FLIGHT COMMENT

ROYAL CANADIAN AIR FORCE

JANUARY • FEBRUARY • 1958

FLIGHT COMMENT

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

JANUARY • FEBRUARY 1958

C O N T E N T S

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OFFICIAL INFORMATION

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A MESSAGE FROM THE CAS

Flight safety is vital to the effectiveness of the RCAF. The accident prevented, the man spared an injury and the aircraft kept from damage, all contribute to a greater operational potential.

No magic exists that will guarantee a successful flight safety program. The responsibility for aircraft accident prevention rests with the station commanders, aircrew, technical staffs, and all others engaged in the operation and maintenance of aircraft. Hence, no one man is doing a job that is either insignificant or unrelated to safety—whether it be fitting a part to an aircraft, flying a training exercise or carrying out an operational sortie. Consequently, the elimination of accidents is related directly to the skill of each individual.

The RCAF accident rate has shown a progressive decline and personnel at all levels can be justifiably proud of this achievement. However, modern high performance aircraft are becoming increasingly complex to operate and maintain and a high level of knowledge and skill, employed in a professional manner, is essential if our accident rate is to be further reduced.

Each officer and airman can and must assist in the RCAF flight safety program during 1958. Only by so doing will our effective fighting strength be preserved.

AIR MARSHAL
CHIEF OF AIR STAFF

LAC L.A. WOODWARD

Cpl L. A. Woodward, an aero-engine technician with 105 Communications and Rescue Flight, was assisting one night in the refuelling of a Dakota at Cambridge Bay.

A gasoline-driven pump was being utilized, and during the operation its exhaust muffler unexpectedly disintegrated. Flying pieces of hot metal and carbon came in contact with spilled gasoline on the wing and started a fire.

In spite of the flames, Woodward removed the hose and funnel and screwed the gas tank cap back in position. While he was doing this, his clothing ignited and he received burns about the face.

Through his cool disregard for his own safety, Woodward prevented two aircraft from being destroyed, for a C-119 was parked right next to the Dakota. In addition, other members of the crew, and inhabitants who were watching, might have lost their lives had a serious explosion occurred.

For his exemplary conduct in a dangerous situation, Cpl Woodward received a personal Letter of Commendation from the Chief of the Air Staff.

Directorate of Maintenance Engineering

This isn't a "how-to-do-it" treatise on the method of locating and acquiring your own private oil well. We can merely tell you what to do with the oil after you have it.

To begin with, you are likely aware that every engine, motor and powerplant—with the exception of rockets and JATO—depends on oil for lubrication, and that any interruption in the oil system will have disastrous effects in a very short time.

It is not unusual for an engine, jet or reciprocating, to fail within 30 seconds of complete oil starvation. In twin- or multi-engined aircraft the situation is not too serious; all of them will fly with one dead engine, although at reduced airspeed and ceiling. The situation differs with a single-engined aircraft, for loss of the engine leaves only two alternatives: either find a place to sit down fast, or else abandon ship. Neither course is very attractive.

Jet engines have a comparatively simple oil system so they encounter very little trouble. However, if trouble does arise, there isn't much the pilot can do about it. Since practically all oil system malfunctions on jets are caused by an internal failure in the engine itself, the pilot simply does an occasional check on his pressure to keep informed of any impending difficulties. Should an abnormal indication show up on the gauge—too low, too high, or fluctuation—the only sensible reaction is to land as soon as possible and investigate.

Reciprocating engine oil systems are much more complex, and since there are more pistons than jets in the air, a knowledge of how they are lubricated is an essential for every pilot. The methods currently used have been developed over many years and are now virtually standardized. The main components are:

- Oil tank. Usually mounted in the engine nacelle. Generally contains a "hopper" which limits the amount of oil in circulation so that warm-up time is reduced. Contains a dipstick to measure quantity.
- Oil pressure pump. Integral part of the engine. Draws oil from the tank and forces it into the engine to lubricate all moving parts. A gauge on the instrument panel indicates the pressure developed by this pump.
- Oil scavenge pump. Also part of the engine. Collects the oil after it has passed through the engine, and returns it to the oil tank via the cooler.
- Oil cooler (or temperature regulator). Acts as a radiator to prevent overheating of the oil. Usually, but not always, thermostatically controlled to maintain an oil temperature of 70°C. Sometimes manually-operated shutters are used to restrict the airflow through the cooler. Usually by-passed by an automatic valve when the oil is cold or stiff.
- Propellor. Depends entirely on engine oil for its operation. (Not applicable, of course, to fixed-pitch props, or to C-119 and Neptune aircraft which have a separate oil supply for prop operation.)
- Feathering pump. Obtains its oil from a reserve in the oil tank, so that the prop can be feathered if all normal oil supply is lost.

Not applicable to single-engined aircraft, for obvious reasons, or to the C-119 and Neptune.

- A horrifying collection: pipes, hoses, clips, clamps, valves, fittings and assorted hardware.
- Oil dilution system. More about this later.

The last two items cause most of the trouble. Every joint and connection is a potential threat: a cracked or ruptured line, or a loose hose-clamp, can empty the system in a short time. Any leakage is a cause for concern. Leaks never cure themselves—they generally become worse; and a slight leak noticed before take-off may easily turn into a severe leak half an hour later.

The capacity of the oil system is limited by space and weight considerations to the lowest possible figure which will permit safe operation for the duration of the normal fuel supply. Normal oil consumption varies with the size and type of engine, its mechanical condition, and the power settings used. For example, a P&W R1830 engine at rated power would normally use one and one-half gallons per hour. A Wright R3350 would use about four gallons per hour. A P&W R985 at cruise power uses about half a gallon per hour. These are normal figures and would be exceeded by an engine which is starting to show its age. Any leakage will increase the total consumption and may easily result in loss of all oil with consequent engine failure.

Oil dilution is one of those necessary evils and is generally somewhat misunderstood and misapplied. Primarily, oil dilution is for the purpose of thinning out the engine oil to facilitate starting in cold weather. As a matter of general interest, oil dilution was originated shortly before World War II by a bush pilot in Northern Canada who had an aversion to the work involved in draining the oil from the engine and tank, storing it indoors overnight,

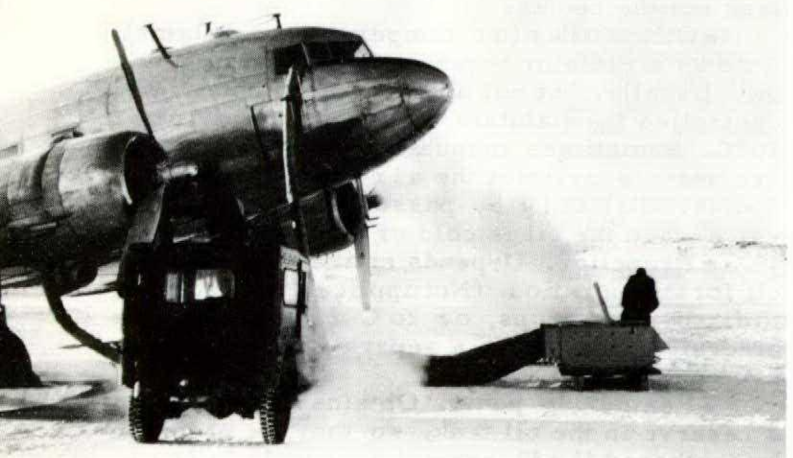
Every joint and connection is a potential threat.

and heating it before pouring it back into the tank. In extreme cold, engine oil will freeze solid, and at more moderate temperatures takes on the general consistency of molasses. An engine simply will not start under those conditions.

Oil dilution is just a means of thinning the oil with gasoline to prevent solidifying, and the amount of gasoline required depends on the temperature anticipated at the next start attempt. Oil tank capacities vary and oil dilution machinery varies—so the requirements for each aircraft also vary. The various details are given in POIs for the aircraft type. If these are adhered to, the engine will start with little or no difficulty.

Now comes the joker in the deal. The gasoline which was mixed with the oil must be removed before flight; if it isn't, it will start boiling inside the engine and cause a great deal of froth and foam in the oil. When all this is pumped back to the oil tank, the tank overflows, the engine gets overloaded, the vent system becomes overloaded, and a siphoning action starts which will empty the oil system completely unless you take precautions. If possible, return and land. If this isn't possible because of weather, weight condition or any other reason, the siphoning can be halted by stopping the engine. Feather it, leave it for a minute or two, and restart. Repeat with the other engine or engines if necessary. In extreme cases it may be necessary to stop each engine twice before the system returns to normal.

The process of removing the gasoline from the oil is called "boiling off", and it means exactly that: engine heat must be raised and maintained at a temperature sufficient to boil off all the gasoline before takeoff. This entails considerable ground running—from ten to forty minutes with engines running at 1100-1200 rpm.



Unfortunately, since no one enjoys sitting in a cold airplane for over half an hour, the boil-off procedure degenerates into a slightly-longer-than-normal cockpit check and run-up. Very often the gasoline evaporates peacefully during the first half-hour of flight; when it doesn't, siphoning action starts. If a flight engineer is one of the crew, everything is rosy; he can start up and boil off prior to takeoff time. If no flight engineer is carried, the pilot must either do it himself or arrange with maintenance to do it for him. A phone call to the OC Maint or EO will usually take care of this, and everybody is happy.

The big problem is that we have no way of knowing how long a boil-off time is needed. Engineering orders place the responsibility for dilution on maintenance people, but no one has been made responsible for boil-off. It is generally assumed that the pilot is responsible since it is his neck that's at stake. Maintenance people are supposed to sign the L14 whenever dilution is carried out but this is sometimes overlooked. Consequently, if an airplane has not flown for several days, it could quite easily have a considerable amount of gasoline in the oil—possibly as high as 50%. Boil-off time for this condition would be from an hour to an hour and a half. Besides, if the airman carrying out dilution doesn't have a watch (and many don't), his estimate of dilution time may be away off. If there is any doubt, have maintenance do the boil-off run and top up the oil tanks afterwards if necessary.

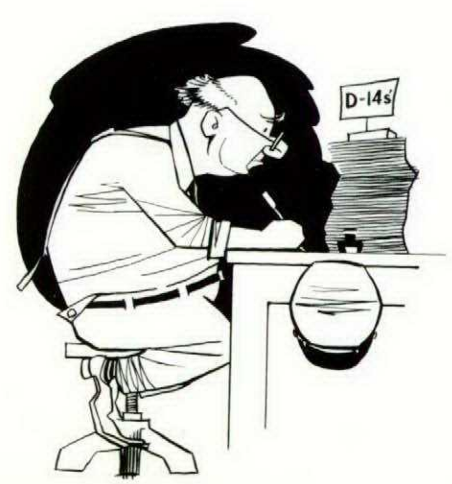
A secondary purpose of oil dilution is to clean sludge out of the engine. This was discovered more or less by accident; engines which had been using oil dilution were found to contain very little sludge when compared with non-diluted engines. Sludge is a by-product of oil which has been subjected to heat and oxidation, and it tends to gum up the working parts of an engine and plug oil passages, pipes and coolers. Any process which eliminates or

How long a boil-off time is needed?

removes this sludge contributes to the reliability and life of an engine; and regular oil dilution all year round is a simple and effective method.

All that is required is a daily one-minute dilution (normally at the end of a day's flying) which can be done conveniently while taxiing in from the runway. The only precaution is that it must be done daily. Should it be neglected, sludge will accumulate in the engine, and the first couple of dilutions carried out in cold weather will loosen the sludge. Great gobs of it will then clog the oil screens and filters and plug up oil passages and pipes—exactly the condition it was the intention to avoid.

There's the oil system. Since an engine won't run without it, it's up to you to treat it reasonably, and let it do its work. If you neglect your engine, you are asking for trouble—and you will certainly get it!



