground

Unsatisfactory airfield conditions contributed to 12% of last winter's accidents. In view of the fact that a great number of people—from the snow-plow operator to the CO—are involved in the maintenance of good ground facilities at an airfield, it is evident that a high degree of co-operation and a genuine appreciation of the conditions which contain a potential threat to the safety of aircrew are prerequisites if the accidents in this category are to be reduced.

*

Only the major hazards arising from the RCAF's experience in the 1955-56 winter season have been dealt with here; obviously many more than these exist. That they did not contribute adversely to the picture is due to two factors: increasing awareness by all personnel of the problems we face and a continuing educational and work program directed at overcoming flying hazards. The success achieved in reducing the number of accidents and incidents in the RCAF last winter is a convincing argument for intensifying our flight safety program and a challenge to improve that record even further this winter.

12% of last winter's accidents were assessed against Ground.

The Otter Flap

One has the greatest sympathy for the squadron flight commanders and engineering officers of today when they complain about the amount of paper work expected from their organizations. Are all these submissions, returns and reports really necessary? Is it worthwhile to spend time preparing a UCR or an operational hazard report, or does some staff type merely file them away and forget about it? We would like to tell you the story of the Otter flap and let you be the judge.

The Otter took off and climbed away to the north for an air test of a new flap installation. Shortly after, two eyewitnesses saw the aircraft level off below a 2000-foot overcast. As they watched, the aircraft nosed down sharply and broke up as it fell to earth. It was later found lying on its port side in several feet of snow. There were no survivors.

Fuel was spread all over the area, and the starboard wing (still attached by one fitting) was sprawled ahead of the aircraft along its line of flight. The port wing had sheared off about five feet from the root and was located along the flight path, 800 feet behind the main wreckage, with the entire tail assembly adjacent to it. Port wing flap and aileron units were scattered further back along the track of the aircraft. Close examination revealed the presence of wrinkles parallel to the chord along the entire underside of the starboard wing with two heavy creases near the root, one of which was approximately five feet out. The supporting strut had collapsed and pierced the under-surface of the wing at this point. Something had caused the aircraft to nose over so violently that a severe negative load was imposed on the wings.

From the evidence it was concluded that the port wing had failed first, thereby relieving the load on the starboard wing. After shearing off it rolled down under the fuselage, came up on the starboard side and then wiped across the tail—up on the starboard stabilizer, across the fin and down on the port stabilizer—effectively severing the entire empennage aft of the rear bulkhead. Finally the trunk of the aircraft and the starboard wing rolled to the left and literally fell out of the sky.

*

Before any wreckage was moved from the crash site, each part—down to the smallest metal fragment—was carefully marked and plotted on a chart of the area for a future flight path disintegration calculation. In addition, every piece of wreckage was photographed and catalogued in case any evidence was damaged or destroyed in transit.

Meanwhile, the investigation continued in other directions. Scrutiny of air traffic records and interrogation of interested witnesses showed conclusively that no other aircraft had crossed the Otter's course. Met reports showed only light turbulence and a northerly wind at 20 knots, so the weather phenomenon angle was also dropped.

