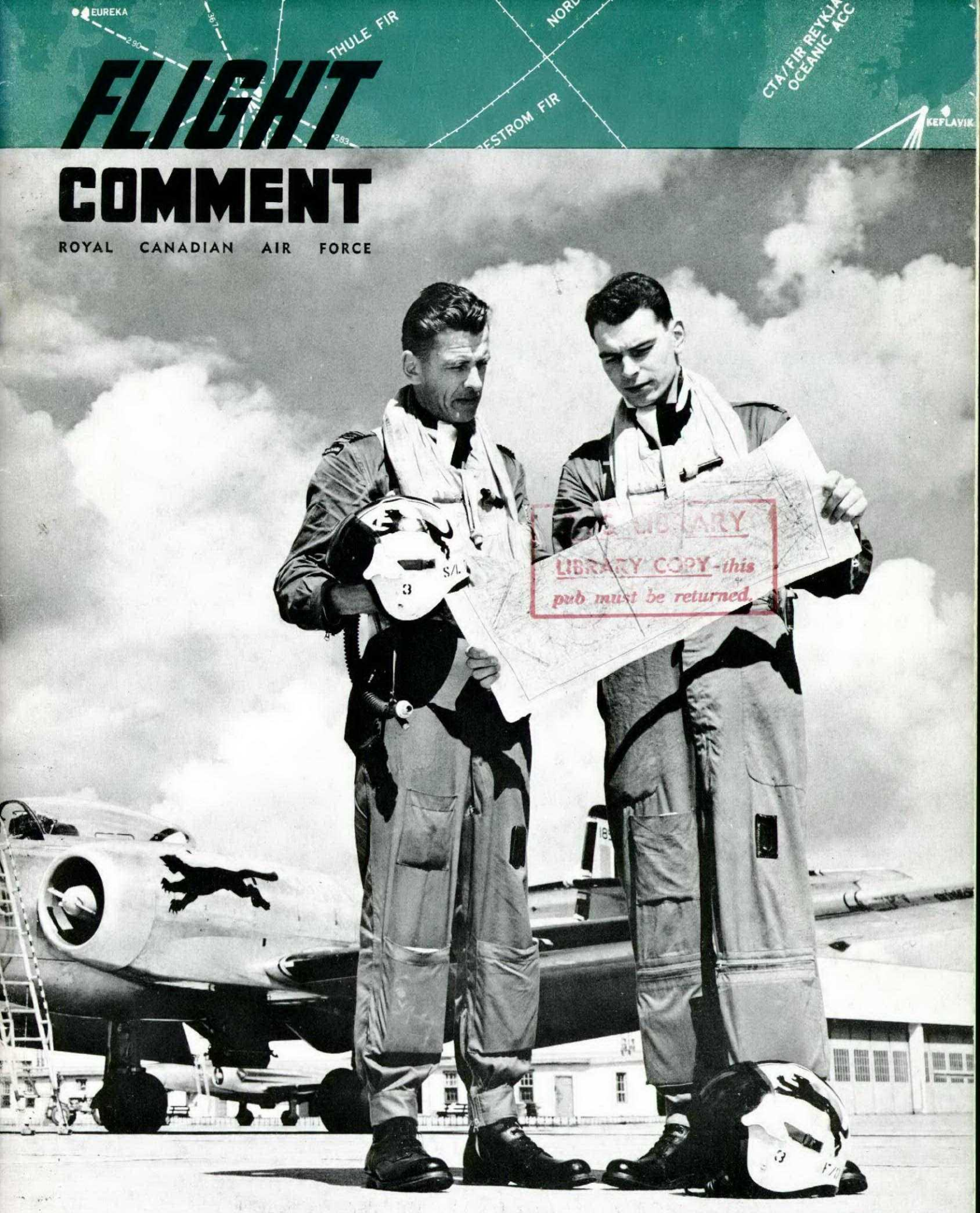
FLIGHT COMMENT

ROYAL CANADIAN AIR FORCE



September • October • 1959

AN APPROACHING JET
APPEARING THIS SIZE
TRAVELLING AT 600 MPH
WOULD BE HERE....5
4...3...2...1...NOW

AIRCRAFT DISTANCE—2 MILES: SPEED—600 MPH: TIME—12 SECONDS
PHYSICAL AND MECHANICAL LAG TIME—10 SECONDS

LAC G. M. CHALLENGER

LAC G.M. Challenger was carrying out a BFI on a Sabre aircraft. His inspection was more extensive than required by EOs for a BFI and, as a result, he discovered extensive damage to the compressor and the turbine section of the engine.

By doing more than was required, LAC Challenger undoubtedly averted a serious accident. This is a case of thorough work paying big dividends—many thousands of dollars. It is an example of preventive maintenance at its best. A very Good Show indeed.

THE HURRICANE

by E. W. Brandon
RCAF Station Greenwood

Sources, Regions and Frequency

When asked to relate one's preconceptions concerning the climate of the sub-tropical ocean areas, one naturally envisions palm-studded tropical islands basking in the bright sunlight, the white surf breaking gently on the shores. Occasionally a passing rainshower accompanied by gusty winds temporarily cools the air a few degrees. However, while these regions usually enjoy the most pleasant weather to be found anywhere, they occasionally become the birth-places of the most violent and destructive storms that the earth's atmosphere can develop on an extensive scale. Entire fleets have been destroyed, thousands of lives have been lost, and vast property damage has been wrought by the furious winds and tumultuous seas accompanying the intense tropical low pressure areas which we call hurricanes.

These storms depend for their beginnings upon the moist, unstable air masses, and high sea temperatures to be found only in low latitudes. It has been found that hurricanes do not form where the water temperature is less than about 80° F, nor do they form closer than about 5° to the equator. In the Atlantic, north of the equator, there are two main source regions for hurricanes, namely the Cape Verde region and the Gulf of Mexico-Caribbean region.

The hurricane season is the period August through October, although hurricanes occasionally occur in other months. Hurricanes of Cape Verde origin most frequently occur in September while the Gulf of Mexico-Caribbean type favour October. A frequency tabulation made for the years 1887 to 1956 shows that about eight tropical storms developed annually in the North Atlantic, but only about one-half of these, or about four per year, were actually of hurricane strength.

The Formative Stage

Weak troughs characterized by extensive cloud bands and showery weather frequently occur in the trade wind flow. Occasionally a closed cyclonic circulation with quite strong winds will develop in one of these troughs. On rare occasions, and for reasons not clearly understood, a hurricane with its highly organized cloud and weather structure, very low central pressure and extremely strong winds (greater than 72 mph) comes into being. The development of the majority of hurricanes is remarkably rapid, the centre of a weak low deepening into a small hurricane vortex of very strong winds within a few hours or a day. The initial diameter of this intense storm is usually in the order of 60 to 100 miles. The strongest winds may exceed 200 mph. A slow increase in diameter occurs as the storm matures.

Structure Of Hurricanes

Perhaps the most remarkable characteristic of a hurricane is the central region of lowest pressure known as the "eye". In this region (which as a rule has a diameter in the order of 8 to 40 miles, depending upon the age of the storm and other factors) the winds are very light and the skies comparatively clear, although patches of middle and high cloud and variable amounts of stratocumulus are frequently observed. Reports from weather observing stations often mention a sharp rise in temperature coincident with the arrival of the eye. Descending air currents, the cessation of the cooling influence of the heavy rain, and the sudden break-through of sunshine, all of which are usually characteristic of hurricane eye passages, combine to produce this effect. Within the eye, the sea surface, relieved of the flattening influence of the violent winds, rises and falls in mountainous waves, threatening at each instant to capsize even the largest vessels so unfortunate as to be ensnared by the storm.

As a first approximation the hurricane vortex can be considered circular, with the winds increasing towards the eye of the storm. The strongest winds occur on the right side of the direction of motion of the storm where the hurricane winds are superimposed upon the steering current. The winds also have a component blowing into the centre, so that an air parcel actually follows a spiral trajectory, as shown in Figure 1. Radar photos reveal a hurricane as an octopus-like structure with rainbands spiralling out from the usually circular eye boundary as in Figure 2. The greatest cloud build-up occurs along these spiral rainbands. These bands are usually more concentrated in the sector towards which the storm is moving.

Fig 1: Paths of motion of air particles about a hurricane with centre at C.

Hurricane Decay

In a tropical storm the process of decay, once begun, generally progresses much faster than is the case with an extratropical low. As a hurricane travels over the sea towards higher latitudes cooler water surfaces are encountered which have a weakening effect upon the storm. A hurricane moving inland usually fills very rapidly, although a few remarkable instances of the generation of intense extratropical storms associated with hurricanes moving inland have taken place. Hurricane Hazel, October 15, 1954, was a noteworthy example. Hazel, moving into the South Carolina coast, came into contact with the polar front lying along the Appalachians. A new and violent low centre formed on the

Fig 2: Spiral rainbands about the nearly circular eye of a hurricane.

Cloud formation close to the eye of a tropical cyclone.
(Plate 186, International Cloud Atlas, Vol. II.)

Damage caused by hurricane Hazel in the Toronto area.

polar front near Buffalo to which the energy of Hazel, the hurricane, was transferred. This new low moved into Ontario causing extensive damage.

Flying The Hurricane

Hurricane reconnaissance flights by military aircraft and personnel, directed by the Miami Weather Office, began on a routine basis in 1944. Each year since 1944 tropical storms threatening the Caribbean area or the U.S. coast have been tracked by aircraft. This is an extremely hazardous undertaking and much credit is owing to the crews to whom this duty is allotted.

In the early days hurricane reconnaissance aircraft would engage the storms at low levels. When traversing the maximum wind zone just outside the eye of the storm it sometimes proved a strenuous task for the captain and co-pilot, working together, to maintain control of the craft and prevent it from being buffeted into the tumultuous sea. No life-saving equipment could possibly be of service in the turmoil created at the ocean surface by the winds of a mature hurricane.