"Old Dad" says:

When a pilot on a normal flight runs into some abnormal trouble with his engine and decides just to carry on normally, he's sub-normal.

The idea is to call the tower at once, get an emergency clearance and land. That way you might save us all an engine. When they start acting up—even if only for a moment—it's a sign of trouble. Should it happen to you, Junior—go home! Fast!

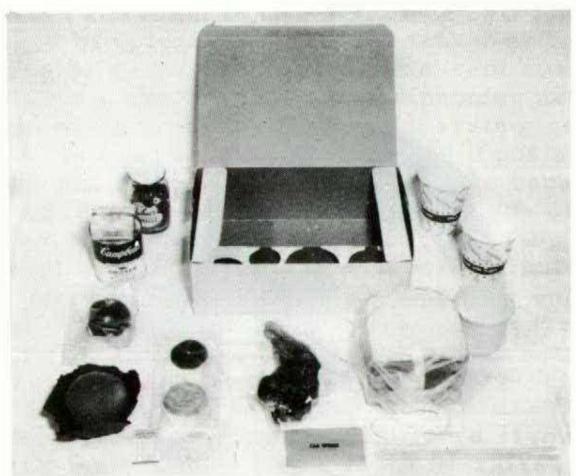
FOOD FOR FLIGHT

Group Captain McCreary heads the Department of Paediatrics at the University of British Columbia and is consultant in nutrition to the RCAF.

Until recently the maintenance of good health in men who fly military aircraft has presented no special problems. The same routines of health as those required by athletes have sufficed—adequate rest, exercise and usual foods in sufficient quantities. However, with the high performance aircraft now on the drawing boards, in which men will be exposed to altitudes, speeds and temperatures which have not previously been encountered, new problems arise. These involve particularly the food which the men eat.

So new and unexplored is this aspect of body physiology that the difficulties associated with utilization of food under these circumstances are not all known. It is clear, however, that problems exist and that some of them may be serious.

It was recognized even before the days of jet aircraft that, after a period of several hours without food, the performance of aircrew deteriorates. This "falling-off" of ability may be associated with low sugar levels in the blood. In any event it occurs to some degree in every individual after about four hours without food. It has become increasingly apparent that this problem becomes more severe when men are flying the newer, faster aircraft. Perhaps because reactions must be more rapid and sure, because a momentary lapse carries much more serious implications, it is clear that some arrangement must be achieved for the provision of frequent feedings for aircrew. That "gone" feeling which you may experience in the late morning or afternoon may be a very dangerous sensation. Avoid it by taking some food between meals.

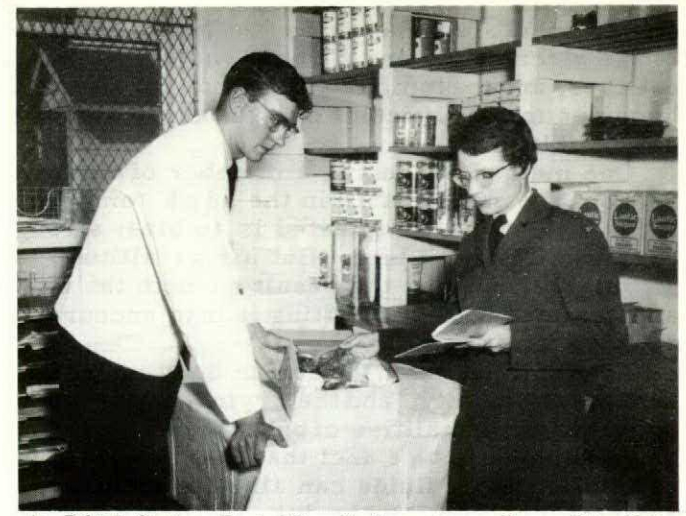


A typical in-flight lunch. Counterclockwise from noon: storage carton, olives, soup and crackers, tomato, peach, cookies, salt and pepper, fried chicken leg, sugar, can-opener, three sandwiches, plastic spoon, straws, paper cups.

However, aircrew are not as a rule a very active group, and eating three full meals a day with two or three between-meal snacks will likely cause excessive weight gain. In order to avoid this, there should be a reduction of the amount of food taken at the regular meal hours, and the between-meal feedings should consist of low-calorie foods. Such foods as fruit juice in summer, and coffee, tea or soup in winter should be adequate.

Another aspect of feeding which may cause difficulty has to do with gas production in the intestine. Flight at altitudes of 50,000 feet or more requires cabin pressurization at 25,000 feet. At high altitudes the gases normally present in the stomach and intestine expand. Such expansion may interfere with food absorption, thus increasing the problem of low sugar levels; it may cause abdominal discomfort and, if severe, it may compress lungs, heart and other vital organs.

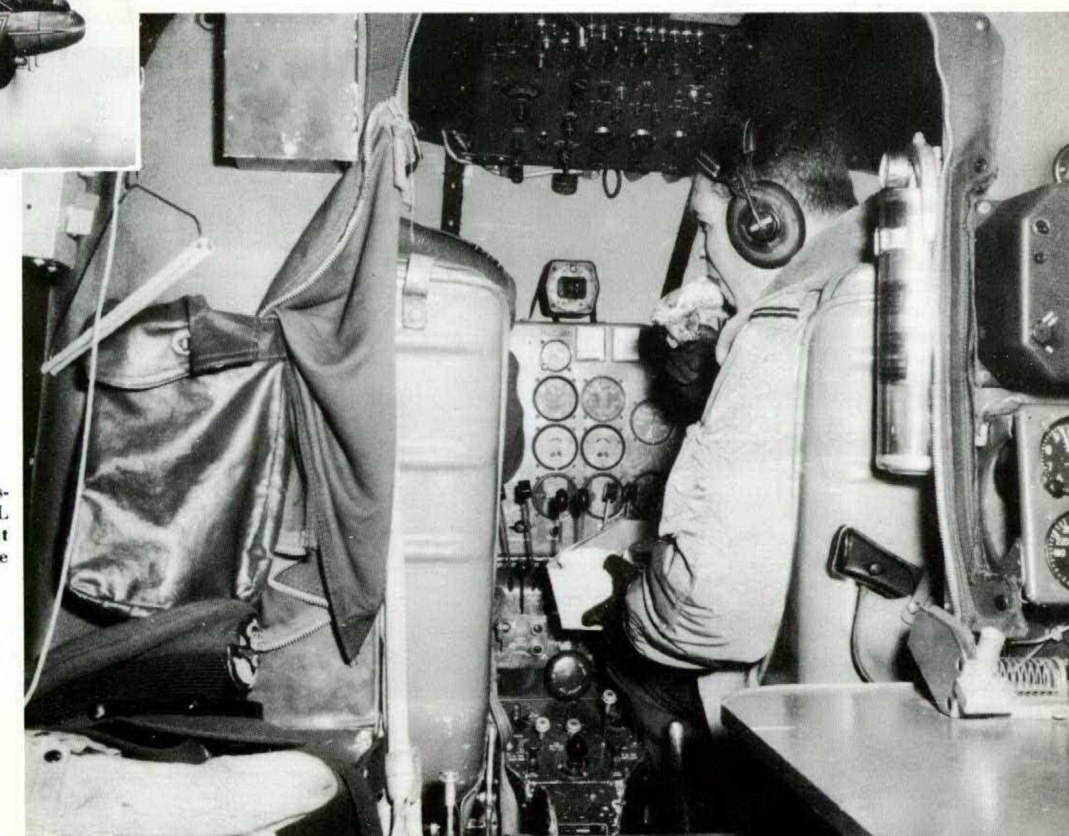
Even more hazardous is the rapid expansion which will accompany explosive decompression. If, as a result of enemy action or from other cause, cabin pressurization is lost at 50,000 or more feet, the gas expansion may be in the neighbourhood of eight times. Further, it will occur suddenly and will certainly cause discomfort and perhaps very serious symptoms.



At RCAF Station Rockcliffe, food services officer, F/L Betty Bell, checks an in-flight lunch packed by LAC Ray Tilley.

So not only is the frequency of feeding important, but also the nature of the food taken. Relatively little is known about the production of gas in the intestine because, in the past, it has represented only a mild social problem. It is suggested that rough, bulky vegetables, such as cabbage, produce more than usual amounts; but the manner of its production and the amounts produced by these and other foods are not known. Vague knowledge of this sort is not adequate under these circumstances, and researches are being set up in Canadian universities to learn more exactly the role of various foods in the production of gas. These studies will determine the best foods to provide to aircrew of the future.

A third aspect of the problem of feeding aircrew has to do with the temperature of the



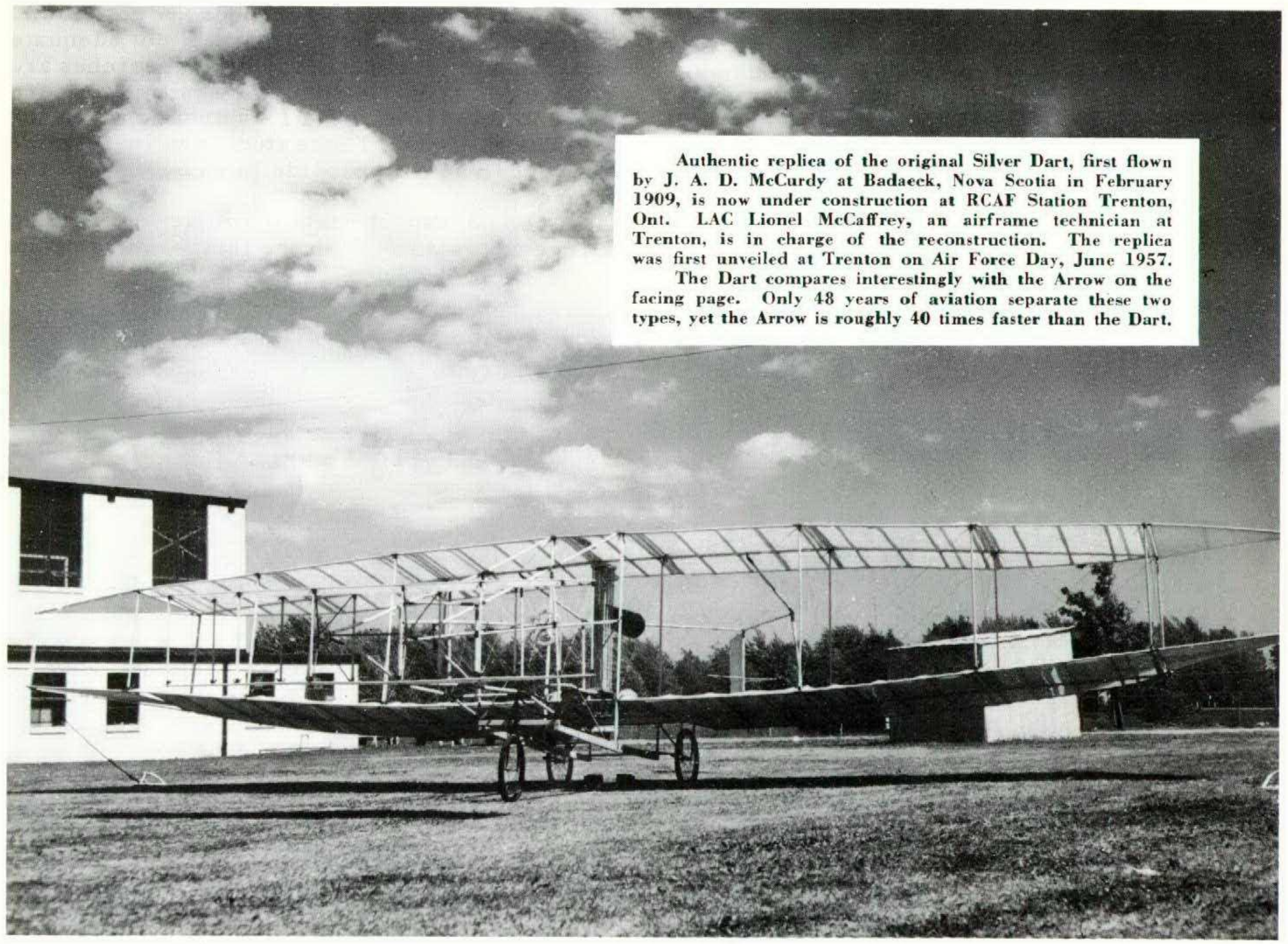
Down the hatch! During a cross-country hop in an Expeditor, S/L George Sheahan shares an in-flight lunch with his co-pilot, F/O Pete Bremner.

environment. As speeds increase, the friction of the aircraft moving through the air also increases, and the temperature inside the aircraft becomes more difficult to maintain in a range compatible with life.