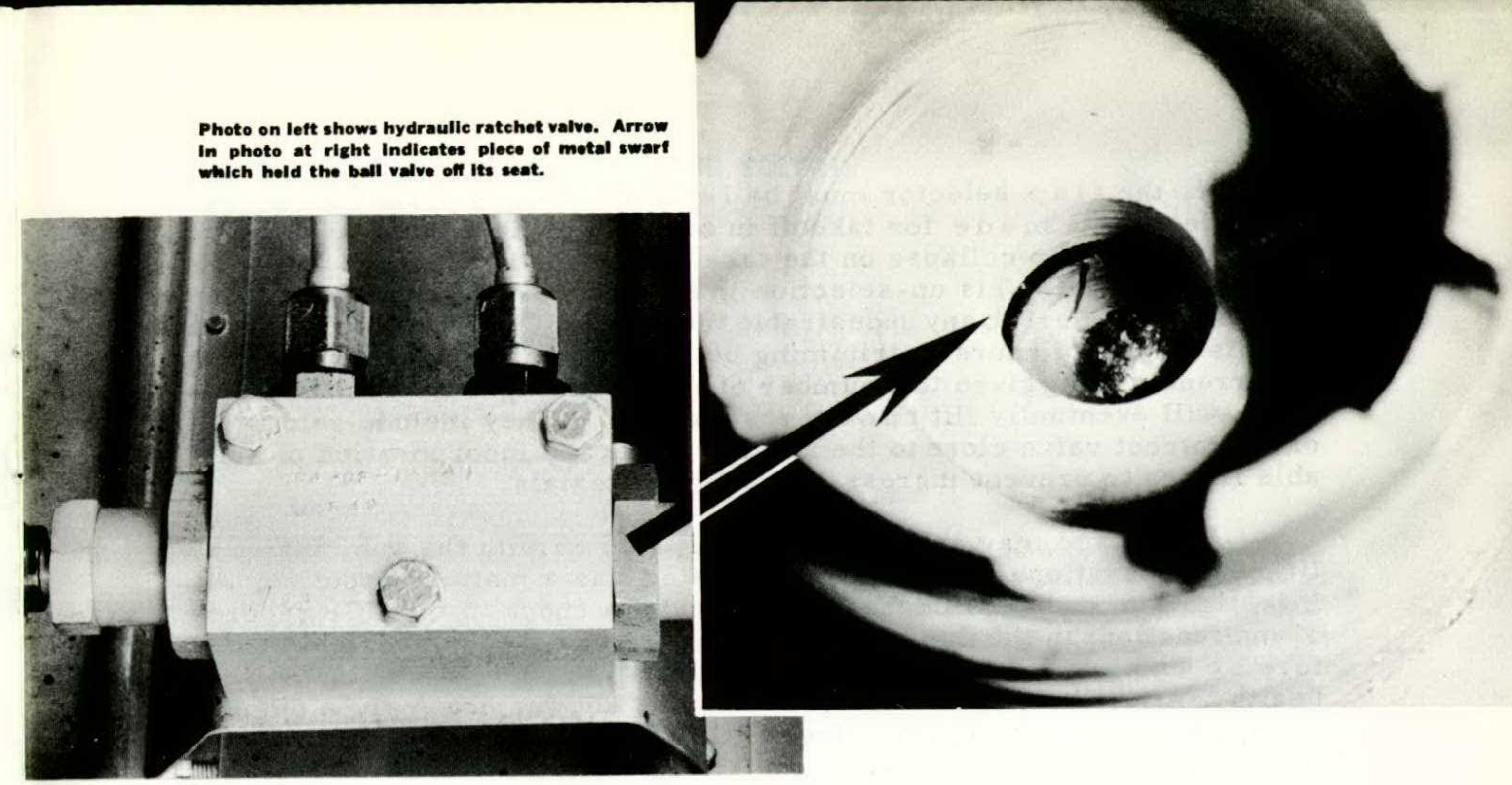
Eventually trim setting and flap selection emerged as the only possible cause of the crash. The entire wreckage was flown to the manufacturer so that the investigators could use the test rigs and other equipment available at the plant. In the ensuing weeks the bulk of the contractor's engineering team made a comprehensive check of the entire aeroplane, right from the design stage. Soon it became apparent that this accident and a previous Otter crash at Downsview, Ontario, were closely related.

*

Physical failure of the flaps themselves could not be substantiated although the aircraft's history made such a failure a possibility. The flap hydraulic system was again checked—this time under laboratory conditions—but a flap collapse could not be simulated. Trim continued to appear as the key to the problem, for although the aircraft (in both accidents) had been trimmed for full-flap configuration, it was established that the flaps were up when they separated from the aircraft. However, the engineers were unable to simulate a trim runaway under any set of conditions.