The majority of hurricane reconnaissance flights now take place at the 700 or 500 mb levels. At these higher levels much smoother flying conditions are encountered. Dropsondes, which are radio-equipped devices used to send back weather data, are released at intervals to determine pressures, temperatures, etc., between the flight level and the sea surface. The use of powerful airborne radar in recent years allows the aircraft to remain outside the more violent storms and still obtain a position fix of the eye. Plans are now under way to drop constant level balloons carrying meteorological instruments and radio equipment into the eye regions of hurricane. It is believed that a constant level balloon would remain within the eye for a long period of time, so that the storm could be tracked without risk except, of course, to the craft dropping the balloon.

Significance Of Hurricanes To AMC

The probability of an occurrence of a hurricane in the Atlantic is greatest from late August to late October. Hurricanes in the Atlantic, other than those arising in the Gulf of Mexico and extreme Western Caribbean, tend to move around the western side of the semi-permanent high pressure area, the "Bermuda Height". With such a track a hurricane becomes a threat to exercises carried out south of Nova Scotia and, at times, to MAC bases themselves. While there is a tendency for a hurricane to weaken over the cooler waters as it moves northwards, acceleration under the influence of the stronger upper winds may result in its arrival near Nova Scotia as a very intense storm.

As a hurricane approaches along the Atlantic coast the atmosphere at the MAC bases becomes increasingly tense. Insufficient hangar space exists at Greenwood for the Neptune and Argus aircraft. No tiedown facilities are provided. Personnel from 404 and 405 squadrons are alerted to fly those aircraft which cannot be hangared to a base, preferably in Canada, which is forecast to be unaffected by the storm. A forecast wind of 60 mph has been chosen arbitrarily as the critical wind speed for grounded Arguses and Neptunes.

Little damage to the sturdily built structures of the MAC bases is to be feared. With reasonable precautions the chance of injury to personnel at these bases or to their families is not high. However, a partial or complete disruption of landline communications is not uncommon during a hurricane. It is to be expected that by the time the wind strength has reached these proportions all that can be done to mitigate the storm damage has already been accomplished.

The aftermath of a hurricane may well be a hectic experience for the Search and Rescue squadron based at Greenwood. Even in this modern age of storm warnings it occasionally happens that ships at sea fall afoul of the weather. Furthermore the destructive forces of a hurricane can completely block land routes, making air evacuation of the critically ill or injured in some localities the only possibility.

Conclusion

Our knowledge of precisely how hurricanes arise and of their internal mechanisms is, at present, incomplete, but research is broadening this body of knowledge at an ever accelerating rate. We are on the verge of great discoveries in this field. On the practical side we know that these storms are not to be taken lightly by those on the ground, and are to be avoided by those in the air.

CONTROLLERS ARE HUMAN TOO

by F/O D. A. Griffith-Cochrane
RCAF Station Rockcliffe

It is occasionally forgotten that we people in the tower, far from being annoyed at the intrusion of occasional flying types breaking up a good crib game or siesta and therefore wax nasty on the R/T or telephone, are really only worried over the possible consequences of momentary memory lapses or "I can make it VFR" tactics on part of usually courteous and well trained aircrew.

For example, a pilot taxiing down the runway hears someone asking for landing clearance behind him and thinking to speed things up he concentrates his attention on the transmissions from this aircraft and expeditious taxiing of his own aircraft to the end of the runway. He concentrates to such a degree that he fails to hear the tower advising "Expedite first right". Result, a near miss, a thoroughly hostile fellow pilot doing the tour of the circuit once again and an irate controller ready to shoot the next pilot on sight. With many airports handling traffic at maximum capacity for a large part of the day, the pilot who ignores, forgets, or does not acknowledge tower instructions creates far more hazard and confusion than many of them realize. The tower, to keep R/T patter to a minimum, will often clear a taxiing aircraft across the "live" without request from the aircraft. The pilot having received this red carpet treatment a few times starts to take it for granted and one day breezes out on the "live" without so much as by-your-leave from the tower, never realizing the tower is trying to watch the AFPs round up a pair of touring dalmations, clear a Lancaster in emergency, contact the hospital via phone because the intercom has gone for the chop, and direct an urgent red light at the snowplow driver who has decided to stop and check his equipment on the middle of the runway. After the smoke has cleared away the poor pilot is observed, with an expression like a whipped bloodhound, murmuring "Wot a snarely clot they got in the tower today".

Let's not forget the majority of aircraft accidents occur during landing, takeoff, and taxiing. Every field is a danger area unless everyone keeps his head up. It is not sufficient to think, "I know what the tower wants me to do". Acknowledge all transmissions and then the tower knows you have received instructions. The other aircraft in the area know it too and have a good idea what you propose to do. Fail to acknowledge and everyone has to keep an eye on one more thing because they are not sure you have received the message and consequently may be going to do just about anything, and some pilots seem to have a weird sense of humor!

One evening during night flying DFCO cleared an aircraft for takeoff and glancing down the runway saw two sets of headlights progressing merrily up the middle. The controller yelled "Abort takeoff" and the pilot, right on the bit, said "Roger" and ground to a halt. The pilot could not see what all the excitement was about as the vehicles were beyond his line of sight at the time he started his roll, due to the rise in the center of the field. The vehicles were a car and a truck, operated by a couple of friendly but inebriated types who thought to shortcut to a friend's home on the other side of the field. They were busy congratulating Ontario on the nice road, well lighted on the sides, when the fireworks started. The car driver, still retaining a slight degree of mental competence, streaked to the nearest cut-off and departed these hallowed grounds. The truck driver, whose mother was obviously badly frightened by an ostrich at some time, stopped in the middle of the runway and turned out all his lights! After it was all over we were able to

see the humorous side of the situation but if the DFCO or pilot involved had been doping off the least bit no one would have seen anything funny in it, particularly the widows who would have been left.

Something unforeseen occurs and in seconds pilot and tower are faced with a new and dangerous situation and there is no time to sit down and talk it over. You have to do something fast and if it is the wrong thing—well the air force will pay for the funeral if that is any consolation. Don't count on routine, keep alert and expect the unexpected because sooner or later you are going to meet it on the field where being awake can well mean being alive. Controllers are not mind readers and can only know your intentions if you have told them. Also, being human, (they are so!) a controller can make as many mistakes as a pilot. Check your clearances and instructions or you may find yourself cleared to the pearly gates.

An occasional worry producer is the chap who has strapped on his trusty charlie forty-five and filed three hours VFR round robin. Arriving in the vicinity of the home nesting grounds he decides the weather and fuel state are comfortable so why not tack on a couple of hours local for good measure. Excellent spirit but he forgets to tell anyone what he is up to. All is serene until ETA plus :30 when Montreal centre calls and says "Where is your wayward aviator?" Immediately calls are made to all stations in the area and all fields check their hangar lines to see if the wayward one is on a coffee break somewhere. No joy, so-o-o-o Search and Rescue is alerted. (If you think controllers don't like being disturbed, try shaking a mess of SAR bods out of bed some night when you are tired of living). Line checks start all over again, aircraft are warmed up, crews are called in. All in all a rather large organization swings into pretty rapid action. Just as everyone is nicely under way—"Out two thousand, landing instructions." Needless to say he is horribly shocked at the reply he received and goes around for days murmuring, "Awful touchy folks, these flying control types".

(This article is a reprint, with some editing changes, from AFHQ Practice Flight (Piston) News Letter.—ED)

A SHORT LESSON ON JETS

Have you ever wondered how the injection of water into a jet engine produces about 30 per-cent extra take-off power? Here is the answer.

When water is fed into the engine air intake ahead of the combustion chamber, and into the combustors, there are two useful effects. First, the water lowers the temperature of the air (which has been raised by compression), and therefore more fuel can be fed into the combustion chamber without exceeding the maximum permissible temperatures at critical points. Second, because thrust is directly related to the weight of air passing through the engine, the higher density of the water-cooled air enables the engine to develop more power.

FSF: Mechanics Bulletin

MAINTENANCE ERRORS — 1958

In this age of statistics, indices, and rates it is easy to be trapped into a false sense of security. For example, our accident rate for the 1958 calendar year was down about 20% from the rate for 1957. Should everybody be happy? Let's take a look behind this rate and see what we, Maintenance, had to contribute. Turn out the E329s and review our errors.

We are charged with 184 errors, an increase of 25% over the 1957 figure. The trades responsible—1957 figure in brackets—were: airframe 110(91), aero engine 37(38), electrical 12(12), instrument 4(4), and four trades not listed in 1957 are armament 3, safety equipment 2, telecom 1, and photo 1. To complete the list there is a miscellaneous item consisting of 14 errors that, due to lack of information, could not be charged to a specific trade.

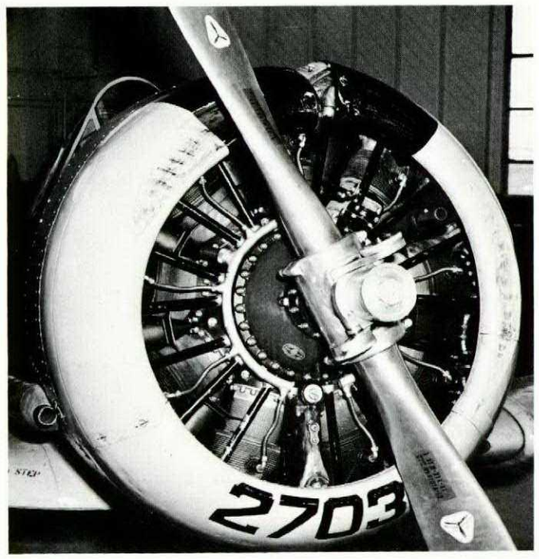
Is everybody happy? Following is a resume of our errors by trade:

Airframe

Undercarriages had a rough time in 1958 - 28 misadventures. A CF100 nosewheel wouldn't lock up; it was adjusted to stay up all the time and did. An Expeditor lost connection with the undercarriage chain drive when a nut and locknut fell off. This left the starboard wheel hanging free, and eventually the wing tip took over the job of supporting the aircraft. A Canso nose gear collapsed after some violent shimmying; the bolt at the apex of the scissors was twisted off through lack of grease. A Harvard wing tip and wing were bent when the downlock pin didn't lock down; it was jammed solid by dirt and sand deposited there by the wind. A T-33 had a near miss when the starboard uplock wouldn't release; the pilot managed to lower the undercarriage by the emergency method.