One method of keeping a member of aircrew reasonably comfortable in the high temperatures which are anticipated is to blast strong currents of air at him. But air at altitude is singularly dry, and the result of both the heat and this method of combatting it is to encourage dehydration.

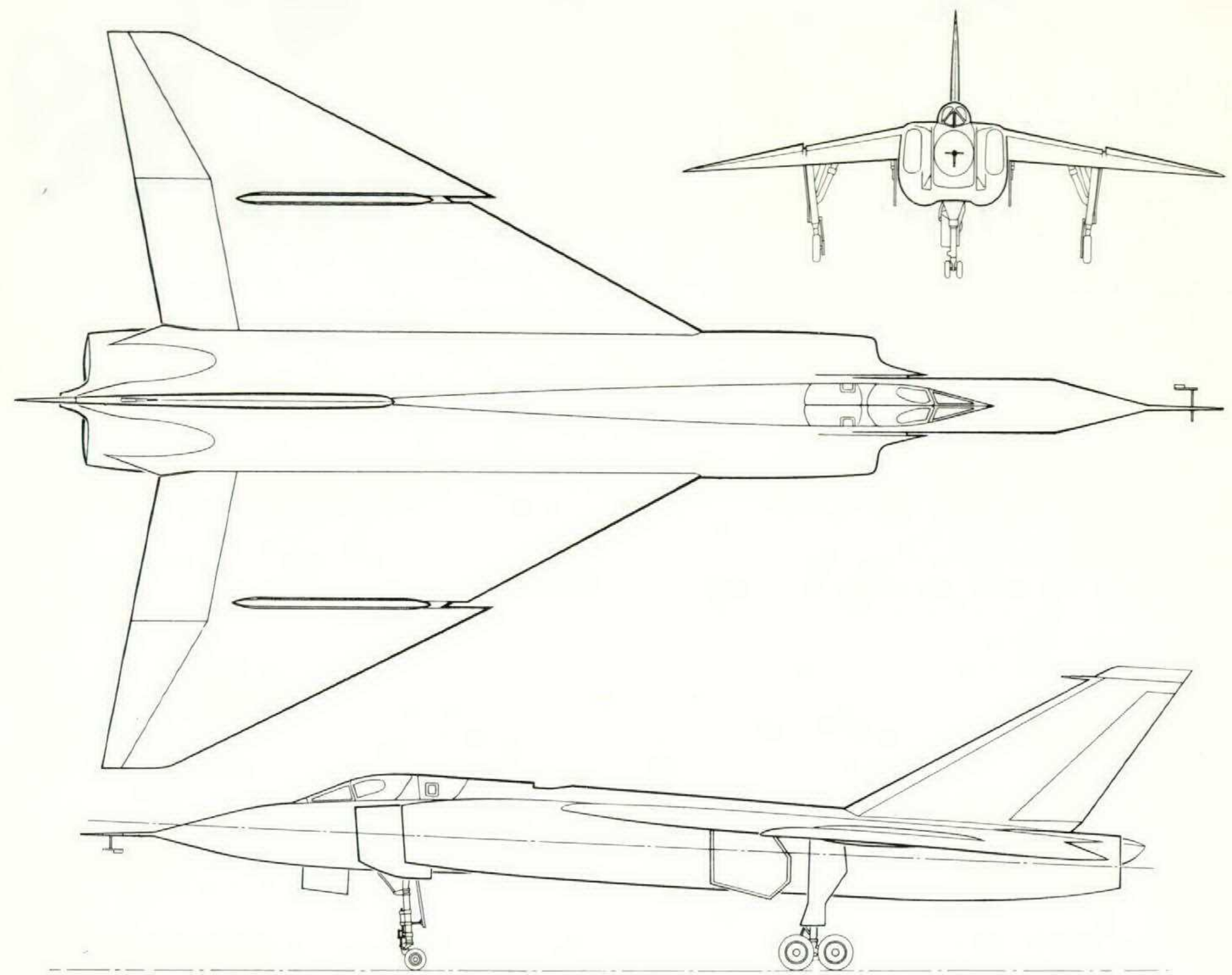
Loss of water from the human body can occur with great rapidity, and the drying-out process produces abnormalities of behaviour. Perhaps more serious is the fact that the materials in solution in body fluids can also be disturbed. Sodium, calcium, potassium and other substances are present in all body fluids. They serve specific functions, such as nerve excitants or depressants. Normal thought processes and normal reactions occur because of normal amounts of these materials in blood and other tissue fluids. These normal levels are jealously guarded by the body and maintained within a very narrow range. However, loss of fluid, particularly sudden losses, tends to throw them out of adjustment. No one yet knows the degree to which this will be a problem. Until men have tested and flown the aircraft now on the drawing boards, until measurements of weight loss have been made, until levels of these electrolytes in blood and other fluids before and after flight have been performed, we can only be aware of this potential problem.

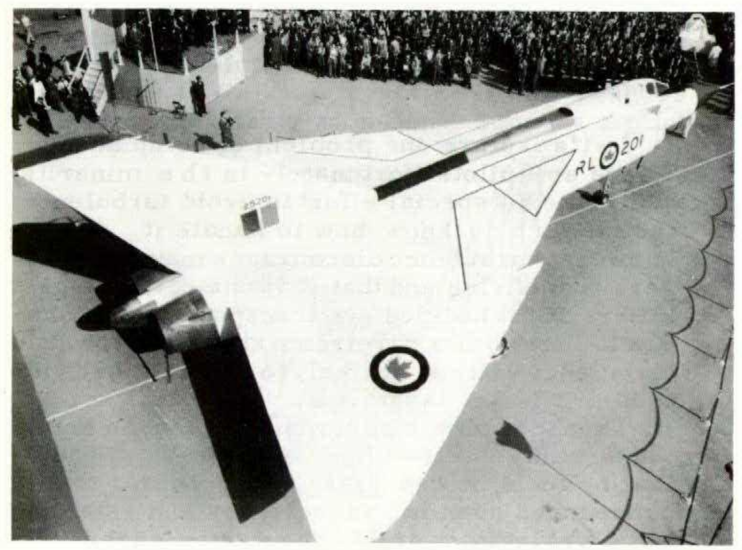
So members of RCAF aircrew will hear more about food and its role in maintaining their health in the future than they have in the past. They will receive lectures, they may be asked to bring their wives to classes in which the foods required for aircrew are discussed, they may find themselves being provided unusual foods under unusual arrangements. Innovations will be made only because researches show the need for such arrangements in maintaining aircrew healthy and fit in their new environment.



Authentic replica of the original Silver Dart, first flown by J. A. D. McCurdy at Badaeck, Nova Scotia in February 1909, is now under construction at RCAF Station Trenton, Ont. LAC Lionel McCaffrey, an airframe technician at Trenton, is in charge of the reconstruction. The replica was first unveiled at Trenton on Air Force Day, June 1957. The Dart compares interestingly with the Arrow on the facing page. Only 48 years of aviation separate these two types, yet the Arrow is roughly 40 times faster than the Dart.

CF-105 (ARROW)





The AVRO CF-105 ("Arrow") is an all-weather supersonic interceptor, developed for use by the RCAF in the air defence of North America. Designed and manufactured by AVRO Aircraft Limited, the Arrow will incorporate two Iroquois jet turbine engines designed and produced by Orenda Engines Limited. Details of this latest Canadian aircraft will be published in Flight Comment as they can be made available. (Our cover for this issue depicts artist Harry Hames' conception of the Arrow.—ED)

Ounce of Prevention

by Jerome Lederer

How do the commercial airlines tackle their flight safety problems? Some of the answers were supplied by Mr. Jerome Lederer, Director of the Flight Safety Foundation, in an address to the Third Annual Air Safety Forum of the Airlines and Pilots Association. We have taken the liberty of extracting those portions of the address which we felt had an application to the RCAF's Flight Safety program.

Readers will be especially interested in the airlines' incident reporting because the kinks that cropped up are surprisingly like those we face in the running of our Near Miss project.—ED

The purpose of an effective accident investigation and prevention program is of course to assure greater safety—to increase the margin between a safe and unsafe operation. In a broader sense, safety is the result of operational efficiency because safety can be defined as the elimination of unwanted, unplanned events.

For example, an airplane takes off with heavy frost on its wings—and the flight is completed without any trouble. No accident occurs, but the margin between a safe and unsafe operation was reduced. It was an unwanted, unplanned event. It should have been prevented because ultimately, if allowed to continue, an accident would have occurred.

Another example might be a DC-6 and a Constellation flying on the same airway, in opposite directions, and at the same altitude but with the altimeters indicating a separation of 1000 feet. Some people, even pilots, will jump to the conclusion that one of the pilots was careless; a more judicial approach might show that the fault was inherent in the airflow over a particular static pressure port installation. No collision occurs, but the potential was there. Another example of an unwanted event.

This incident has probably occurred many times without being promptly reported to the agencies that could have uncovered the airflow condition. In other words, one way to prevent accidents is to uncover the incidents and eliminate their causes.

In the year 1954—a fantastic year for safety in airline operations—there were only three fatal accidents. However, over 40 other accidents were reported which resulted in injury to people or damage to equipment. How many similar incidents occurred but were not reported because only chance intervened to prevent damage or injury? Airline operations have reached the happy state where accidents are few and their causes form no set pattern; therefore we must resort to incident reports to improve the record. If you agree, then we face the question of how to recognize and report the incidents.

This presents many problems. Incidents which result from complacency (taking off with frost on the wings or other deviations from established operating procedures) will go unreported because, by definition, complacency means "satisfied with one's actions". The other type of incidents—those brought to the attention of the pilot by physical means: unusual turbulence, the near miss, cockpit troubles, errors in navigation—may or may not be reported, depending on how much they scare the pilot, and how much trouble will be created for the pilot after he reports them!

Complacency

Let's explore the problem of complacency. There are pilots (fortunately in the minority) who make no special effort to avoid turbulence; they feel they know how to handle it. Yet we know that turbulence discourages many passengers from flying and that it is one of the biggest killers in scheduled air transport operations. But a pilot with a carefree attitude towards turbulence will not be likely to report it because to him it is not dangerous.

Then there is the pilot who feels that he knows the terrain so well—"like the palm of my hand"—that he feels he can disregard accepted traffic procedures even in bad weather, and establish his own letdown or climbout procedures. He and others like him may be successful in doing this many hundreds—even thousands—of times. They get away with deliberately improper practices because they retire before the law of averages catches up with them.

Incident Reporting

I am sure any pilot can recall several fatal accidents resulting from lack of compliance with planned takeoff or approach paths on the part of experienced pilots who may have accomplished the same procedure many times in bad weather without knowing how close they came to disaster. These incidents go unreported. But if a false instrument reading or a wind shift happens to occur at a critical time, the danger is compounded.