Then, for the nth time, the flap hydraulics were checked and the ratchet valve given another close scrutiny. Just for comparison, a valve of similar age was ordered from the plant stockroom. When it appeared it bore a red tag, indicating that it was unserviceable. Now, because this valve is a simple gadget, there isn't too much that can go wrong. So the crew that had unearthed it in the first place were asked the story on it

Photo on left shows hydraulic ratchet valve. Arrow in photo at right indicates piece of metal swarf which held the ball valve off its seat.



before a strip was undertaken. They reported that the valve had malfunctioned during a ground test, the flaps sinking to a "down" position of their own volition! To cure the trouble they simply replaced the defective valve.

Now that the scent was hot, the valve was x-rayed and a minute sliver of metal swarf was found jammed under a ball-valve in such a way as to hold it off its seat. Armed with this knowledge the engineers performed careful rig tests and managed to simulate a flap collapse which fulfilled their requirements.

Next, the tests were carried to the flight-test stage where speeds, times of collapse and G rates were calibrated on a specially stressed aircraft. At last it was proved conclusively that, (at the higher flap-down speeds and with the aircraft suitably trimmed) if a flap-up selection was made with the ratchet-valve jammed open, the flaps would collapse completely in very short order. Allowing only a couple of seconds time-lag for pilot appreciation of the situation, aerodynamic forces and airspeed build-up coupled so rapidly that stick forces required both hands—plus a third on the trim, supplied by an alert crewman—to avoid a disastrous negative G condition! All doubt thus dispelled, there remained the need to develop some corrective action.

*

As an interim measure, maximum flap-down speed of the Otter has been restricted. The flight tests proved that if this restriction is observed there will be no danger if the valve should malfunction because the resultant stickloads and forces would be readily controllable with one hand.

Further, the flap selector must be left in the down position after the flap selection is made for takeoff in order to obviate the possibility of a progressive flap collapse on the takeoff run. It is assumed that when a pilot does make his up-selection in flight he will, in view of these accidents, be alert to any undesirable trim change. He should also "milk up" his flaps, of course, trimming between selections. Consideration is currently being given to a number of proposed long-term modifications which will eventually lift these restrictions. They include relocation of the ratchet valve close to the actuating jack and incorporation of suitable filters to prevent ingress of foreign materials.

And so you may ask, What has this to do with the submission of UCRs or operational hazard reports? Well, as a matter of routine, the investigation conducted on the Otter included a check on the UCR records of malfunctions in the flap system. There were none. One might therefore be excused if he assumed that the flap system had a clean bill of health. After the cause of the accident was known, however, a number of reports were received (not from RCAF sources) regarding malfunctioning of the ratchet valves.

We find it strange and difficult to believe that the first malfunction of a ratchet valve in thousands of hours of flying terminated in a fatal accident. Could it be that some previous malfunctions were stoically accepted as being "one of those things" and not worth reporting? Or would it be more reasonable to assume that a conscientious staff officer who had received an appropriate UCR would have had the cause of the malfunction determined and corrected before the fatal accidents occurred? We think so. Do you?

WHAT'S THE ANSWER?

Q: What effect would approximately one-eighth-inch thickness of frost on an aircraft's wing have on its takeoff distance?

A: For every one-eighth inch of frost height up to three-fourths of an inch, the takeoff distance is increased by approximately 30 percent. If the designed takeoff distance is to be maintained, the needed decrease in weight becomes rapidly critical up to three-eighths of an inch where the decrease is a prohibitive 50 percent of the designed gross weight!

LETTERS TO THE EDITOR

Bright Idea

Enclosed is a copy of Flight Safety Digest, a local bulletin which I intend to produce and use to circulate Flight Safety information to the various units here at Rivers. The bulletin is not intended to replace existing publications, but will be used to give wider circulation to items which (because of the limited number of copies available) are not always accessible to the personnel needing such information. The material will include accident signals from AFHQ and TAC which have a local application, and items from USAF and RAF publications.