Several aircraft had trouble hiding the wheels after takeoff. Two Sabres had the nose gear tangle with the door when adjustments were a little out. Two CF100s had the opposite trouble - the nose gear went up but left the doors behind. Two more CF100s had nose gear trouble; on one a flexible hydraulic line got into the uplock before the gear did, and on the other the wheels were left flapping around after the oleo became disconnected. A T-33 had door trouble when the support bracket bolts let go; the bolts had been tightened several turns too much and the threads stripped. A Sabre nose gear indicated unsafe after retraction; it was fully up and locked but the micro-switch was not in the right place. An Expeditor pilot couldn't raise the wheels at all - the mechanism was jammed by a surplus stud which had been dropped during a feathering pump change.

Two T-33s finished the landing roll each minus one wheel. One had a 1/16" oversize nut installed on the axle that didn't stay installed. The other had a nosewheel bearing installed in a mainwheel. Because the internal diameters of the two bearings are considerably different the rollers all fell out and the wheel slid easily over the nut. A Canso had a bearing spacer left out when a mainwheel was replaced. This caused the wheel to seize during taxiing. Two CF100s had tires blow out on landing; during tire assembly and inflation some air was trapped between the tube and casing, resulting in hot spots, blisters, and blow-outs. A Mitchell also had a tire blow-out; an item from the tire-bay tool inventory had been left inside. A C119 lost the emergency escape hatch as a result of severe main-wheel shimmy caused by unbalanced tires. The unit had been operating C119s for



Four dzuz fasteners were not properly secured.

several years without balancing equipment. A Dakota and a CF100 had brake failure due to incorrect adjustments. Two more CF100s had the main-wheel doors come loose and jam between the tire and wing. A Neptune also had undercarriage door troubles - the operating chain was broken because it was adjusted too tight.

Two T-33s tried to bury their noses in the tarmac a few seconds after the pilots pushed their starter buttons. Since one was on air-test after a periodic inspection and the other had several retraction checks the night before, the AFTechs carry the can for leaving undercarriage levers in the UP position.

Airplane designers are a pessimistic bunch and insist on putting in some kind of alternate system to take care of things if the standard hydraulic system gets out of kilter. Eighteen times during the year their pessimism was justified. Nine CF100s lost all their hydraulic fluid from leaks, loose fittings, etc., so did two Sabres and a Dakota. Another Sabre lost the fluid when the reservoir cap fell off, another had a mixture of fluid, water, ice and dirt sloshing around in the pipes, and two had obsolete hydraulic pumps pack up. The pumps should have been replaced by an improved type. Two T-33s had their header tanks fall apart when the clamps broke because the bolts were tightened too much.

A good share of sloppy maintenance was perpetrated on fuel systems during 1958. T-33s in particular had their troubles. Fifteen times one or both tiptanks wouldn't feed, usually because of loose caps, but a couple of times the air connection in the wing tip leaked, and once a screw had been left out of each tank. Just a little screw but enough to let all the pressure out. Three Sabres also had droptank trouble, on one the cap was loose, on another the sway brace came loose and caused a leak, and on the third the sway brace fell off—so did the tank. Another Sabre had indigestion brought on by a mixture of fuel and water. The tank sumps had been drained but the aircraft was parked on a slope, tail down, and the water wasn't in the sumps. A CF100 and a Mitchell each lost a wing tank cap. Two T-33s had fuel venting past loose fuselage tank caps, and one was venting all over the place because a float valve was jammed open by a piece of stone. Another T-33 sprang a leak in the line between wing tanks and fuselage tank because the clamps were not tight. Finally, the fuel selector valve handle in an Expeditor was installed 180° out. When the pilot switched to starboard Main the selector was actually in the OFF position; the starboard engine quit and could not be started again.

Thirty-three aircraft had their controls act up. The types involved may be of interest - 1 Sabre, 1 T-33, 1 Mitchell, and 30 Canucks. The difficulties had a variety of causes including wrong diameter cables (Mitchell), water in the hydraulic system (Sabre), various nuts, bolts and other assorted junk jamming things, extra tight or loose cables, levers and cables fouling on other parts, ice on the cockpit floor, etc.

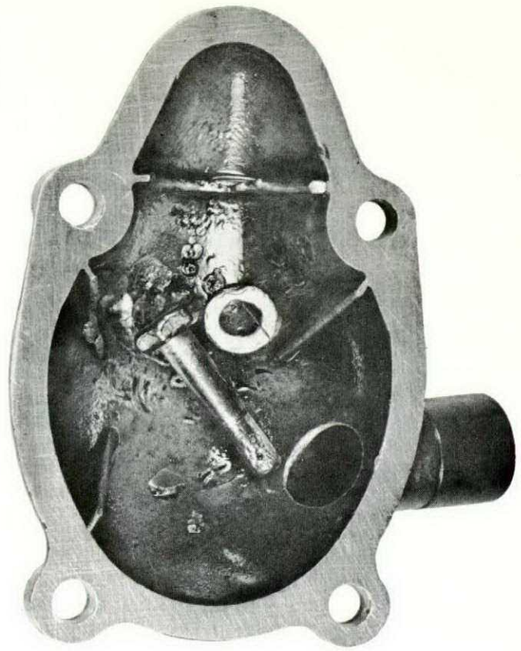
Two T-33s had flap trouble when the flexible shafts were fractured because of sharp bends. Another T-33 had a plenum chamber door come open in flight. Still another T-33 had an accident of a type that has never been reported before. After landing and taxiing to the hangar line, the pilot unlatched the canopy and it whipped up so fast that the operating chains snapped. Somebody had left the cabin pressure regulator in the OFF position after a P200 check—the pressure must have been terrific. A CF100 had the opposite trouble, no pressurization. The 8th stage air line came loose from the elbow because the clamps were not tight enough, and while the line was flapping around it bashed up some wiring in the gunbay.

Engine

A Comet had an overheat warning in one nacelle. Two combustion chambers on that engine had been installed with the sealing ring gaps in line, permitting leakage from the chamber into the nacelle. A CF100 had a leak between the tailpipe and the exhaust cone. This also caused an overheat warning. Another CF100 had the oil and fuel lines broken when the auxiliary gear box drive shaft came loose, and still another had severe vibration in one engine traced to a loose retaining strut. A T-33 had one burner nozzle installed outside the flame tube, resulting in burnt nozzle guide vanes. Three Mitchells, an Expeditor, a C119, and a Lanc had valve troubles—adjusting screw locknuts left loose, a rocker arm not locked, pushrod covers loose, and pieces of old gasket left in the rocker boxes to plug oil lines. Another Mitchell had a couple of induction pipe inserts come loose. This is an old trouble on these engines, and the -7 EO requires a visual check for signs of gas leaks in the area. An H34A Helicopter was due for pre-oiling, so the pre-oil plug was left loose and an appropriate entry was made in the L14—of another aircraft. The Helicopter went flying, the plug came out and all the oil went overboard. The engine never did get pre-oiled, but it doesn't need it now. A CF100 also ran one engine out of oil. This particular engine had a history of high oil consumption, but the oil level was not checked on several BFIs. A Harvard, a North Star, and two Lancs had oil tank caps fall off or come loose. A Bristol Freighter had a feathering line chafed through because a spacer was left out, and a Chipmunk sprang a leak at a loose connection behind the instrument panel. A Dakota pilot found one engine running hot - the oil temperature just kept going up and up. Oil cooler connections had been reversed.

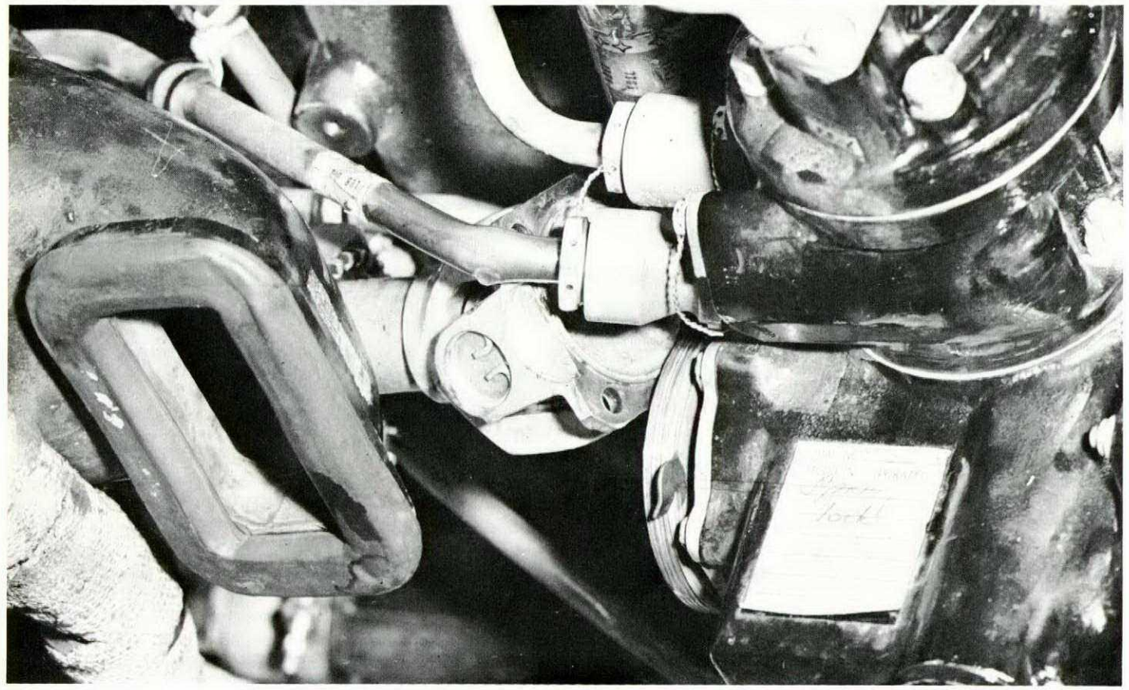
Engine controls had their share of inattention, as usual. Nine cases afflicted eight types of aircraft. An AETech doing a PI on a Dakota noticed the CSU pulley was loose. He tightened the nut on the CSU shaft, but didn't notice that he jammed the pulley in full fine position. Naturally an overspeed occurred on takeoff. A Harvard pilot found that Harvards do not climb well with the prop in full coarse. This always happens when the CSU linkage comes loose. A Mitchell and a Neptune each had a throttle disconnect; a C119 and a Chipmunk had throttles jam. The student pilot in the Chipmunk was right on the ball—he cut the ignition switches and pulled a forced landing on the runway. A Sabre and two CF100s had flameouts caused by incorrect throttle adjustments. The reason given for the two CF100 flameouts is a new one on us, change in the weather causing low idle speed.