The problem of incidents versus accidents has been studied in other industries. A famous safety engineer, William Heinrich of the Travellers Insurance Company, concludes that in shop practices an accident can occur on an average of about 300 times before it results in a lost eye, a crushed hand or a broken arm. Some employees may undertake the unsafe operation a thousand times and not be injured. Others may get hurt in the beginning. The average is one in 300 times.

These hazards often result from complacency. For example, eye injuries are often caused by failure to use protective eye shields on grindstones. The "It-won't-happen-to-me" attitude, just as in the case of the pilot who knows the terrain "like the palm of my hand". The point of all this is that complacency is easily acquired when the operator gets away with his unsafe practices. In the case of the shop, the employee involves only himself. In the case of the airline, public safety is affected, and therefore complacency is a luxury which no pilot can justify. But, like fatigue, complacency is not easy to recognize, especially in oneself.

We must acknowledge that pilot integrity has been an important factor in achieving our present safety record—that even without regulations, well-intentioned pilots will correct deviations from safe practice if the dangers are brought to their attention. Suppose a pilot

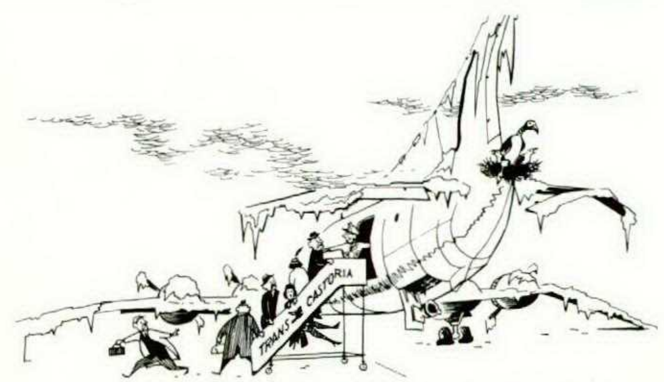
Complacency is easily acquired when the operator gets away with his unsafe practices.

has been making approaches in dangerous terrain in bad weather without following established practice. He continues to feel very satisfied with his ability. But suppose there was some device which later showed that, on one in every five approaches, he was brushing dangerously close to an unseen mountain. The incident would be reported before the accident occurred and the pilot would stop his dangerous procedure.

An incident reporting system already is in effect in connection with maintenance. The airlines send to the CAA daily written reports of certain mechanical difficulties, and these are disseminated through the CAA, ATA, and other organizations industry-wide to prevent recurrence. This is an intelligent way to operate. It is ridiculous to have information at hand that might prevent an accident or incident and not use it to do so.

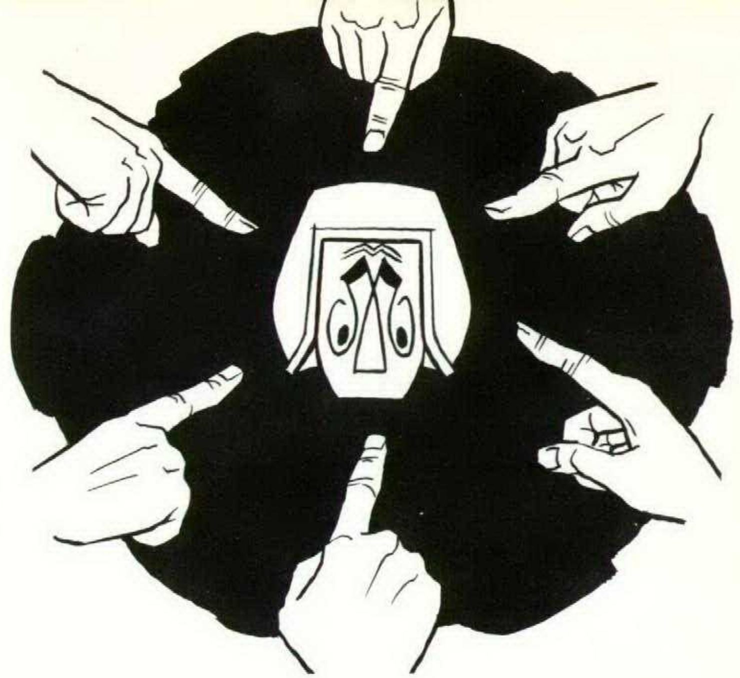
Dangerous incidents, not otherwise recorded, should be reported by the pilot in his self-interest and for public safety. It is, unfortunately, not always done. One reason is that pilots may accept a certain amount of unusual danger as a part of routine operations. This attitude can be combatted by an appeal to reason. But there is a much more powerful and understandable obstruction to the reporting of dangers: the pilot does not want to involve himself in further trouble or in any way to jeopardize his reputation or his pilot's certificate.

In a recent survey of near collisions conducted by the Air Transport Association, it was found that near misses were occurring at a rate much greater than the rate reported by pilots. They were reluctant to report for fear of involving themselves in government investigations. ATA then prepared a near miss report form which did not require the pilot to identify himself. The results were astounding, not so much in the number of incidents reported (which was more or less expected) but in the prompt response by pilots to report near misses when they were freed of the fear of possible repercussions.



Complacency means "satisfied with one's actions".

Did You Check?



by S/L M. J. Dooher

How many times, at how many Boards of Inquiry into aircraft accidents, has that question —Did you check?—been asked of the pilot?

Up until the time he has been confronted with this embarrassing query, the pilot concerned has usually considered that his accident was purely an act of God and that nothing could have been done to prevent it. His consternation when certain penetrating queries are put to him would most certainly have alarmed his passengers; for up until the time of the accident they considered that they were under the fortunate care of a second Steve Canyon.

How about the keen, alert young man who—entrusted with the lives of several passengers—filed a flight plan at Phoggy Downs for a flight to Moose Pelvis? The weather man says that Moose Pelvis is CAVU and is expected to remain so until at least the following Easter. Our happy young birdman gleefully has his flight plan initialled by this benevolent seer of clag, and vaults into the air and is on top in no time. All is well with the world. That cute brunette nurse at Moose Pelvis is in for a large time tonight, lucky girl.

Suddenly all is not right with the world. One engine has an ailing pot and temperatures are off the clock. Shut 'er down! A diversion to the airport at Metropolis is commenced and an immediate descent made on receipt of clearance.

Down into the clag. Look at that ice form! Where did it come from? No one warned me about ice! Oh well—we'll soon be on the deck. Down to approach minimum and still in the muck. Better check the weather. What's the matter with these blasted radios? Wonder if all that ice is giving me radio trouble? Anyway, I still have the radio compass. Station passage....down we go....400 feet....There's a runway! Ah! No sweat to an experienced pilot. I wonder what the female situation is in this town.

Yow!....What's that truck and grader doing on the bloody runway? Overshoot!....She won't do it!....Hang on, here comes the snow! Up gear! In we go!

A crash and several bangs later, our intrepid young hero is crawling from a one-hundred-thousand-dollar wreckage and assisting his passengers out into a snowy wilderness in the middle of the aerodrome. "Wait till I see the clot who let that equipment out on the runway. But for my skill we'd all be dead."

Come the men from AIB with their overflowing brief-cases. Come the embarrassing questions. Did you check the enroute weather? Did you know that ice was forecast below your enroute flight level? Did you check the terminal weather at enroute fields? Did you check the notams at enroute fields? Did you know that there was a notam on Metropolis aerodrome, warning of repairs on runway 27-09 and of heavy equipment on the runway?

As our young hero's complexion alternates between mud grey and slime green, the inquisition goes on. Eventually he arrives at the same conclusion as the board: He is a congenital idiot. Later, as he packs his Arctic kit, he reflects moodily that his next unit—a detachment in the boondocks—should be a good spot to ponder where he flubbed.

He's not alone, friends. There's the jet jockey who pushed his flaming stovepipe into the outer troposphere, bound from the golden west to the foggy east. The trip necessitated an enroute stop for fuel at a certain American base whose only navigational facility is a range station. Our boy blithely thumbs his facility chart, extracts the frequency of same facility, tunes in the bird dog, alters heading 30° on the needle, and merely homes away.

Fifteen minutes after ETA he becomes dubious of the old bird dog and tunes up the volume to check the signal. "H'm—it's weak and indistinguishable." He trys VHF for another 15 minutes. No joy! So over to Dog channel where he hollers HELP!

GCI comes to his aid—but 50 gallons too late. Junior has to get out and walk. Fortunately, he's alive and well when the Board of Inquiry starts. No sweat though. Purely radio compass trouble from start to finish. But wait! Those questions again....

"What was the date of your facilities book?" (Only four months old.) "Did you realize that the range frequency of the American station was changed two months ago and that it is incorporated in the latest facility charts?" (Gulp!) "Did you realize that in the 30 minutes you flew past ETA that you had journeyed 200 miles from your station?" (Gulp!) "Did you check and confirm the frequency you tuned on the radio compass as being the correct identification?" (Ooooh! Gulp!) And another candidate for a far-off detachment goes down the pike.

These are instances which appear idiotic and laughable to us all—but not to the poor delinquent concerned. Hardly a day passes without somebody asking "Did you check?"—and some poor type (who happened to be operating in a mental vacuum at that sad instance) saying "I didn't realize."

The RCAF has gone to great expense and effort to provide its aircrew with publications and facilities designed to eliminate on-the-job hazards. For a pilot with three-quarters of a wit and half an ounce of common sense, the proper use of these aids makes most flights safe, routine affairs.

Prime factor in making a flight safe is preflight planning. Are your pilot's handbooks amended to date? They are useless unless they are; you would be almost safer to go without them. Are you using up-to-date radio facilities charts and maps? Always destroy old radio facility charts, and never use maps as radio facility charts. Station operations provide a wealth of information to the airborne traveller. Have you checked notams for destination, alternates and enroute fields? You may suddenly need that knowledge.

The weather office is your next stopping point. The information available to you here has been obtained at no small expense. Tell the man you're from Missouri; and check and confirm all weather at all the terminals—and forecasts for all areas and terminals, possibly excluding Tasmania and Outer Mongolia. Committing the information to memory is strictly NDG. Your best bet is to take notes—check—and re-check. It's the only way to make certain of your date with that cute brunette at destination.

S/L Dooher is Flight Commander of 433 AW(F) Squadron at RCAF Station North Bay where he is engaged in flying Canuck and T-33 aircraft.

"Did you check the enroute weather? Did you know that ice was forecast below your enroute flight level? Did you check the terminal weather at enroute fields? Did you...? Did you...? Did you...?"

GETTING AHEAD

In "Human Factors in Air Transportation" by Ross A. McFarland, we read that "It has been possible to find the amount of energy required for a fracture of fresh cadaver heads without the removal of any of the tissues. From tests on 46 heads, the average impact energy necessary to fracture the skulls was 616.5 inch-pounds, with a standard deviation of 149.2 inch-pounds. The mean value represents the equivalent of dropping a head weighing 12.5 pounds on a steel plate from a distance of 49.32 inches."

In the past 12 months...members of the RCAF have carried out independent tests. Aircrew personnel contemplating similar trials in the forthcoming year are requested to obtain the correct weight of their heads and forward to the Directorate of Flight Safety so that an accurate statistical record can be maintained. Those not wishing to volunteer are referred to: (a) POIs (b) SOPs and (c) Common Sense.

CIRCLE OF CONFUSION

"I took corrective action."

"I landed with full flap in a crosswind."

"My aircraft landed with crab."

"Corrective action caused this accident."

"The student neglected to use brake."