You will note that I have used a composite cartoon made up from drawings by Dubord which have appeared in Flight Comment. I would like permission to continue using these excellent drawings in articles which I intend producing in future bulletins. Also, could you advise whether I will be violating any copyright regulations by using material from RAF or USAF flight safety publications.

W. B. Cottnam, F/L
Flight Safety Officer
CJATC Rivers, Manitoba.

Your letter and Flight Safety Digest were reviewed with interest by the staff of Flight Comment.....There are no restrictions to prevent you using material from Flight Comment. Extracts can also be made from RAF and USAF publications. In all cases, credit lines should appear adjacent to the borrowed material. These lines could read, RCAF: Flight Comment; RAF: Flying Safety Review; USAF: Flying Safety. **— ED**

Extra! Extra!

Aircraft Accident and Maintenance Review, published by the USAF, is now available for general circulation among RCAF readers. Regular distribution to Air Force units will commence with the August issue. Although this publication is of interest primarily to maintenance personnel, we highly recommend it to all of our readers. AA and MR's over-all excellence makes it one of the most popular magazines received at AFHQ. For greatest utilization, see that the copies reaching your unit obtain the broadest circulation.

Helping Hand

I have just finished a wonderful brake to be put on aeroplanes. This brake I invented can stop a plane that is doing 400 miles an hour in less than 10 feet. Could you use it?

Willy Boggs
Jumpoff Junction, Sask.

P.S. Now I am working on an invention to keep the pilot from going through the windshield.

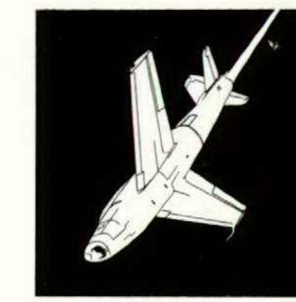
Willy, that sounds like one hell of a good brake! When you get the answer to problem two, we'll find a slot for you. — **ED**

FLIGHT SAFETY PRESENTS

SURVIVAL IN THE SNOW 14C/2042 | **FLYING FOLLIES - PART I** 14C/2663

THIS DOUBLE FEATURE HAS BEEN CHOSEN FROM A FILM SURVEY CONDUCTED BY TRAINING COMMAND. WATCH THIS SPACE FOR FUTURE BILLINGS. FILMS ARE LISTED IN CAP 428.

Accident Resumé



One Landing—Two Standing

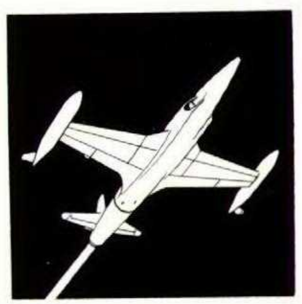
Numerous reports in these pages have dealt with the problem of aircraft stalling out on the approach. Usually the damages incurred are confined to one aircraft—the one that undershoots. In this case, however, three aircraft were damaged, thus pushing the cost figures well and truly into the higher brackets.

The pilot was on the approach as number 2 of a four-plane formation when his Sabre stalled 50 feet short of the runway. When the aircraft hit the ground it swerved onto the operational readiness strip where it struck a parked aircraft and caused severe damage to both. The

starboard drop tank broke free and struck a third aircraft, damaging it also.