Two CSU's and one propeller were installed rather carelessly. A Lanc had an extra spacer and gasket installed below the CSU. After a few hours running the drive gears were sufficiently worn to disengage, the prop went to full fine pitch and overspeeded. One engine on an Expeditor ran out of oil and seized. The CSU base plug had not been tightened. Another Expeditor had no unfeathering results on an air-test after prop installation. A seal in the prop was leaking. If a ground feathering check had been done the leak would have been



Foreign objects discovered inside a rocker box cover.

Two trades worked on this accessory drive disconnect.



discovered.

There were four instances of extraordinary maintenance that deserves special mention. One engine in a Mitchell was overheating continually. After the normal trouble-shooting failed, a check was made for air leaks in the induction system. A leak was found; there was no gasket between the carburettor adapter and the supercharger casing. A Dakota was having a PI inflicted on it when the AETech found some oil leaks on one engine. He fixed up the leaks and called it a day. A pilot doing his preflight check a short time later found, on the same engine, part of the engine cowling and the cowl gills burnt through. A section of the exhaust collector ring has come loose, apparently during the previous flight. A Chipmunk pilot found that his throttle lever had no effect on the engine. No, it wasn't disconnected. A small bug (insect, species unknown) was plugging the main jet in the carburettor. Presumably it dropped or crawled in during the previous inspection while the jet was removed. That old standby, Harvard engine cowling, is the last one. The AETech did not do up the Dzus fasteners at the top last or first. The -2EO specifies doing the Dzus fasteners first and latches later. This fellow just hooked the studs at the top into the corresponding holes, did up the latches and forgot the fasteners.

Electrical

The undercarriage warning horn is a device to remind pilots in case they forget to lower the undercarriage when landing. One student in a Harvard forgot, and the horn didn't remind him, so he landed wheels up. The rollers on the horn actuating switch had developed flat spots which made the switch very erratic; at the time of this accident the horn would blow only if the throttle was fully back, instead of at the usual throttle position. Several other Harvards on the unit were found in the same condition. A CF100 pilot shut down one engine when he had a fire warning. When he shut off the low pressure cock the other engine quit. The low pressure cocks were wired to the opposite switches. A Sabre generator failed, after causing some voltmeter and loadmeter antics. The brushes had been removed during a PI and were installed backwards. Two CF100s lost their canopies; one was taxiing when a loose wire from the jettison switch touched a live terminal; in the other the navigator inadvertently operated the jettison switch while reaching for another switch because the jettison switch had no guard on it. Two CF100s had false fire warnings; one had a wire left off the detector and it shorted, and in the other the detector itself was not secured. One CF100 lost the use of a wing fuel pump and another lost all its lights and some radio, both caused by loose terminal screws. Two T-33s had their tiptanks jettison when terminals were shorted by metal objects in the terminal blocks. And finally an Expeditor undercarriage had to be handcranked down because a wire was broken on the dynamic relay.

Instrument

The ITechs had most of their problems with CF100s, especially the pitot-static system. One had a loose connection at the rear altimeter, one had the lines reversed in the port wing leading edge, and in the third the lines were not connected when the leading edge was buttoned up. Probably the ITechs didn't know about the last one, no L14 entry, but we'll give them credit anyway. Their only other boner was on a Mitchell. The nosewheel indicator showed unsafe after the gear was lowered. It was OK, but the indicator was worn out - 50% past its authorized life.

Armament

A Sabre was shooting up the area, literally and legally since it was on a gunnery range, when a small explosion occurred. A shell had fired before it got into the gun, wrecking the gun and some ammunition chutes. The firing pin retainer had fallen out unnoticed while the gun was being assembled. The EO specified the retainer and pin are to be a tight fit, so it should be impossible for pieces to fall apart if the gun was assembled properly. A CF100 came back deficient one rocket pod. The waisted bolt had not been installed in the ejector piston. On another CF100 the pod came apart and the tailcone fell off because the butterfly nut was not tight enough to hold the pod together.

Safety Equipment

The SETechs supplied one accident and one incident to the records, both involved CF100s. One pilot and one navigator returned from a trip looking and feeling a little blue. No oxygen. It had all leaked out through a loose connection. Another pilot heard a loud crunch when he closed the canopy; the drogue scissors shackle had not been fastened down and it went through the canopy.

Telecom

It is not very often the Telecom people interfere with flying activities, except for minor annoyances when the various radios and things quit. However, the VHF antenna on a Sabre, the tip of the vertical stabilizer, caused them some embarrassment. A technician removed the tip in order to have new anchor nuts installed. The workshop boys did the work and set the tip back in place to check for fit. It fitted. The technician saw the tip back in place and signed the L14. The aircraft went flying and the VHF went dead. The antenna had fallen off - no screws had been installed.

Photo

A photographer came up with one of the easiest and most effective ways of wrecking an airplane. He just left two Dzus fasteners undone on the camera panel in the air intake of a Sabre. The panel came off, broke off the pitot head, and both chunks went through the engine during takeoff run. Since the engine was running at full throttle it disintegrated. Bits and pieces flew out in all directions, through the sides of the fuselage, through the wheel wells. It is only by the grace of God and good living that the pilot is alive today.

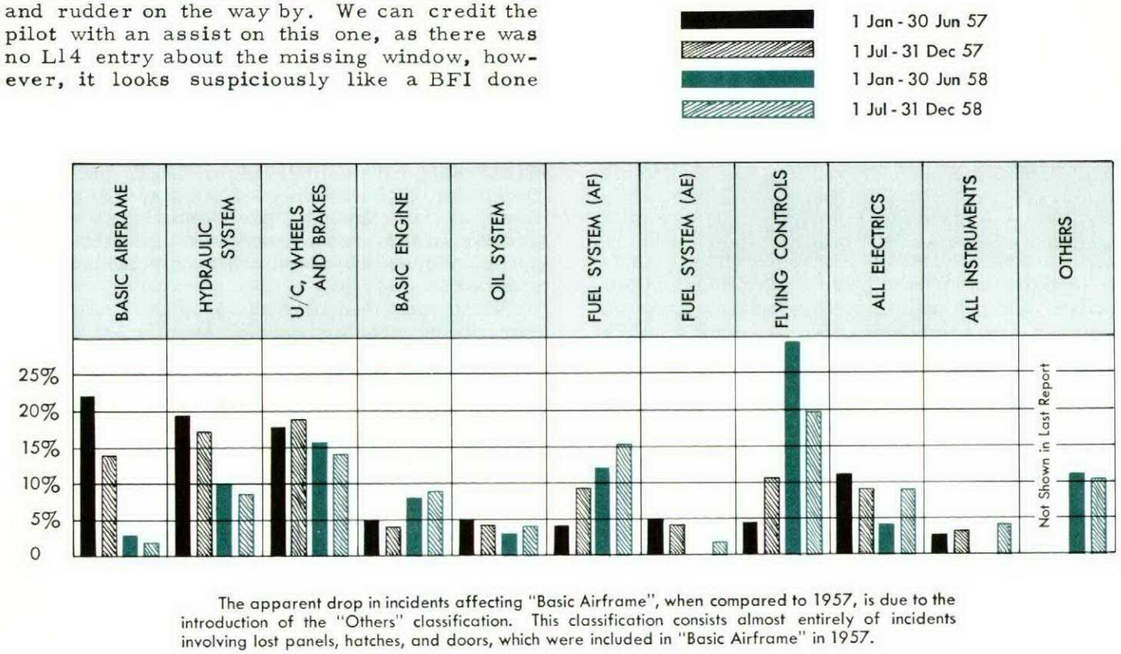
Miscellaneous

There were many cases of careless maintenance during the year where the trade of the person responsible was not mentioned in the report. Eleven of these referred to various hatches, panels, doors, etc., being left loose and either coming off or being damaged during flight. Maintenance people are responsible for fastening these panels; the pilot's pre-flight check is merely a little extra insurance. He cannot possibly check every detail, only the most obvious things.

In addition to the various panels and hatches left unlocked, there were a couple of other interesting cases. A BFI was carried out on a Harvard, or at least the book was signed. A short time later someone passing by noticed a side window missing from the canopy. The window had blown out during the previous flight and left some unhealthy gashes in the fuselage and rudder on the way by. We can credit the pilot with an assist on this one, as there was no L14 entry about the missing window, however, it looks suspiciously like a BFI done from the smoke room. The other case concerns a CF100. The pilot was slightly bewildered by an explosion which took place when he lowered the seat. A couple of MRPs had been installing a mod (Martin-Baker 337) and in the process the seat latch had been installed upside down. This allowed the seat to drop past the latch, firing the drogue gun through the canopy. An M&W Tech NCO carried out an independent check after the MRPs were finished, but did not check the latch as it is an airframe part, and no one told the AF Techs that the latch had been disturbed. The MRPs are mainly at fault, with inadequate checks on their work contributing.

Our last item is a good example of lack of common sense and the only known case of a taxiing accident being blamed on the maintenance organization. An aircraft towing vehicle was parked 7 or 8 feet from the edge of a taxi strip during night flying, with no lights on the tractor and none in the area. A Sabre taxiing by clobbered it with a wing.