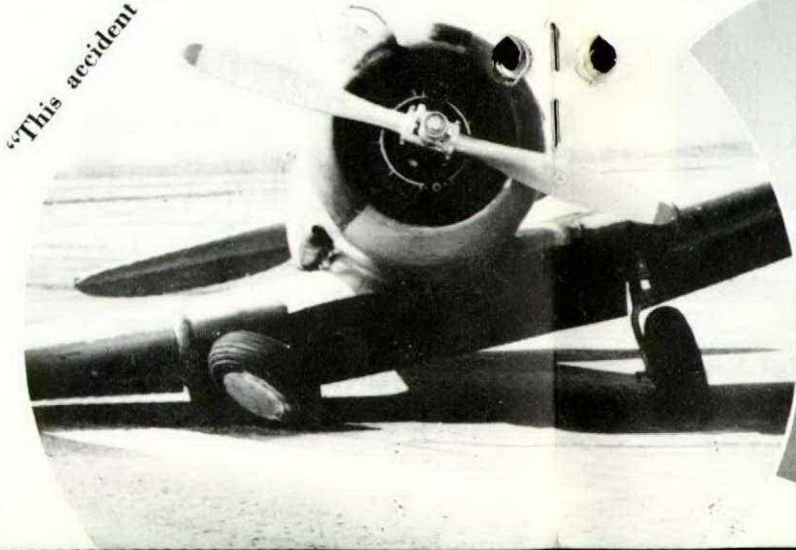
"It would appear that I used too much rudder."

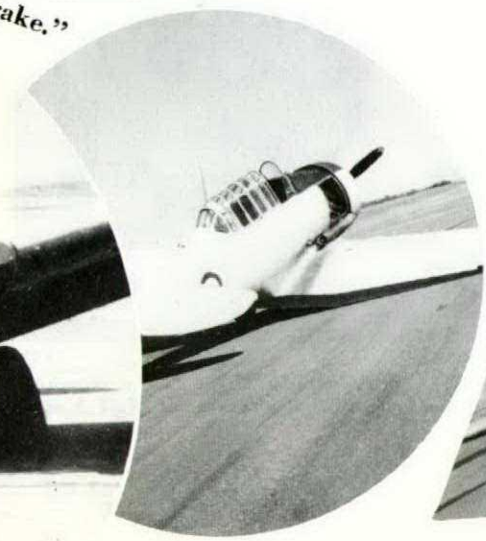
"This accident was caused by an induced ground loop."

"I landed in a gusty crosswind using full flaps."

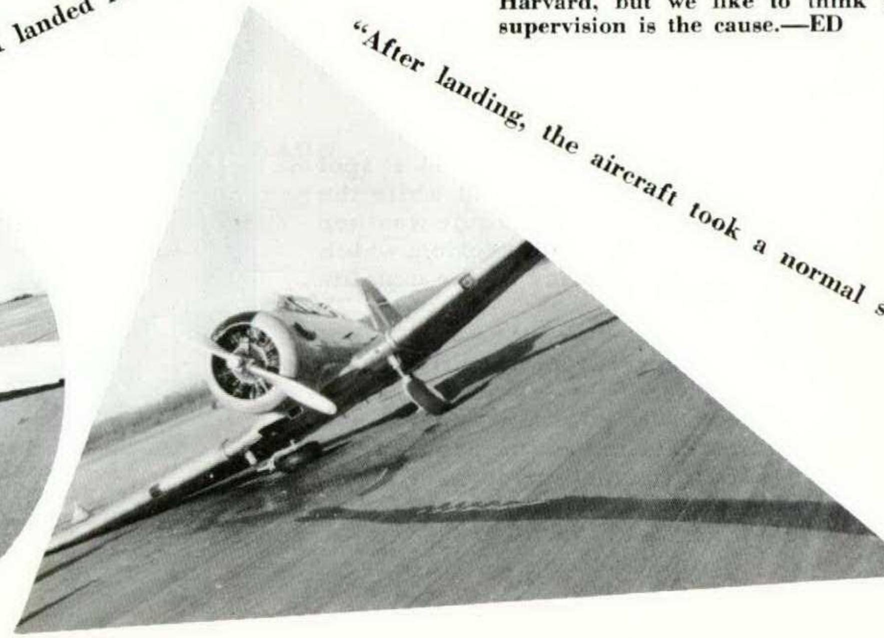
As bad as all this looks, the accident rate on Ground Loops has actually shown a steady drop. The decline could be attributed to the steerable tail wheel on the Mark IV Harvard, but we like to think that better supervision is the cause.—ED

"I used a bit too much brake."





"After landing, the aircraft took a normal swing."



PIREPS

by Arthur H. Lamont

Senior Meteorological Officer
RCAF Station Winnipeg

The accuracy of the weather information presented at a flight briefing is dependent on two basic factors:

- The completeness of the forecaster's knowledge of existing conditions over a wide area; and
- His ability to predict how these conditions will change during the period of the proposed flight.

Pilot's weather reports are important in connection with both of these factors. They provide information from areas between reporting stations and from altitudes which cannot be observed from the ground. They therefore serve to round out the current weather picture for the forecaster, placing him in a better position to predict future conditions.

Apart from being valuable when processed through the forecast office and incorporated into the flight forecasts and briefings, pilot's reports can also be valuable when passed directly from one aircraft to another or from the aircraft to the traffic controller. For instance, reports of strong turbulence, icing and high winds can be of immediate usefulness to other aircraft.

In this article, it is intended to focus attention on the use of pilot's weather reports, hereafter called PIREPS. It will be shown that PIREPS contribute substantially to safer and more efficient flying operations.

Preparation and Handling

There are two types of PIREPS: the spot weather report which is transmitted while the flight is in progress, and the full enroute weather report, usually including a cross-section, which is provided to the forecast office at the conclusion of a long range flight.

Most flying organizations ensure that spot weather reports are received on a routine basis from long range flights. This weather information, generally sent with position reports and other information relating to the progress of the flight, is passed to the meteorological office as soon as received.

Such a weather reporting procedure will seldom be established in organizations not engaged in routine long range flying. This is the case with many air force flying units. It then becomes the responsibility of the pilot to use his initiative in reporting significant weather conditions. He may, of course, be requested by a ground agency to send a spot report. However, this will generally only occur when there is a specific problem involved. The pilot of any aircraft, but especially one in hazardous weather conditions, should remember his responsibility for weather reporting.

All significant weather reports received in the weather office are normally transmitted on the meteorological teletype system for the benefit of other stations. They may be incorporated into the current aviation weather report (aircraft reported ceilings or remarks at the end of the aviation report) or they may be transmitted as a special upper air report. Either way, they are made available to all concerned as quickly as possible.

The pictorial cross-sections from long range flights are normally handed in to the forecast office at the destination airport and are discussed by the pilot himself with the duty forecaster. The latter will usually prepare a summary to be transmitted for the benefit of other offices.

F/O Pete Bremner, Directorate of Flight Safety, discusses a PIREPS with Mr. John Kaffezakis, Met Officer for RCAF Station Rockcliffe.

Value to Following Aircraft

It is not difficult to appreciate how useful PIREPS can be from an aircraft ahead in bad weather. In a doubtful situation, a captain will breathe much easier if he knows that others have gone through before him without serious difficulty. Having reports covering icing, turbulence, and heights of cloud tops and bases, he is even in a position to anticipate necessary changes in his flight plan.

Value to Air Traffic Control

PIREPS help the traffic controller to ensure that aircraft are directed safely with due cognizance of flying conditions aloft and near the ground. Traffic controllers can utilize information about icing conditions and turbulent layers when allotting air space and approving flight plans. They can pass reports from one aircraft to another and assist the pilots to avoid reported hazards and undesirable altitudes

Value to the Forecaster

The meteorologist is the one who has the weather analysis into which PIREPS can be fitted and on which forecasts and briefings are based. Emphasis is rightly placed on PIREPS of bad or hazardous weather with a view to the direct use of these reports by the pilots themselves and by air traffic control. However, for the meteorologist, PIREPS of good weather may be equally important in their rounding out of the current weather picture and their provision of a check on the accuracy of previous forecasts. Further, through studying PIREPS the meteorologist becomes better informed regarding the three-dimensional structure of weather so that, should occasion arise when no PIREPS are available, he is in an improved position to interpret his various charts correctly.

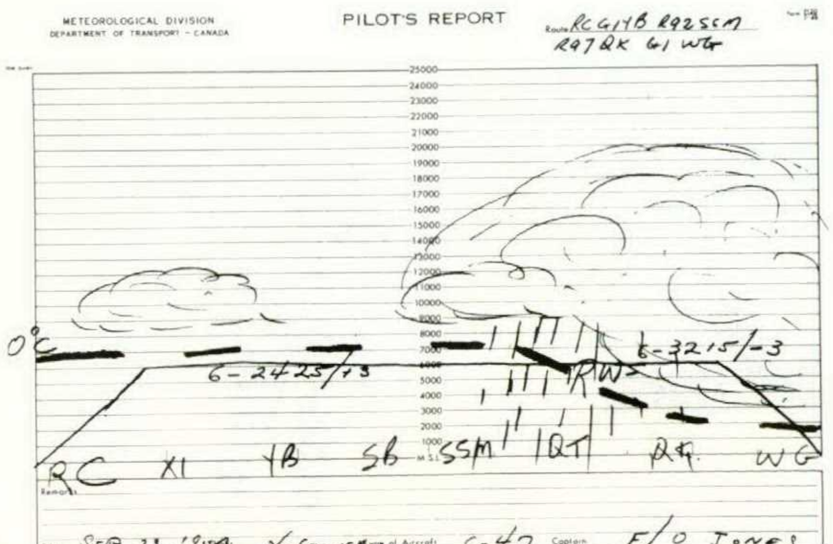
Mr. Kaffezakis is shown checking a Pilot's Weather Report against his own analysis of the weather for the day. He feels that "PIREPS are of great value to both pilots and Met. It's a pity everyone doesn't make more use of them for safety's sake."

Pilot Reports and Meteorological Research

In recent years meteorological research has made great use of reports from high level flights. Studies have been made of cirrus clouds, thunderstorm and other convective clouds, clear air turbulence, jet stream winds, aircraft icing, and condensation trails. These studies have improved our understanding of the various phenomena and, consequently, our ability to forecast them despite the relative sparseness of data normally available.

The following remark was made in the forecast office by a pilot who had recently commenced the practice of preparing weather reports in cross-section form: "You know, I'm finding that I see things I never used to notice and I'm learning much about the weather that I never knew before." This illustrates the fact that routine in-flight weather reporting helps a pilot to understand the weather and to make better use of weather information.

With his PIREPS the pilot shares his weather experience. By conscientious weather reporting, he is helping not only himself and other pilots directly, but is adding to the general understanding of and the ability to predict weather phenomena. He is contributing substantially to the quality of aviation weather services and to safe flying.



UA 1 WG 160756Z
104
PIREPS TCA FLT 150 QR D2340Z WG A0604Z

UA GM 161415Z
PIREPS T-33 18⊕30 70⦶90 OCI ABV

UA 1 WG 201430Z
106
PIREPS TCA FLT 9 UL D0534Z WG A1151Z

HELICOPTER RESCUE

Clock-Watching

It could happen to anyone... Report it.

People find instruments fascinatin'.

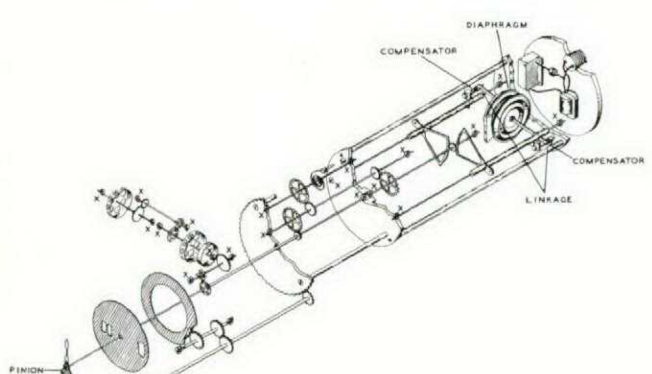
By Raymond J. Cenawood

Manager, Service Engineering Department
Kollsman Instrument Corporation

Many instruments are more fragile than eggs...handle them accordingly.