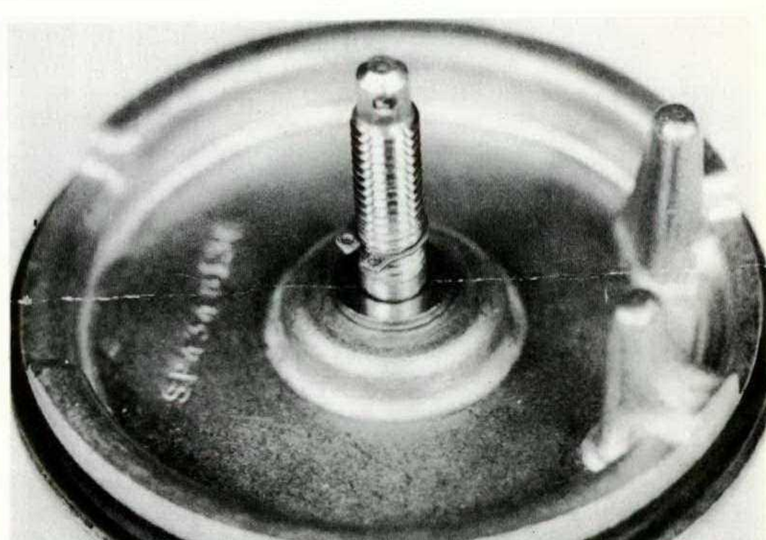
Without letting it develop into a mach-run, the pilot must maintain his approach speed at a figure sufficiently high to keep the aircraft flying safely until the runway is made.

Displaced Circlip



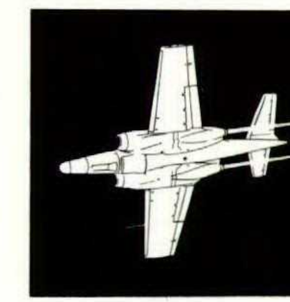
A tip tank which fails to feed can be a source of serious trouble to a pilot because of the low speed control problem during final approach. In a number of recent accidents and incidents the reason for non-feeding of tip tanks has been traced to the circlip shown in the accompanying photograph.

Examination of a salvaged tank showed that although the cap appeared to have been properly tightened, the ring retainer (part NAS 51-31) was not in the groove on the screw but had worked down onto the thread, as shown. When the filler cap is tightened the retaining ring will come up against the straddle bar into which the screw fits and act as a lock, thus giving the airman installing the cap the impression that it is secure when actually it possibly requires one more turn to seal the tank. Because of the small size of the retaining ring it has been suggested that it may be forced from its groove by pressure exerted on the ring by the cap as it is being removed. It will then work down the thread and jam when the cap is replaced.



Correction consists of drilling for and installing a small split pin. But let us have additional assurance against costly accidents by close checking of such vital components so that potential trouble may be spotted and eliminated before a photographer again has to take pictures like these. And pilots! Review your operating procedures so that in the event of a malfunction you will be able to do the right thing. The second picture shows the result of a pilot's failure to jettison his tip tanks after one had refused to feed.

Wait For It!

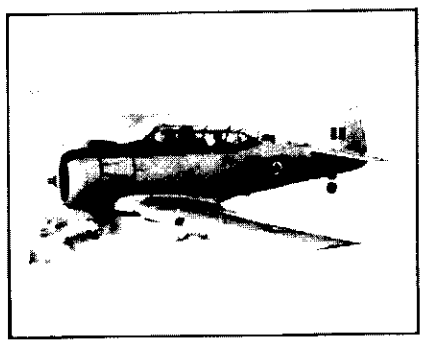


During the takeoff run and at a speed of between 110 and 120 knots, the pilot took his hand off the throttles and placed it on the undercarriage button in preparation for raising the gear when the Canuck became airborne. He stated that he could not remember making the up-selection but that he does remember feeling the button going down under his left forefinger.

The next thing he knew, the undercarriage had folded and the port wing struck the runway; but the pilot decided not to abort the takeoff and managed to get the Canuck into the air. He recalls six or seven distinct contacts with the runway before finally becoming airborne.

While he circled to reduce the fuel load, another Canuck pilot flew alongside and confirmed that there was serious damage to the undercarriage and the underside of the aircraft. Also, the Squadron Commander checked for debris on the runway before ordering the crew to eject after it was found that even the emergency system was out. The ejection was successful.

Immediate action was taken to correct a very bad flying fault. Granted, with modern high performance aircraft, the time left between becoming safely airborne and having to get the wheels up because of air loads is fast reaching the vanishing point. But nothing is to be gained by premature retractions. Until you are properly airborne, the place for that left hand is on the throttles—not on the undercarriage control. By operating any other way you are just asking for trouble. As has been stated in Flight Safety Foundation Bulletins, "Before you louse it up—THIMK!"