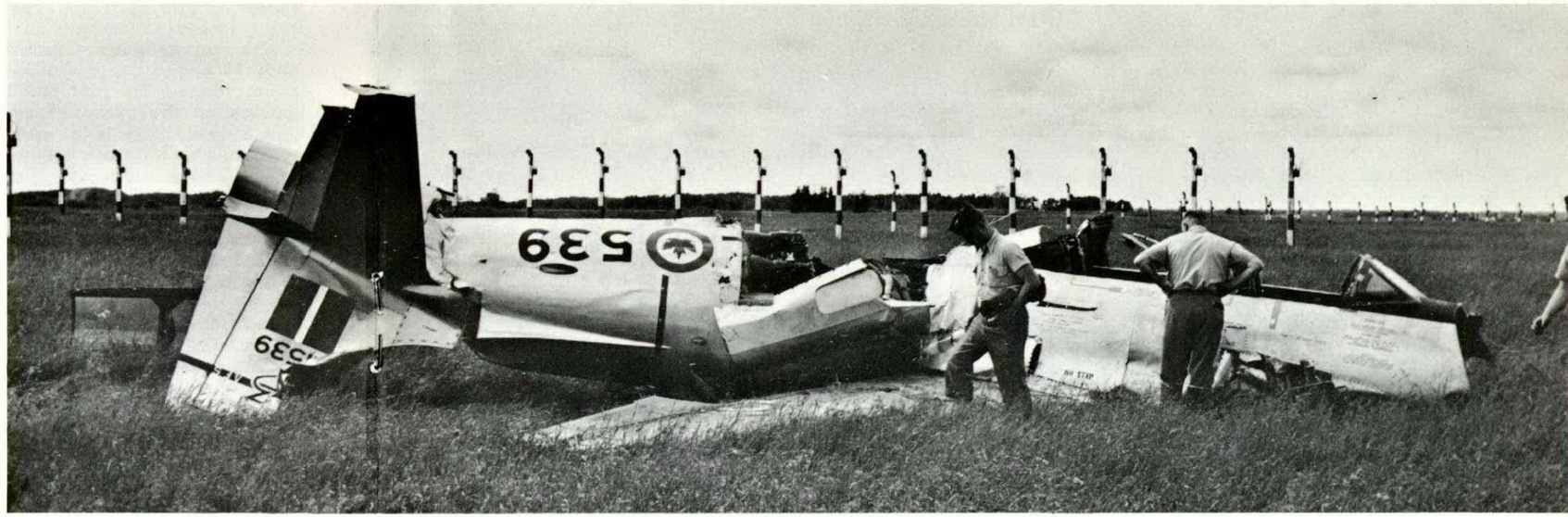
Quite an indictment against the maintenance people, isn't it? One sad part of the story is that in almost every case the original cause of the accident or incident was a relatively minor detail. Something was not tightened enough, or tightened too much, something was not quite properly adjusted, all the splitpins except one installed, or something equally "unimportant". There are many ways of describing this kind of maintenance; some of them are—sloppy, careless, haphazard, inattentive, lackadaisical, and thoughtless. Which word applied to YOU?



The apparent drop in incidents affecting "Basic Airframe", when compared to 1957, is due to the introduction of the "Others" classification. This classification consists almost entirely of incidents involving lost panels, hatches, and doors, which were included in "Basic Airframe" in 1957.

WHEELS UP OR DOWN

by S/L G. L. Sheahan



Six Spades! Double! The words were loud and clear throughout the crew room. Dummy spread the cards on the table, and excitement mounted. Declarer, who is a sharp operator, looked at the lead, looked over the dummy and gave the matter a little thought. Said he, "I'll try a squeeze play and if that doesn't work I'll try an end play. What's the chances of them working? 50-50."

Clang! Clang! Scramble! Engines on, taxi out, airborne, on heading and climbing. I wonder if that end play would have been necessary? "Rat Trap Two your vector is 315." "Roger 315." Yep, it's too bad we couldn't finish the hand. Mayday Mayday Mayday—Flameout. Well there is no squeeze play here but let's get to it. Let's have the speed stabilized to gliding speed, and try a relight. Well, well, no joy. Let's try it again, watch the airspeed. It should work at the lower level so we'll try it again. Still no joy. I guess we have had the course; now do we eject or do we force land. We're well within gliding distance to the field, so give it a go.

"Gladstone Tower Rat Trap Two unable to get a relight. I'm in position to make base. Request clearance to force land." Man, this couldn't be better if I tried. Altitude just right, "Tower Rat Trap Two high downwind." Base leg, undercarriage down and locked, watch this turn, not too tight, that's better, lined up. Airspeed good, a little high, better get some flap down, that's better. I got her made, full flaps, flare. Man it's nice to be home again.

Now in this case there was no doubt about putting the wheels down, which brings us to the point of this story.

When you, the pilot of a jet, are faced with an emergency forced landing should you try the landing wheels up or wheels down? (EO 25D-1 recommends "a normal wheels up landing" for the CF100.)

In the old days the order was clear, in the event of a forced landing, we were instructed to land wheels up because this would minimize the damage to the aircraft. Today, unless you are landing on a prepared surface the odds are the aircraft will be a write-off, so the problem we are trying to answer with Wheels Up or Down is how to minimize injury to the crew.

This problem was brought to the fore by the USAF in 1956. Their EOs left no choice; you landed Gear Down. DFS investigated forced landings in the RCAF and could not substantiate this ruling and, as a result, RCAF EOs, except for the recommendation for landing the CF100, leave the decision up to the pilot. It is not the intention to argue this point, but we feel that if the pilot has a little background it will assist him in making a decision should the occasion arise.

Of eight Sabre forced landings at aerodromes, five were short landings on prepared or semi-prepared surfaces, four with wheels down and one with wheels up, and in each case the crew sustained minor or no injury. Two, on take-off, landed wheels down in the overrun area and the pilots sustained no injuries. One landed on the runway and was fatal as the pilot ejected the canopy on touchdown and it was assumed that he was knocked unconscious.

Thirty-four cases of Sabre forced landings off the airfield were reviewed of which 28 landed wheels up and six landed wheels down. Wheels up landings caused two fatalities; one landed too fast and the other struck a steel guy wire before touchdown. One pilot sustained minor/major* injury when he landed wheels up in an open rough field and in each of the 25 other wheels up cases only minor or no injury was involved. Two pilots were fatally injured in wheels down landings because they were ejected from the aircraft after touchdown. One wheels down landing was in heavy bush (trees ten inches in diameter) and the pilot suffered major injury. One landed wheels down, partially out of control, but with wings level, in light bush and the pilot sustained minor/major injury. Only minor or no injury was reported for each of the other wheels down landings.

A review of 15 T-33 cases of off the airfield forced landings reveals no fatal injuries. Two only landed wheels down and in one of these the pilot suffered a severe back injury. His harness was unlocked. In one wheels up landing the pilot also suffered a back injury because his harness was undone. In one landing accident the aircraft stalled in the turn, but the pilot managed to level the wings before the aircraft struck the ground, with the wheels down. The aircraft was a write-off; the pilots suffered minor and no injuries respectively.

From the overall analysis, it is impossible to arrive at a definite conclusion as to whether jet aircraft should be forced landed wheels up or wheels down. Therefore it is left to the pilot to select the configuration that is appropriate for his particular emergency. The most important factor is effecting the landing in a controlled attitude and with proper airspeed. This point bears repetition—a controlled attitude and with proper airspeed.

There are cases on record where the pilot either tried to put the wheels down or retract them just before landing, with the result that the last minute distraction caused a poor landing. This brings in the psychological aspect of indecision. If you are trying to decide whether to land wheels up or down, you are apt to forget your flying and lose control close to the ground. As the evidence we have does not indicate that one configuration is safer, a good policy to follow would be to make up your mind early, then under no circumstances change it at the last minute. And again: Choose your configuration then concentrate on controlling attitude and speed.

There are other cases on record where the specialists felt that because the wheels were down they absorbed the initial shock, with the result that the crew were unhurt. Let's take a

A successful wheels down forced landing.

The Board felt this terrain indicated a wheels down landing.

* Inquiries classified "minor/major" may be either minor or major depending on complications.

hypothetical case where a pilot for reasons unknown has to force land. The field is uneven and strewn with rocks. Now for my books, this would be an ideal case where the wheels should be down. The initial contact, be it a mound or rock, will be taken by the wheels. No doubt the undercart will be torn from the aircraft, but that is the whole idea. The initial shock will be absorbed by the wheels, the aircraft will decelerate, and the contact of the fuselage will be less severe. Again, bear in mind, the speed on touchdown is all important.

In summary, the forced landings that were carried out either wheels up or down were successful if the aircraft was under control to the point of touchdown. In the 42 cases concerning the Sabre that were discussed, all the aircraft were written off except two that sustained C and D category damage. This, therefore, is the justification for the statement that the purpose of discussing this problem is to save lives, not aircraft, and the reason for repeating, choose your configuration then concentrate on attitude and speed.

I'll leave you one last thought, if you have the altitude and have control in a normal glide, you have the ideal conditions for a successful ejection.

(The USN made a study of jet forced landings. This study only considered landings in which the wheels were up or down—not in an intermediate position—and "only those cases in which the aircraft made initial contact with the ground in an attitude suitable for landing." Their conclusions are quoted in toto:

"1. When all forced or crash landing accidents are considered without regard for any factors other than position in gear, there is no relationship between position of gear and injuries incurred. In other words, the seriousness of injuries received is no greater for accidents when the aircraft is in a gear up configuration than when in a gear down configuration, and vice versa.

2. When the accidents considered are only those in which serious injuries were incurred, there is a tendency for more compression fractures to occur when the gear is in the up position than when it is down.

3. When the factor of speed upon initial impact is considered, there is a definite relationship between speed on initial impact and seriousness of injuries received—the higher the speed the greater the injury. This relationship holds true regardless of the position of the gear; and there is no relationship between position of gear and injuries incurred when speed is held constant.

4. When type of aircraft are grouped together on the basis of their descent rates, there is only a very slight tendency for the higher rate group to incur more serious injuries than the lower rate group. However, when gear position is also considered there is a definite relationship between the higher rate group with gear up and seriousness of injuries—higher rate of descent aircraft incur more serious injuries when the gear is up.

5. When only accidents which are obstacle free are considered, there is no relationship between position of gear and seriousness of injuries.

6. In contrast, when obstacles are encountered, more serious injuries occur than when no obstacles are encountered. This holds true for both the gear up and gear down configuration, although slightly more serious injuries occur when the aircraft encounters obstacles in a gear up configuration."—ED)

Forty out of forty-two Sabres were written off.