With these words, Pan American World Airways opens its general maintenance manual for the care and feeding of aviation instruments. The thirty years' experience of our repair department indicates that the advice is sound and should be emblazoned over the entrance of every instrument storage facility from Abadan to Yokohama, from Thule to Little America.

Actually, the airlines have been quite successful in impressing their personnel with the fragility of aviation instruments. Storage facilities are usually built with shelves insulated with foam rubber or similar material. Wagons and dollies used to cart the instruments to their installation point are similarly treated. It takes a very careless stock clerk to jar an instrument out of adjustment.



Schematic of Kollsman #2371 counter-pointer altimeter. X indicates jewels and pivots where shock may, as in all precision aviation instruments, cause damage. Other parts indicated, though less susceptible to shock damage, should nevertheless be inspected if the instrument is dropped.

Damage by Dropping

Two problems remain: (1) the new man on the job, and (2) the unauthorized stray who uses the stockroom as a short cut to the coke machine. Let's take a look at the new man on the job. He naturally wants to show the boss that he's able to do a job and achieve an unblemished record. Then one day he goofs. As he reaches far back on the top shelf for a cabin pressure indicator, his elbow sends another instrument—let's say an altimeter, crashing to the floor.

Now an altimeter, though precision built, is quite a rugged instrument. He inspects it. The dial glass isn't broken, there are no chips or mars on the case, and the knobs aren't bent. What's more, there is not a soul in sight. Who would know he dropped it? So...back on the shelf the altimeter goes.

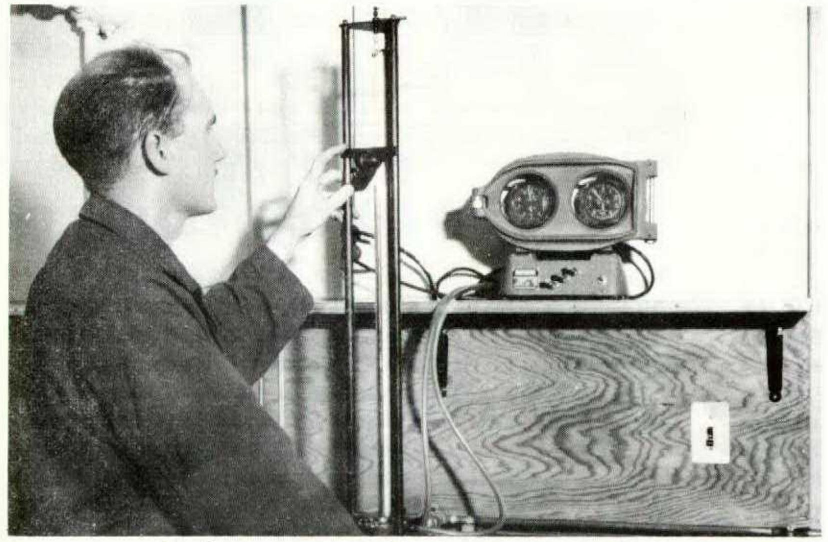
Humans, being what they are, quite often submit to the same impulse as our friend, the new man on the job. We at Kollsman have a rigid policy concerning this situation. If a Kollsman employee drops an instrument and reports it immediately, the matter is closed. The instrument is rechecked and nothing is said to the man. However, if it's found that an employee has not reported an instrument that was dropped, that person is taken to task... but severely.

Accidents do occur and even the most careful employee may drop an instrument at one time or another. Obviously, a rigid procedure is required. If an instrument that has been dropped or otherwise damaged is routed to the overhaul shop for rechecking and perhaps repair, no one is endangered.

This point cannot be overemphasized. Though there is no apparent damage to the exterior of an instrument, a jar or knock can cause serious damage to the jewels, pivots, or even to the diaphragm inside. So if an instrument has received any unusual shock through mishandling or any other cause, tag it "Dropped" and route it back to the repair shop. Remember, somebody's life may depend on it.

Unauthorized strays in the instrument storeroom are another cause of unwarranted damage. They may have little reason to know about instruments and the procedures for properly handling them. And instruments have a strange fascination for people who like to turn the knobs and move the pointers. These are the people who wouldn't know what to do if they did drop an instrument, and certainly they wouldn't report it because they know they're not supposed to be in the instrument storeroom anyway.

The easiest way to control strays is to put a lock on the door. It may be inconvenient at times, especially if there are many doors that would require keys. However, a simple buzzer arrangement that automatically opens the door for authorized personnel and is controlled from a central point can eliminate much of the problem.

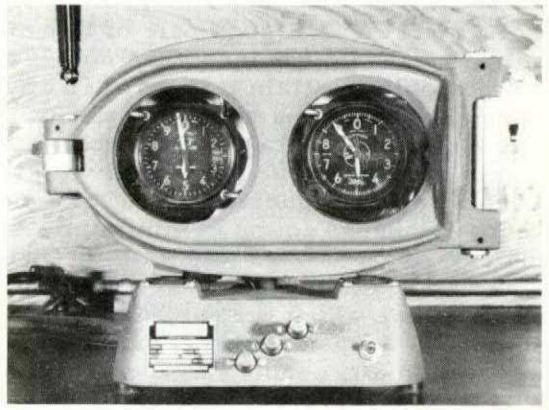


In the instrument calibration room of 408 Reconnaissance Squadron at Rockcliffe, instrument technician Cpl Tommy Thompson does an accuracy check on an altimeter, using a manometer (l) and a vacuum chamber (r). Altimeters are checked when they arrive from the manufacturer, on every major inspection, and whenever a pilot reports one as being unserviceable.

Damage by Moisture

Another big enemy of aircraft instruments is moisture. Some instruments may be stored as long as 36 months before they require rechecking and possible recalibration. However, if they have not been stored in a dry area, the lapse-time between rechecks is considerably reduced.

Instruments should be stored in air-conditioned rooms where the humidity is



The reason for checking altimeters is obvious from this closeup of the vacuum chamber. The altimeter on the left is reading correctly at 5000 feet; the altimeter on the right (just received from the factory, mind you!) is showing 25,000 feet—an error of 20,000!

Sgt Ernie Booth is checking stock for time-expired items in the instrument section of 408 Squadron. Such items are reported to Air Material Command which authorizes that they be returned to the manufacturer for bench-testing.

controlled. A good rule of thumb is that humidity should be less than 60%. When it is not possible to attain this continual control, special precautions should be taken.

Shipping containers for Kollsman instruments have silica gel packed with the parts whenever it is requested by the customer. This keeps dampness down to a minimum. A humidity indicator is also packed with the instrument. This is a small piece of chemically-treated, blue paper which turns pink when excessive dampness seeps into the container. In areas where humidity cannot be adequately controlled, it is best to leave instruments in their shipping containers until they are requisitioned for installation.

Another method of controlling the humidity is to keep the instruments in a cabinet in which an ordinary 50-75 watt electric light bulb is continuously burning. This will help keep the moisture in the air at a low level. However, the instruments must be kept at least a foot from the lighted bulb. In this way, heat will not dry out the lubricants in the instruments nor will certain metals they contain expand to cause leakage.

Because instrument cases are coated with anti-corrosive paints and lacquers, many people have the impression that moist atmospheric conditions will not damage an instrument. Generally this is true after the instrument is installed. However, pressure instruments have external ports which permit the free flow of air inside the case. Moisture may have a disastrous effect upon the highly polished steel surfaces of some of the mechanisms.

If an instrument receives any unusual knock or jar, report it immediately. If there's a chance of humidity higher than 60%, take steps to prevent it from damaging the instrument or its component parts. In this way you'll be getting all the precision, service and reliability that is built into the instrument. Remember: "Many instruments are more fragile than eggs ...handle them accordingly."

FSF: Aviation Mechanics Bulletin

"Old Dad" says:

Every single day this winter, some pilot somewhere is going to go blasting off into the frigid blue with not a match in his pocket.

So what? asks a young punk with a puff-ball for a head and a feather tick for brains.

Here's what, Junior! If one of those boys goes down in a stretch of typical Canadian bush on a typical Canadian winter day—he's dead. And all for want of a simple match.

Just to make sure, stick a batch of them in a waterproof container and sew the container into the lining of your coat. Don't forget that old Eskimo proverb: "You can rub two igloos together all week and never get a spark."

HEADS-UP FLYING

ONE PIN SHORT

Flying a Sabre, F/O G.E. Miller executed a tight break, reduced power to 55%, and extended his dive brakes. Just as he was turning onto base leg there was a loud knock and a rapid loss in power. Smoke began to fill the cockpit, and the utility hydraulics fell to zero.

The pilot next backed the throttle around the horn and—since the dive brakes could not be retracted—jettisoned his drop tanks. As the aircraft was banking steeply to the left, the starboard tank sheared the pitot head, causing a loss of airspeed indication. Despite this setback the landing run was continued and the aircraft touched down just beyond the button. During the landing roll the aircraft was kept straight by means of some judicious emergency braking action. Later, investigation revealed that the Sabre's engine had seized when debris flew from a fractured stator blade.

In his handling of a most critical situation F/O Miller displayed flying ability of professional status. His clear thinking and fast responses resulted in a exceptionally good landing, with no damage to the aircraft or injury to himself. Heads-up flying at its best.

FLYING FRACTURE

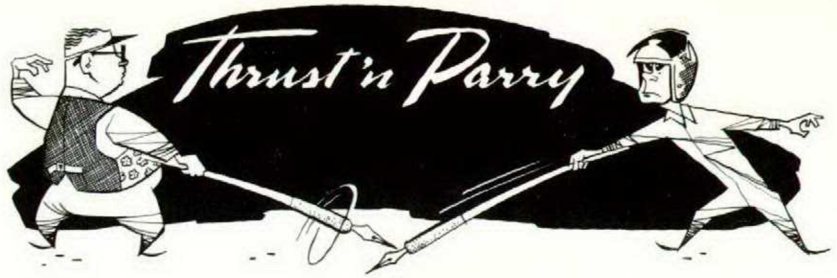
F/O A.E. McKay, piloting a T-33, completed a closed pattern but overshot on final because of traffic. His statement on the D14 reads: "On the undercarriage-up selection I noticed a barber pole indication for the right wheel, and the red light was on. Upon confirmation of the same indication in the front seat, I completed two more undercarriage selections with the same results. The duty pilot in the tender confirmed that the right inner door was open.

"Clearance for a closed pattern to the left runway for a full-stop landing was received. The down-selection was normal and the undercarriage indicated down-and-locked, but on touchdown the right wing was lower than normal and there was a scraping sound. I then overshot, holding the right wing off. The duty pilot in the tender said he saw a wheel roll down the runway, and a missing right wheel was confirmed visually by another aircraft.

"After burning off excess fuel, I made a landing with the wheels and speed brakes up and flaps down. The high pressure cock, fuel switch, electrical equipment and battery generator switch were shut off before touchdown."

An undercarriage selection was made on the aircraft and revealed that the starboard main wheel was missing. It was found adjacent to the runway. Apparently no damage had been done to the main landing gear shock strut: but the tire was cut and blown—probably by the inner door which, when it failed to close, gave an unsafe reading on the undercarriage indicator. The split pin was missing from the main wheel nut, and no evidence was found to prove whether it had broken or sheared.

F/O McKay did a fine job of flying the aircraft when he recognized, on touchdown, that all was not well. He was able to keep the right wing up and complete an overshoot, thereby avoiding a serious accident.



Letters to and from the Editor

What Do YOU Want?

Flight Comment is directed at every groundboy and flyboy in the business, so if you people aren't enjoying the sort of fare we serve, there is nothing we can do about it until you complain.

We are vitally interested in what our readers think about Flight Comment. Because you are the people to whom the magazine is addressed, we have accomplished nothing if we fail to please you.

So, how about dropping us a line, readers? We'd like to know how you feel about our articles. Since we derive more benefit if you criticize our efforts bluntly and frankly, we suggest that you pull no punches.