Exhibitionis Calamitosus

Since January 1955 Flight Comment has four times published reports of accidents resulting from unauthorized low flying and low aerobatics. The object of this publicity is to convince pilots in all stages of their careers that it is not worth it. The accidents are so similar that the Bird Watchers' Corner subject (on the inside back cover) tells the story in practically any case.

A student pilot took off in a Harvard on an authorized solo flying exercise which was NOT to include low flying. Twenty minutes later the aircraft was observed flying very low in the vicinity of a farm where the student was well known. The aircraft was seen to initiate a roll over the farm. When the manoeuvre was almost completed the Harvard suddenly executed a flick roll and crashed inverted in an open field opposite the farm house, breaking up and catching fire on impact. The pilot was killed.

The accident occurred outside the local solo flying area. The student was known to be weak on aerobatics and the Board was of the opinion that he lost control attempting an abrupt recovery from a roll at extremely low altitude. Some pilots of this type may live to be nurtured to maturity—but most don't. And death is so permanent.

Double Crossed

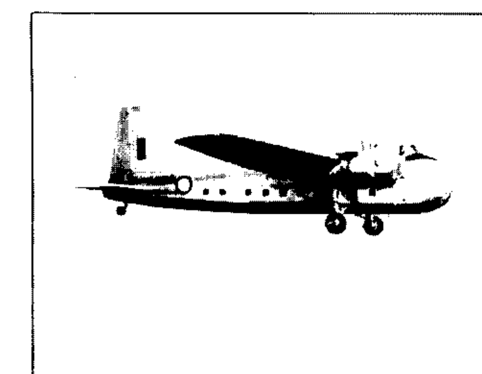
A pilot is dead because aileron controls were crossed twice and a so-called "finished" job was not inspected thoroughly enough. The starboard wing cables were incorrectly routed when the Harvard was undergoing repairs at a contractor's plant. The mistake was not detected because cable routing errors at the aileron bell crank and control column torque tube arms, in effect, cancelled each other so that the ailerons operated normally.

A subsequent starboard wing change was made during which control cables to the aileron bell crank were attached in accordance with EOs. However, mis-routing of cables still existed at the control column torque tube arms. This was not discovered, and the cable hook-up when the wing change was complete caused the starboard aileron to operate in reverse. The discrepancy was not caught on inspection.

Just after takeoff on the test flight the pilot reported difficulty with lateral control. Then the Harvard entered a steep turn to starboard and crashed, killing the pilot.

No matter what the pilot's pre-flight check consisted of, it is possible that he was led astray by an error in the L14 which recorded a port wing change when, in fact, it was the starboard. Through this error he may have concentrated his check largely on the port wing. The original responsibility for checking out the work rests with maintenance but, for their own protection, pilots should develop an instinctive and regular habit of checking for "full and proper movement of all controls and control surfaces."