NEAR MISS

450 FEET

Prior to letdown in a CF100 at our destination the tower gave us an altimeter setting of 29.94. A few minutes later another tower in the area was heard to give a setting of 29.45. Destination tower was asked again for the altimeter setting and they again gave 29.94.

On GCA while passing through 8000 GCA was asked to confirm 29.94. Their answer: 29.49. Although the setting of 29.94 would have meant a high roll out, it could have been critical had fuel been low. On the other hand, if it had been IFR and the altimeter settings reversed it could have been disastrous.

FSO's Comment:

This strongly suggests the need for caution in accepting such a critical item as an altimeter setting without cross checking whenever possible. The finger may also be pointed at the originator of this report for his false deduction. Had he left the erroneous setting on his altimeter he would have rolled out lower, not higher than desired.

CROSSED UP

A C119, which was 81:15 hours past overhaul by a contractor, was climbing through 6000 when the pilot noticed that the starboard oil temperature was increasing. It could not be kept within limits so the engine was shut down and the aircraft returned to base. During the eight minutes required to return to base the port oil temperature decreased to a point just above the minimum limit.

After the previous flight the port oil temperature was reported low and adjustments were made to increase the temperature. Here is where everyone was crossed up—the temperature gauges had been cross connected by the contractor.

Why did it take 81:15 hours to discover this error? Because the automatic oil temperature control system kept the temperature within limits. When a small adjustment was required it magnified the problem. Then manual operation by the pilot only added more heat to the hot oil and more cold to the cooler oil.

The pilot, however, took the proper action. A UCR has been raised to "colour code" these connections. And the contractor has been informed of his error.

(Here is more proof that, all automatic gadgets to the contrary, there is nothing to take the place of a conscientious maintenance man and a good supervisor.—ED)

CORRECT EMERGENCY ACTION

A T-33 was on cross-country from MacDonald to Saskatoon. Approximately one minute from station passage on the Saskatoon range a complete generator failure was experienced. At this time conditions at Saskatoon were 600 feet and 10 miles; the tip tanks had ran dry about two minutes before the generator failed; and the aircraft had been cleared to descend on arrival at Saskatoon.

An emergency was declared and the letdown commenced with all excess electrical equipment turned off (the defroster had to be turned on again). The flag on the gyro horizon was flicking off and on so the letdown was done on limited panel.

This is how the pilot told it: "On reaching minimum the ground could be seen through breaks in the cloud. The letdown was continued so that we could remain visual. At this time we tried to call approach to tell them we were visual but contact could not be made. We could barely hear on the RT, but were getting a bearing on the ARC. We homed into the range station on ARC and on station passage the wheels and 20° flap were lowered. The wheels indicated down and locked. Flaps were then selected full down but only about 35 - 40° went down before battery power failed. At this time total radio contact was lost. A straight-in approach on

runway 32 was made and the crash equipment was noticed standing by at the side of the runway. Touchdown was made without incident and the aircraft brought to a stop on the runway. The ambulance led us to the parking area and the aircraft was shut down. There were still 70 gallons indicated in the fuselage tank and lights were still glowing faintly. The canopy could be slowly raised electrically. During the let-down we were not able to transmit but the VHF receiver was still functioning. We were not advised that crash equipment was standing by nor cleared to land. It is suggested that in similar emergencies the tower should consider blind transmission of any pertinent information. If this accomplishes nothing else it would at least help to reassure the pilot."

Investigation showed that the field circuit wiring was broken inside the insulation approximately 3 1/2 inches from the rear generator field switch. (The code number of this wire is PP4F-20 and it is located in the rear right hand switch panel.) The cause was assessed "Materiel" and UCR action initiated.

FINAL CHECK PAYS OFF

On checking out a CF100 prior to a navigation exercise I found that the radios were very weak. While I was waiting for this snag to be fixed the groundcrew were instructed to see that all aircraft had pitot covers on. When the radios were fixed I did not do another external as I was already twenty minutes behind my flight plan.

I noticed, on takeoff, that no airspeed was indicated. By this time I had accelerated to approximately 90K but managed to stop without burning out the brakes or going off the end of the runway.

I feel that this incident was caused by my own negligence in not doing another external but I cannot help thinking that part of the blame was with the groundcrew since they knew I had checked the aircraft.

FSO's Comment:

The pilot avoided a serious accident in doing a cockpit check on takeoff roll. All too often we pour on the coal and forget about a final check after we've started to move. Perhaps this is the lesson we can learn from this incident.

LET THERE BE LIGHT

While doing local night flying, the tower asked me to hold north of the field at 2500 as he had a two plane CF100 scramble. The tower then gave the CF100s their departure instructions, "Takeoff R24-2500 feet to the inner climb 015 degrees". The clearance was acknowledged by the formation leader. While we were circling to the right a CF100 passed approximately 200 yards in front of us and at the same altitude. This was quite a surprise as we were not concerned about other aircraft in our holding area and we knew the scramble would turn left after takeoff and go to the inner beacon.

Immediately a check to the tower confirmed that the leader of the scramble proceeded directly to the "cans" and had not adhered to his clearance. The leader had read his departure instructions back to the tower so this was not a misunderstanding.

If anti-collision lights were fitted to the aircraft it is possible that this Near Miss would not have been quite so close.

(DFS has recommended priority installation of anti-collision lights on aircraft.—ED)

FIRE ONE

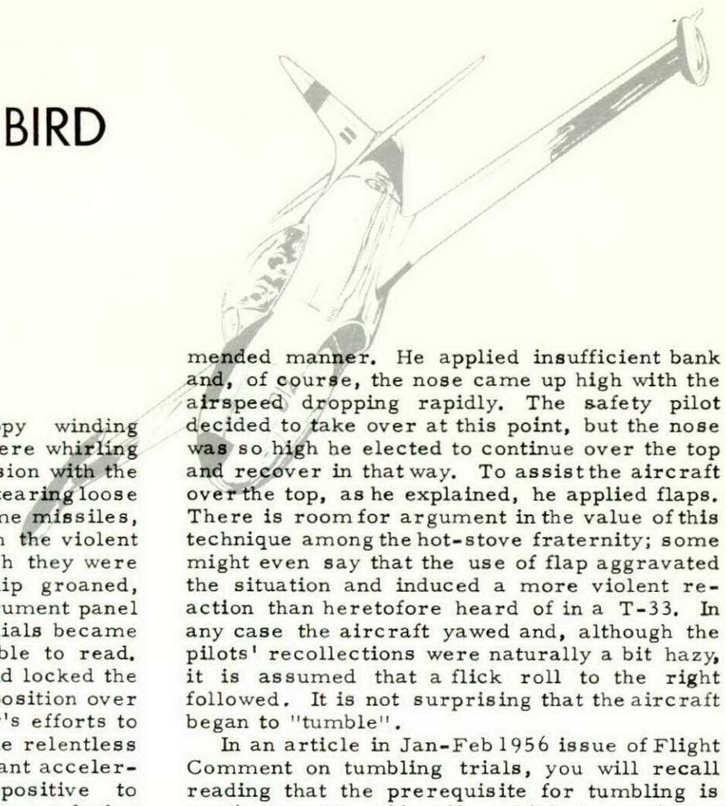
During a periodic inspection on a CF100 the drogue guns were removed and taken to the armament repair shop for servicing. The Cpl put the guns on the workbench and explained to the M&WTech the procedure for carrying out an inspection on the drogue gun. The Cpl then went to the tool crib. In his absence the M&WTech secured a drogue gun in the holding bracket on the bench and proceeded with the inspection. With the barrel, piston and cartridge still installed the safety pin and sear were removed. The gun fired. The piston struck an ejection gun that was on the bench and ricocheted against a concrete wall.

Cause: Instructions laid down in EOs 55-50-2B and 55-50-2C were not followed.

No one was injured and, as accidents go, this was not an expensive one. How much will the next one cost? A hand? A life? Even though steps have been taken to prevent similar accidents, we still must depend on the individual to do it the safe way. The way prescribed in EOs.

Note dent in drogue gun and damaged wall.

WATCH THAT BIRD



by S/L T. Wallnutt

Flashlights, handbooks, canopy winding handle, and other sundry items were whirling about the cockpit threatening collision with the crew's heads. These objects were tearing loose from their normal storage to become missiles, their energy being derived from the violent manoeuvres of the vehicle in which they were suspended. In its descent the ship groaned, shuddered, and heaved. The instrument panel was shaking so badly that the dials became fuzzy and indistinct, and impossible to read. Although the harness was tight and locked the seat packs shifted to an awkward position over the lip of the bucket and the crew's efforts to replace them were ineffective. The relentless gyrations of the ship and the resultant acceleration forces, fluctuating from positive to negative "G", were causing extreme confusion to the occupants, disorientation, and rendering them virtually incapable of any co-ordinated response with their hands. At best they might have been able to negotiate the canopy jettisoning handle, but they had little hope of success in manipulating their seat ejection controls.

The launching of a space ship? Sounds like it doesn't it? Or two ordinary fly-boys giving with an "'orrible line" to impress some doll early in the evening at the squadron thrash? Wrong on all counts! Not out of this world, but very much an actual event. It happened in the RCAF. And if you have been conscientious in reading your flight safety literature, you will be able to identify the event as a recent T-33 accident published in the Flight Safety Bulletin. Moreover, you will recall that the two pilots who survived this "hair-raiser" were two experienced instructors. So beware! And read on with the hairy details so that you won't get caught the next time you strap on your trusty T-33 to do a spot of stick handling in yon blue! It could happen to you without any warning!

Two instructors were engaged in mutual instrument flying and one was giving the other some unusual positions under the hood. During one recovery from a nose high attitude at 18,000 feet the instructor under the hood applied back pressure and bank to recover in the recommended manner. He applied insufficient bank and, of course, the nose came up high with the airspeed dropping rapidly. The safety pilot decided to take over at this point, but the nose was so high he elected to continue over the top and recover in that way. To assist the aircraft over the top, as he explained, he applied flaps. There is room for argument in the value of this technique among the hot-stove fraternity; some might even say that the use of flap aggravated the situation and induced a more violent reaction than heretofore heard of in a T-33. In any case the aircraft yawed and, although the pilots' recollections were naturally a bit hazy, it is assumed that a flick roll to the right followed. It is not surprising that the aircraft began to "tumble".