A postcard will do, if you haven't the time for a letter. The important thing is that you tell us what's right and what's wrong with Flight Comment—and give us an inkling of the sort of material you like to read in YOUR magazine.

Incidentally, our full address appears in the box on this page. There are no channels to go through; you simply write us direct and sound off. — **ED**.

What Do WE Want?

Criticism, ideas, suggestions, comments, short filler articles, and full-length articles—that about covers it.

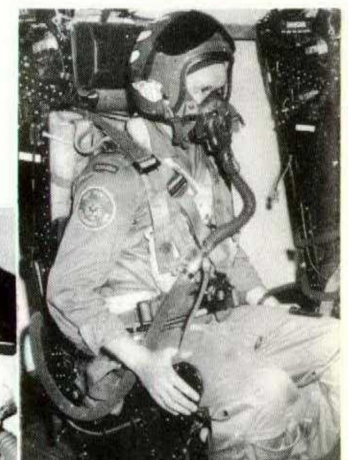
Like any other publication, Flight Comment neither writes nor prints itself. Without a major push from our readers now and then, we'd be out of business. If any of you would care to take a shot at writing an article for us, we'd be grateful. Don't hesitate just because you can't turn out a rhapsody in prose. Getting your ideas down on paper is the main thing. Do that much for us and we'll apply the polish.
— **ED**.

Articles, comment and criticism welcome. Address all correspondence directly to:

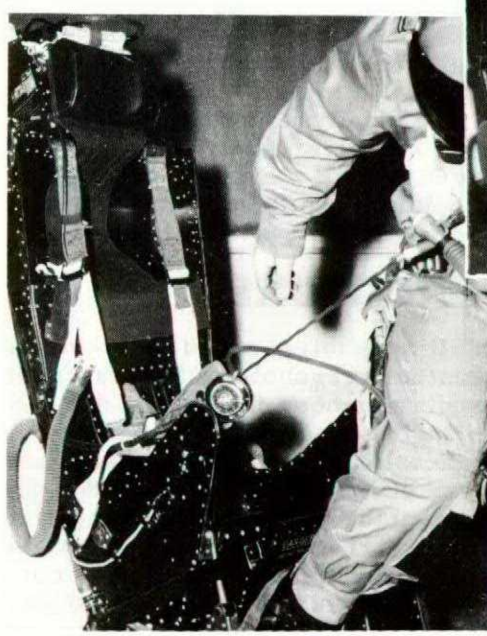
THE EDITOR, FLIGHT COMMENT
DIRECTORATE OF FLIGHT SAFETY
AFHQ, OTTAWA

The Perfect Hook-Up

Naughty! Naughty! on your example of a proper oxygen hook-up in the article "Misplaced Alligator" (Sep-Oct 1957). The person in your example might not lose his main oxygen supply; but if he bailed out, he sure stands a good chance of getting his emergency oxygen hose hooked up with the buckle on his lap strap. The next line to your story might run "Down Will Come Pilot, Parachute and Seat" (sung to the tune "Down Will Fall Baby, Cradle and All").



This is the photograph of a "proper" hook-up that appeared in the "Near Miss" section of the Sep-Oct Flight Comment. Note that the oxygen line to the bailout bottle runs outside the lap strap of the safety harness.



According to F/L Thompson, here is what could happen just as a pilot is separating from the ejection seat. The oxygen line to the bailout bottle has snagged in the quick release mechanism.

It is suggested that people flying the Canuck should hook up their emergency oxygen hose by placing it either around the thigh or between the legs—and then up beneath their lap belt. Hooked up in this manner there is no chance of it becoming caught with the harness buckle as the drogue chute throws you away from the seat after ejecting.

Enclosed you will find a picture of a properly connected oxygen system and another showing what could happen to a man if he was connected up as indicated in your photograph.

P.S. You might tell your model his chin strap isn't connected.

W. K. Thompson, F/L
OC Conversion Flight
RCAF Stn Cold Lake

The photos are excellent and certainly prove your point. We checked with the jet boys in DFS and found that all but one of them were using the method illustrated in Flight Comment. After a lengthy discussion, we agreed that your method is the more logical one. — **ED**

Photo Credit

So many of the photographs in this issue of Flight Comment were taken for us by Cpl. W.T.K. Stephenson of RCAF Photographic Establishment, Rockcliffe that we felt he should get a pat on the back for a job well done. His work appears in the articles beginning on pages 7, 12, 16, 18 and 22.

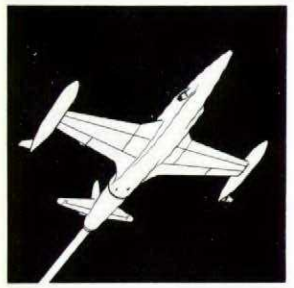
Pictured above is the hook-up arrangement suggested by F/L Thompson. It is obviously the safest and best method. Note that the oxygen line to the bailout bottle has been located behind the lap strap of the safety harness.

TIPS FOR SAFE WINTER OPS

- There is often a thin coat of ice under the fluffy blanket of snow which has accumulated on the wings of your plane. Don't depend on the snow (even the light kind) blowing off during takeoff, and remember to check for ice. Falling snow sticks at temperatures above 10°F. It also forms a coat of ice between 32 and minus 10°F.
- Snow-grip tires should be on all aircraft flying into icy runway country. Even the best brakes will not stop an aircraft that is skidding down an icy runway. Every winter there are a few accidents of this nature which could have been prevented. The heavier aircraft seem to be especially addicted to the long skid when not properly equipped.
- Snow or ice covered runways require that short field landing techniques be employed at all times since braking action is at a minimum. Instead of landing short, the common tendency (due to optical illusion) is to land long.
- Propeller pitch should be changed occasionally during cruise to prevent oil congealing.
- Cold, and the necessity of wearing heavy flying equipment, tends to lower pilot efficiency. The physiologists say that many of the same symptoms which are associated with hypoxia have been noticed in pilots who are subjected to extreme cold. However, this is not dangerous; just a matter of expecting it and being a little more alert than usual.
- There is no way to estimate accurately the number of inches of snow on a runway. If an airport is not being used, stay away from it unless you have an emergency. One pilot "estimated" that there were two inches, and landed on his back. There was an airport with cleared runways not far away.
- Night takeoff accidents involving loss of directional control and collision with snowbanks point up the necessity for being really on your toes under these conditions. A slight veering to the left would ordinarily not be noticed; but when there is a snowbank in that direction, the veer winds up as an accident statistic.

USAF: Flying Safety

ARRIVALS and DEPARTURES

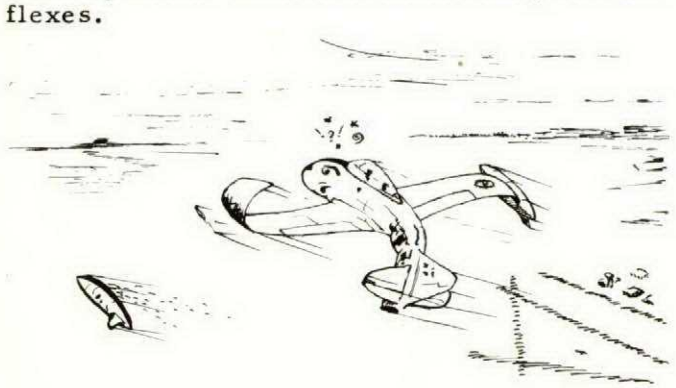


It Happened Again

On a dual exercise in a T-33 the pilot was briefed to carry out a beacon letdown. After crossing the beacon he retarded the throttle to 70% and the undercarriage warning horn blew. At this he moved his hand automatically to the lower left instrument panel and pressed the bomb jettison switch, thereby losing his starboard tip tank. Using fuel from the port tank, he landed safely.

Later the pilot remarked that he became aware of his error just as he was committing it—but too late. As an old Harvard user he was simply doing what he did every time the horn blew.

While the bomb jettison switch in a T-33 is located in the spot occupied by the undercarriage warning horn in a Harvard, there is no logical excuse for pressing the wrong button. In this case the full tip tank landed in open prairie; but what would have happened if it had dropped in a built-up area? Don't let habit rule your reflexes.



Correct Procedure

The following pilot's statement was taken directly from the D14: "I was practising forced landings on Mission 18 when this accident occurred. I was downwind at approximately 3000 feet and opposite the button when I started my turn onto final approach. At approximately the 90-degree position, I decided I was too low and should overshoot. The aircraft stalled. I levelled the wings, raised the undercarriage, opened the throttle—and then heard a slight rumble. I can't remember much from this point onward but I pulled back hard on the stick when I realized I was going to hit the ground."

On being questioned about his accident, the student asserted that he had made practically no reference to the airspeed indicator or the altimeter during the final turn, nor had he recognized the symptoms of an approaching stall.

There was no excuse for getting the aircraft into such a critical flight condition but perhaps he could have saved the day if he had used the correct procedure to recover from the stall. The time he wasted in raising the undercarriage before opening the throttle may have meant the difference between an effective recovery and the damage shown in the accompanying photograph. It would be interesting to know how much instruction and practice this student had been given in stall recovery procedure.

Foreign Object

A nut was found in the canopy locking mechanism of a T-33 aircraft. The nut, a self-locking type (28NS/22K1-048), is used on the end of the rod instrument panel support (part number 178714; EO 05-50C-4 page 464B index 67 refers). How did it get there and how was it discovered?

While it is difficult to say exactly who put it there, the evidence points to maintenance personnel who were working behind the instrument panel. The nut had been removed and placed in such a position that it fell through the canopy lock opening into the mechanism. Now, let's follow the story through to the finish. How was it discovered?

A student was carrying out a crosscountry exercise in the aircraft. He was cruising at 31,000 feet when he noticed the canopy-unlocked light come on, and saw the handle in the three-quarter-locked position. He attempted to pull the handle to the fully locked position, but it would not move. He then reduced speed to 200 knots and requested a clearance to descend to 8000 feet. Before the clearance came through, the canopy blew. The events that followed are quoted from the pilot's statement.

"I was at 31,000 feet, so immediately I descended at Mach 8 to 10,000 where I levelled off to see if I still had full control of the aircraft. Since I still had control, I descended to 8000 feet and attempted to position-report to Sioux Lookout on 'B' channel, because I could receive no acknowledgment of my transmissions. I selected 'D' channel and sent a distress (May Day) transmission and placed my IFF set on emergency.

"My maps had been blown out, and the wind was so great that I believed it would also take my emergency maps if I removed them from their case. So I decided to fly in a southerly direction to intercept the Trans-Canada Highway or CP Railway. This action was taken because I could not get a radio compass bearing on Kenora.

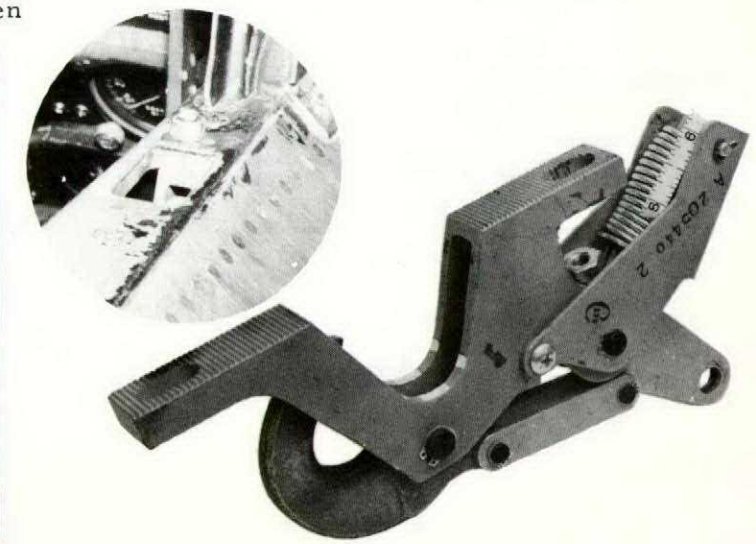
"I followed the CP Railway line to Dryden where I circled in an attempt to find an airport; but I was unsuccessful. I continued to fly west along the railway until I spotted the Kenora airport. Here I joined the circuit and made a low pass to determine the crosswind strength, and the elevation and length of the runway.