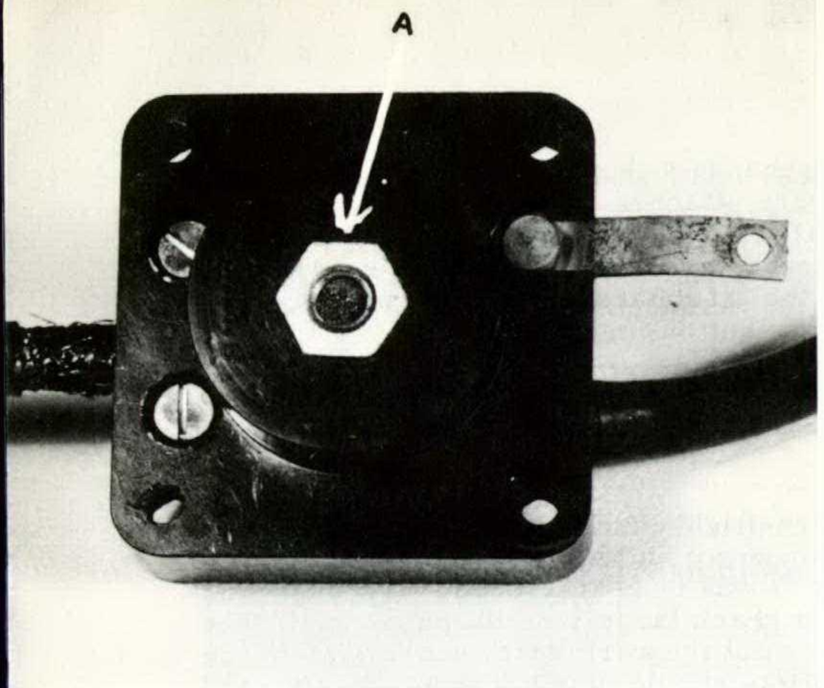
The Cumulative Effect



The dictionary associates the word "cumulative" with what it calls "separately unimportant facts". Where aircraft are concerned even the smallest discrepancy may become so magnified out of all proportion when coupled with other errors or omissions that the result can spell disaster.

A Bristol crew was preparing for the second leg of a scheduled flight having remained overnight at a regular stopover point. While making his DI the crewman slipped on an icy surface and, in saving himself from falling, broke off the VHF antenna. He had the aerial welded, reinstalled it on the aircraft and then got a ground check on the radio which appeared serviceable. No entries for this work were made in the travelling copy of the L14. However, the L14 was not signed by either pilot before the flight so a discrepancy would have been missed in any case.

The pilots now enter the picture. Each breakfasted on an apple, then did a weather check; and the captain filed a flight plan while the



first officer proceeded to the aircraft and did his pre-flight check. When the captain arrived with the passengers they were briefed and emplaned; and then the crew took their seats, the captain occupying the right-hand seat and the first officer in the left to do the flying. Take-off was normal and the aircraft settled down on course as cleared, 1000' on top.

No further radio contact was made with a ground station until arrival over destination. Because of weather conditions an instrument letdown was necessary and contact with GCA was established over the beacon. Immediately after the turn onto the downwind leg, radio contact was again lost. At this point the captain directed the pilot to continue in an unorthodox letdown procedure, hoping to regain contact with GCA on an inbound heading. The instrument letdown was continued. Suddenly trees were seen ahead—but it was too late to climb away and the aircraft crashed into the side of a hill.

During the investigation it was established that radio failure was caused by the VHF antenna breaking off near the repair. It was believed that it had been lost shortly after takeoff. Had the pilot been aware that the antenna had been broken and welded he might have associated the radio failure with this fact and noticed its loss in flight. No doubt he could then have gone to his alternate, where weather conditions were better, rather than attempt an unorthodox instrument letdown.

Because neither pilot ate breakfast, there is a strong probability that low blood sugar had reduced their efficiency prior to and at the time of the crash. Also, the crewman was criticized for not entering the VHF antenna break and repair in the L14 and for failing to tell the captain of the occurrence.

Lack of complete co-operation between the crew members was shown by the fact that the pilot flying the aircraft did not understand the unorthodox letdown which the captain was directing and yet apparently asked no questions. The danger of continuing a letdown below the safe minimum altitude should be self-evident but obviously a reminder was needed in this instance. Never forget that weather conditions in the approach area will not, in all probability, be the same as those reported at the field. Careful attention to detail, full crew co-operation and adherence to SOPs would have prevented this needless accident.

HEDGE-HOPPING THRILL-SEEKER

Or Exhibitionis Calamitosus. Male of species may be seen doing intricate manœuvres at low altitudes above beaches and near abodes of friends and relatives. Shows a tendency towards self-destruction through smashing into trees, barns, houses and power lines. Has also been known to beat up perching sites. May be nurtured to maturity if caught in time by Flock Leader who grounds and clips wings.

Call: IMAROCKETIMAROCKETIMAROCKET

BIRD WATCHERS' CORNER

CONTENTS 1956