In an article in Jan-Feb 1956 issue of Flight Comment on tumbling trials, you will recall reading that the prerequisite for tumbling is maximum-rate side-slip, which necessitates crossing the controls. This situation cancels out the natural aerodynamic stability of the tail and the tumble may follow. These two pilots do not recall crossing the controls, but no doubt the effect was the same as it appears the aircraft stalled on its tail, side-slip, and yawed.

However, the most startling aspect about the tumble, according to other pilots who inadvertently have induced one, is the complete absence of warning. In contrast to the "incipient" spin familiar to all pilots who have mishandled the controls, the transition from more or less controlled flight to the violence of the tumble is instantaneous. Even when deliberately trying to induce the tumble its suddenness is unexpected and disconcerting to the pilot. Thus, in an inadvertent tumble, the reaction is so sudden and violent that, initially, the pilot suffers complete spatial disorientation. This likely accounts for these two experienced pilots having difficulty recounting the position of the controls when "all hell broke loose". Pilots who have experienced the tumble say that there is no attitude of flight that develops so suddenly and is so surprising to the victim.

This particular tumble was a bad enough experience, but the recovery became the hair-raiser. Characteristically, the gyrations of the tumble were so confusing that neither pilot

could identify the direction of rotation. As recommended they raised the flaps, retarded the throttle, and attempted to centralize the controls, but the rudder resisted being centralized and remained full left. The controls were then released and they centralized themselves after a few more gyrations. The controls were held neutral until the aircraft recovered into a vertical dive at eight to ten thousand feet. The recovery from the dive was achieved at approximately 1500 feet above ground level! How close can you come! Not a fatal, but looking back, a few of our obscure T-33 fatals are suspect.

Fortunately, the aircraft suffered only minor buckling of the wing root fillets and the boys returned safely. The accelerometer registered plus 7 1/2 to minus 4 1/4, which is considerably more acceleration than has been recorded previously in tumbling experiences. Likely the highest positive acceleration occurred during the dive recovery.

How can you intrepid T-33 jockies prevent this from happening to you? Here is some sound flight safety advice for those who wish to draw pensions:

- Avoid situations that are likely to produce tumbles. Tumbling is an emergency condition. Tumbles are not listed as such under Prohibited Manoeuvres in the AOIs, but "side-slips using full rudder, vertical stalls, and any manoeuvre involving large yaw angles" are listed. Since these are the necessary prerequisites for tumbling, enough said!
- Experience alone is no guarantee against tumbling, therefore, comply with minimum altitudes. These experienced pilots started at 18,000 and nearly ran out of altitude. When you are the safety pilot engaged in unusual positions do not be lulled into a false sense of security because you have an experienced Joe under the hood.
- Do not depend on being able to read the dials in a tumble—it may not be possible. Thus, if you are over a cloud deck, ensure the tops provide you with enough recovery room especially doing unusual positions.
- Ensure that the harness is extremely tight before commencing aerobatics, spinning, and unusual positions—a tumble could catch you off guard!
- Keep flashlights, handbooks, etc., in zippered or flapped pockets, and ensure stored items are secure in their holders.
- Know and follow prescribed recovery procedures from a tumble.
- Review the RCAF training film on T-33 tumbling periodically.

OXYGEN

In the May-Jun issue of Flight Comment, page 18, a short article was printed on Oxygen in which we explained the term hyperventilation as too much oxygen. We realized that this was not true, but we were not prepared for the violent reaction we received from the users. This is indeed gratifying. However, to get everyone back on an even keel, we asked W/C Coons DGMS(Air) Av Med to clarify the points of anoxia and hypoxia.

Two questions have been raised with respect to the first paragraph of that article:

What is the difference between "anoxia" and "hypoxia"? When speaking in terms of the whole man, anoxia means a total lack of oxygen and is not commonly encountered except through drowning, strangulation and like events. The biological scientist may speak of anoxia of specific body tissues which can result from some event preventing the oxygen from reaching those tissues through a disturbance of, or damage to the oxygen transport system. For practical purposes the two terms may be used synonymously in the flying environment, although hypoxia would be the correct term to use in most instances to denote a relative or partial lack of oxygen.

Is "hyperventilation" too much oxygen? No! Hyperventilation, or overbreathing, results in a reduction of the carbon dioxide in the blood. Although carbon dioxide is a waste product of our cellulor metabolism it is one of the chemicals which plays a part in controlling the pH (acid-base balance) of the blood. By a simple chemical reaction it combines with water to form a weak acid, carbonic acid. For the body system to function normally the acidity (pH) of the blood and tissue fluids must be controlled within relatively narrow limits, otherwise malfunctions occur. This is particularly true of the nervous and muscular systems. When carbon dioxide is blown-off by hyperventilation, carbonic acid cannot form and the pH of the blood becomes alkaline because this weak acid is not present to neutralize the alkali (base). The symptoms of this acid-base disturbance are frequently similar to those of hypoxia and are just as incapacitating. This state is known as alkalosis, and it takes longer to recover from it than from hypoxia.

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ARRIVALS and DEPARTURES

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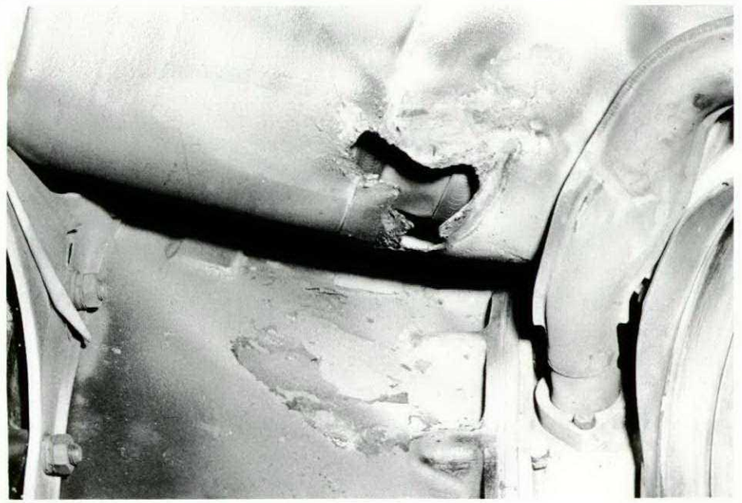
POT ROAST

A T-33 was being flown on an IF exercise. Start-up and pre-taxi checks were completed. The aircraft was taxied to the TO position. On takeoff power was increased to 65%, TOE switch on, normal surge and 100% power was applied. As the aircraft broke ground the JPT started to climb and the tailpipe overtemp light came on. The pilot reduced power to 65% and the light went out. The tower was informed of the details. It was found that the JPT remained within limits with power up to 85%. The tower relayed the information to the supervisory staff. Considering that the aircraft was behaving well at 85% the supervisory staff instructed the pilot to burn off fuel locally and then land.

From the scanty information that you have read, do you agree with this decision? It is not our intention to comment either way on the action of the supervisory staff as we do not know what information they received from the pilot, but the pilot sure pulled a boner when he failed to understand his difficulties.

An article in the Jan-Feb 59 issue of Flight Comment on Nene air casing failures outlined the symptoms to watch for when a casing fails. The first symptom was a JPT higher than normal, and it also mentioned the amber over-



A burnt out air casing is hotter than a blow torch.

heat or fire warning ection of rotation. As mended getting the bi ed the flaps, retarded quickly as possible. pted to centralize the

In this case the pil r resisted being cen- minutes burning off fuel full left. The controls ing. hey centralized them-

Investigation revea erations. The controls from the guide vanes, the aircraft recovered casing, and a hole bur ht to ten thousand feet. No. 1 casing. There was dive was achieved at in the back end adjacent above ground level! cables. Fortunately the ... through No. 1 and 2 casings did not occur in a position where the heat could have burned through the fuselage.

There you have it. The pictures tell the story, and we have two wiser pilots who are lucky to be with us today. Remember, if you have an overheat condition suspect the worst and get down on the ground.

UNDER PENALTY OF DEATH

A pilot took off in a T-33 to test a smoke generator. Shortly after takeoff he found that he had to use left rudder to maintain his heading. He suspected the undercarriage doors were causing drag so he recycled the undercarriage. This did not clear trouble; left rudder was still required.

He carried on with the exercise. On the third run at 390Ks he felt a bump and found that left rudder was no longer required to maintain his heading.

On landing it was found that the lower fillet, wing, to fuselage, at the lower wing root port side was torn open leaving a hole one foot in diameter. One piece of metal was missing and the rest was torn back by the slip stream. The cause was assessed "Maintenance Error". Someone had left six 10-32 screws out of the leading edge of the fillet.

Not securing parts properly is inviting an accident; flying an aircraft at high speed after experiencing a control problem is flirting with disaster. A piece of metal torn from the aircraft and travelling towards the tail at 400Ks has, if it strikes the tail, the same effect as being bit by cannon fire.

He carried on with the exercise—at 390Ks.

We could quote page and para for half an hour where you have been told that, if anything is wrong with the aircraft get on the ground and do not, under penalty of death, carry out a high speed run. This pilot was lucky. Next time will he know if his luck has run out before it is too late?

altitude. When you engaged in unusual lulled into a false cause you have an e the hood.

- Do not depend on b dials in a tumble—i Thus, if you are over the tops provide you room especially doi
- Ensure that the harn before commencing and unusual positi

A SUGGESTED PROCEDURE

The startup, runup, and takeoff of a C119 were routine. Just after takeoff, however, the tower reported fuel venting from the port wing. When circuit height was reached the engineer went aft to check and reported a considerable amount of fuel was venting. With booster pumps on emergency fuel pressure read 26 psi, switching the pumps to off and normal did not clear the trouble so they were returned to emergency and the aircraft was landed. The port engine was shut down to taxi then, because of the quantity of fuel streaming from the wing, the other engine was shut down with the aircraft still on the runway, a fire truck was called and the crew stood by with fire extinguishers.