"From my low pass, I estimated a crosswind of fifteen to twenty miles per hour, 90° to the runway, the length of runway at 3500 feet, and the elevation of the field at 1400 feet. Because of the position of the runway on top of a hill which was approximately 300 feet above the surrounding district's elevation, I made an unsuccessful landing from which I had to overshoot.

"Because I had only 300 gallons of fuel remaining on my third approach, I made my roundout at 115 knots. I jabbed the brakes upon landing, but as the end of the runway was coming close, I held them on. The left tire blew, but the aircraft stayed under control until a full stop was completed."

When we analyse the actions taken by this student, we must remember that he was an inexperienced member of aircrew. (He did land the T-33 safely, with minimum damage to the aircraft and no injury to himself.) However, when we look more closely at the maintenance aspect, we find it difficult to understand how a nut could be misplaced. But if one is misplaced, why not major the aircraft till it's found. A waste of flying time? Probably at that particular moment, yes. But look at the flying time that was ultimately lost in this case! And remember, it could have been worse: the nut could have jammed the controls, causing a writeoff and possible loss of life.

The problem of foreign objects in aircraft is serious enough where pistons are concerned; but in a jet, it's murder. The technician making repairs to an aircraft should take a tip from aircrew: Do a last check before you go. Are all the bits and pieces accounted for? The answer to that question may spell the difference between life and death for some flyboy.



Mystery of the Missing Fuel

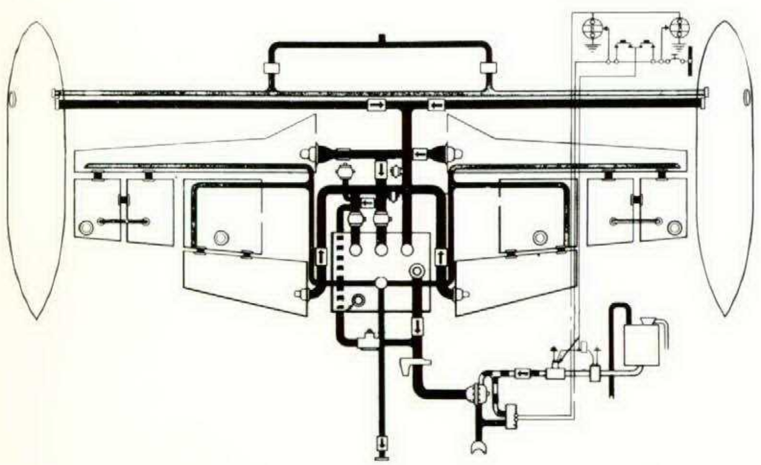
Two pilots took off on an IFR crosscountry in a T-33 which had been certified as having a full fuel load. On the 5000-foot check they noticed severe venting from the port main wing group tank filler cap, accompanied by moderate buffet. Since they were on airways, they continued the climb and worked out an estimate of the quantity of fuel they could expect to lose. They calculated that, at the worst, it would amount to loss of the entire internal port wing fuel load. This meant there would still be sufficient fuel to reach either destination or alternate, plus a comfortable reserve for emergencies.

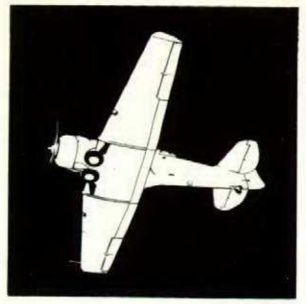
Breaking out above cloud at 33,000, the aircraft was levelled at 35,000 for "1000-on-top" flight. However, when the venting continued unabated, the captain obtained clearance for a throttled-back descent to base, intending to burn off fuel locally prior to landing.

The aircraft had been airborne forty minutes when the tip tank warning light illuminated. A rapid calculation showed that the tip tanks had contained only 100 gallons each! Congratulating one another on the decision to turn back, the pilots landed and marched on the servicing crew with blood in their eye.

It was soon determined that although the troublesome filler cap had been placed in the filler neck, it had not been tightened. (Corrective briefing was soon undertaken on this point!) However, the refueller adamantly insisted that the tips had been topped up to "full" —and a check with the fuel compound confirmed this.

The question is: Where are the 180 gallons of missing tip tank fuel? There is an explanation. Do you know what it is? (Hint: The tip tanks did not vent fuel.—ED)





Clear Thinking Pays Off

The aircraft was being flown on a basic instrument training flight with a student in the rear cockpit. At 6000 feet indicated, the student was instructed to glide to 5300 feet at 90 knots using 15 inches of manifold pressure, wheels and flaps down, and with an altitude of 5200 feet indicated as the simulated ground level. The instructor set the pitch at 2000 rpm, and the student used 28 inches of manifold pressure to overshoot from 5300 feet.

Nothing unusual was noticed in the sound of the engine or in the instrument indications. However, as the student levelled off again at 6000 feet and throttled back in the normal manner to 24 inches of manifold pressure and 1750 rpm, there was a slight "bang". The instructor richened the mixture, thinking the student had left it too lean; but the engine continued to run slightly rough, with no outward sign of what was wrong.

Taking control, the instructor headed for base 10 miles away, flying at 100 knots and using 22 inches of manifold pressure and 1750 rpm. He advised the tower on 121.5 of his condition.

By this time the engine was getting rougher, and it started to smoke. At 3000 feet on final straight-in approach, oil pressure started to drop, oil sprayed along the port side of the aircraft, rpm dropped to 1500, and manifold pressure was reduced to 15 inches. At about 300 feet above ground, flames appeared around the engine cowling, so the fuel was shut off. On the landing roll the engine was switched off, leaving no further sign of fire, and the Harvard was rolled off the runway and towed to the hangar. The instructor is to be complimented for his good airmanship in averting a forced landing away from base.

Know Your Engine

A Harvard student, on his second solo trip, detected abnormal sounds from the engine after a landing run. He returned to the servicing line and reported the incident to the NCO. Investigation revealed a failure of number five cylinder. No further damage was sustained.

The action taken by this student is a direct reflection of the calibre of instruction he had received and of his own sound judgment. A pleasant ending to what could have been a serious accident.

Pattern for DISASTER

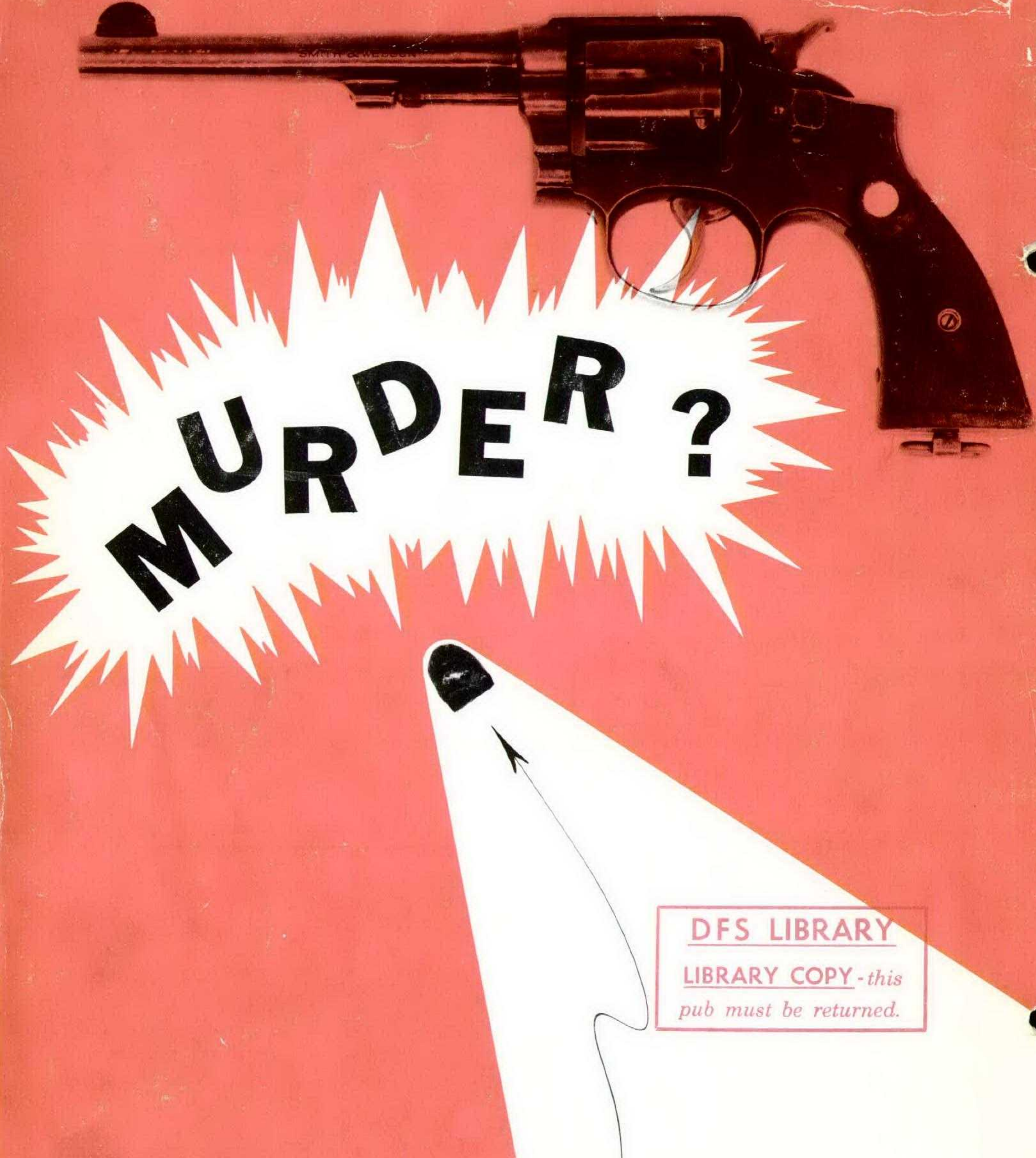
On a recent visit to an RCAF unit, an accident inspector from the Directorate of Flight Safety walked from a hangar to station operations and from there to an aircraft on the flight line. In the roughly four minutes that it took him to cover this route—and without straying appreciably from his path—he picked up the 19 assorted bits of debris pictured here.

There is no need to emphasize the fact that any one of these items could either severely damage or completely write off a jet engine if blown or sucked through an intake. Everyone is aware of such hazards. The big question is Where did this crap come from? Runway and taxi areas of the unit involved are swept regularly.

One suggestion offered is that possibly this debris fell through holes in the pockets of overalls worn by personnel working in the area. Perhaps the solution is to contract with the garment manufacturer to install pockets of more durable material. In the meantime we might instruct laundries to inspect the pockets of overalls sent out for washing, repair those that have holes and reinforce those that are wearing thin.

Obviously people don't walk about deliberately scattering junk on our runways. But we should be on the lookout for newer and better methods of eliminating the expensive accidents that can be caused by foreign objects. It will be a sad day for the Air Force if an accident inspector ever traces the loss of a sixty-five-thousand-dollar engine back to a hole in somebody's pocket.

Against such a time every man-jack of us can lend a hand. If you see a bit of junk lying on a runway, bend over, pick it up, and drop it in a trash can. If no trash can is in sight, put it in your pocket. The one with no hole.



This isn't a .38 slug, but it might just as well have been. It's a nut that was ingested into a Sabre's engine and caused a fatal accident.