Investigation revealed that the port inboard tank selector (27VA/2044) had failed in the open position and allowed fuel to be pumped into the tank. When the selector and motor were dismantled they were found to be saturated with water. It was assumed that the presence of water was caused by a defective gasket (W-7950-2D-H). UCR action has been taken.

Because the aircrew involved did not know the source of the venting fuel, it is considered that they took the proper action. In this case, however, switching to the port inboard tank would have stopped the venting. This procedure would reduce the fuel in the inboard tank to a safe level. The only problem being that, if sufficient fuel has not been removed from the outboard tank it will overflow due to the carburettor vapour vent return. This same procedure may be used if an outboard tank shows signs of overflowing, i.e., switching to the outboard tank.

In similar incidents it is suggested that aircrew try this procedure and then, if venting persists after a reasonable interval, assume that the leakage is from some other source, for example, a leaking fuel cell.

JAMMED PARATROOP DOOR

An RCAF C119 was engaged in a paratroop dropping exercise. When readying the aircraft for the drop the starboard paratroop door latch was found jammed in the closed position. The captain sent the flight engineer aft to determine the cause of the jamming and to assist in opening the door.

After several unsuccessful attempts to release the latch, the flight engineer decided to pull the hinge pins. A rope was attached to the door to pull it into the aircraft and then the hinge pins w only way a successful cross feed of the door v ecuted, would be to transfer the fuel broke free, age tank and then cross feed it. This air flow and not be done until the 140 gallon level the horizon done to the seemed to make excuses for the land the air ervicing crew in that they lacked the

To find a required to handle this particular of the USAF What sort of TYPE training does a was made. need so that he knows enough not to covered; in tip tank?

in the other ence which stated "although the port horizontal stabilizer was damaged - all on board were killed. The RCAF aircraft, it would seem, was about as close to disaster as it could come and still escape.

Investigation of the RCAF accident revealed that the flight engineer did not inform the pilot of his decision to remove the door in an unorthodox manner. This was a serious mistake; the pilot must be kept informed of all things that may jeopardize the aircraft.

must by their nature be completed while the aircraft is taxiing or airborne, (fuel logs, bulletins, cross-section), it seems that monitoring instruments, maintaining a look-out, and carrying out student instruction must suffer. I grant you delegation of duties can enter in here, but in the end the captain is still responsible for the safety and efficiency of the trip.

Surely in this age of increasing air speeds, denser traffic and more complex equipment the trend should be to reducing the pilot's fringe duties so he can return to flying the aircraft.

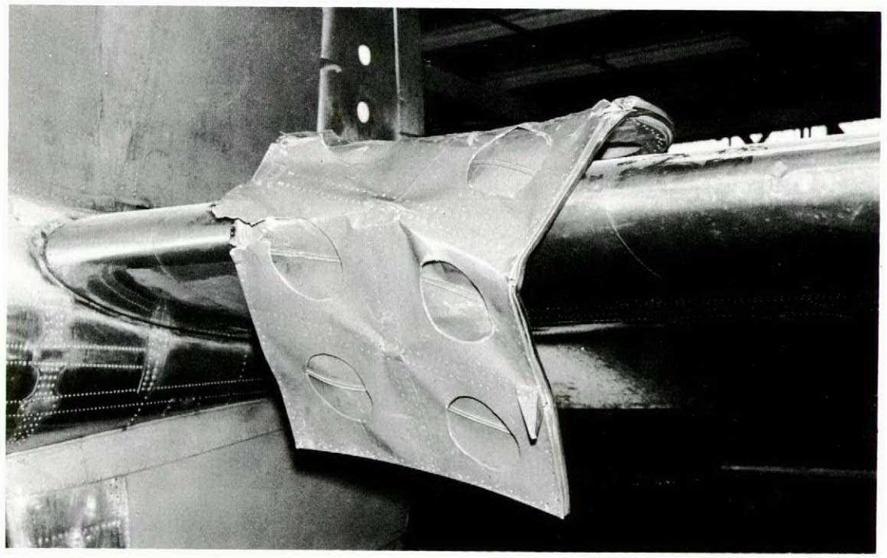
D. B. O'Connor, F/L
4 (T) OTU

Part Of The Blame

It seems a shame that the "accident conception watchers" (Runaway Mule Kicks Birds, May-Jun issue) did not see fit to try to warn the airmen by shouting or whistling that the mule was still moving. Perhaps they should be assessed part of the blame for it?

was made at Ottawa. At the time of this entry the aircraft had flown 4 hours 45 minutes and its oil state was recorded as 6 gallons each tank. No oil was added. The pilot said he had asked for oil and fuel at each servicing stop but, according to the L14T, the aircraft flew 13 hours 35 minutes without oil being added. Fortunately the engine was not damaged.

Disciplinary action has been taken against the pilot for not checking the L14T after each servicing stop. But what about the servicing flights concerned? Surely they must realize that fuel is useless if the crankshaft won't go around. The pilot is finally responsible it is



A paratroop door that was removed during flight.

could identify the direction of rotation. As recommended they raised the flaps, retarded the throttle, and attempted to centralize the controls, but the rudder resisted being centralized and remained full left. The controls were then released and they centralized themselves after a few more gyrations. The controls were held neutral until the aircraft recovered into a vertical dive at eight to ten thousand feet. The recovery from the dive was achieved at approximately 1500 feet above ground level! How close can you come! Not a fatal, but looking back, a few of our obscure T-33 fatals are suspect.

Fortunately, the aircraft suffered only minor buckling of the wing root fillets and the boys returned safely. The accelerometer registered plus 7 1/2 to minus 4 1/4, which is considerably more acceleration than has been recorded previously in tumbling experiences. Likely the highest positive acceleration occurred during the dive recovery.

How can you intrepid T-33 jockies prevent this from happening to you? If [illegible] smoke

THIS IS A RARE ONE

Shortly after takeoff he found that CF100 continued to swing to the right. If left the runway and ended up in a snowbank.

When the navigator started to climb out of the aircraft he noticed smoke coming from the rear air conditioning trough cover and advised the pilot to get out quickly because the aircraft was on fire. As the pilot was leaving the aircraft there was an audible bang and witnesses stated that flames began coming from the mid-dorsal section and that smoke appeared from the sabre drain below the empennage.

The cause of the shimmy and swing to starboard was due to a nut missing from the torque link bolt in the scissors shackle. Damage from running off the runway was minor. The origin of the fire was traced to a defective oxygen line. When the line was soldered to the nipple it had not been fully inserted. The unusual stress caused by the landing seperated the line from the nipple. The fire started when the oxygen, under pressure, came in contact with oil and grease on various fittings. Due to the fire, the aircraft was written off.

The hazard associated with oxygen under pressure and grease is well known, and this is one of the rare cases that proves the need for caution. So when you are working on an oxygen system make sure you know what has to be done and do it properly or you may be rigging yourself a blow torch.

Shimmy marks.

A SUGGESTED PROCEDURE

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BRAKE ADJUSTMENT

The crew of a North Star were practicing touch and go landings off simulated instrument approaches. The technique used for all landings was combination wing down and crab with touch downs being made on the starboard main wheels. The fourth landing was a full stop and during the landing roll a loud "clunk" was heard on the port side. The "clunk" did not affect the operation of the aircraft so it was taxied to takeoff position for more touch and go landings.

On the second landing there was considerable vibration so the over shoot was aborted. The aircraft was returned to the ramp where investigation revealed that the port inner main wheel tire had blown and the undercarriage plate was damaged.

The D14 listed "D" category damage and suggested that the cause may have been brake adjustment, i.e., "the inner wheel's brake tolerances were closer than the outer wheel's but still within limits".

LETTERS TO THE EDITOR

Checked Carefully

First of all, the gentleman who was the victim of the "Near Miss" reports; "after emptying the auxiliary tank I selected both tip tanks but only the starboard indicated that it was transferring". According to my knowledge of the CF100 MK IV fuel system it is impossible to transfer from the tip tanks until the level of the fuselage tanks drops to 140 gallons. (Auth EO 05-25E-2 Part 5, Section 2 Para 53). There would be a considerable lapse of time until the 140 gallon level was reached after completion of the auxiliary tank transfer, which leaves the fuselage tank full.

He also stated that "by cross feeding I was able to finally balance the load". It is also an impossibility to cross feed from a CF100 tip tank. The only way a successful cross feed could be executed, would be to transfer the fuel to the fuselage tank and then cross feed it. This in turn cannot be done until the 140 gallon level is reached.

You also seemed to make excuses for the Winnipeg servicing crew in that they lacked the knowledge required to handle this particular aircraft. What sort of TYPE training does a technician need so that he knows enough not to fill just one tip tank?

The sentence which stated "although the port tip tank indicated that it did not feed, there was no fuel in it when inspected on the ground" has me completely baffled as well.

J. A. McGovern, Cpl
4 (F) Wing

(Considering the information given, Cpl McGovern is correct. The pilot did not report all his actions in detail so both he and Flight Comment have left the impression that the impossible was accomplished. If there's a lesson in this it must be that Maintenance must have complete reports—ED)

Lobbying For A Clerk STATS(Air)

I think the time has come to erase the false picture of the transport pilot sitting in his spacious cockpit thumbing through Playboy and occasionally checking up on "George".

Leaving on a trip these days one generally has a small bag of clothes and two large bags of paper work. (At that something is probably missing if the check list is more than two weeks old.) A quick glance at these papers show that 30% are authorizing the trip, 30% to be completed to prove you went on it, and the remainder to show you should be entitled to food and shelter while away.

For the transport pilot roughly one third of the total trip time is spent flying and two thirds are used in compilation of forms, logs and the like.

While I realize that many of these are necessary some are added with no thought of the pilot's work load or the time required to complete them. Since a large number of these forms must by their nature be completed while the aircraft is taxiing or airborne, (fuel logs, bulletins, cross-section), it seems that monitoring instruments, maintaining a look-out, and carrying out student instruction must suffer. I grant you delegation of duties can enter in here, but in the end the captain is still responsible for the safety and efficiency of the trip.

Surely in this age of increasing air speeds, denser traffic and more complex equipment the trend should be to reducing the pilot's fringe duties so he can return to flying the aircraft.

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J. W. Brown, FS
1110 TSD

(Agreed. Accident prevention is not a spectator sport.—ED)

Somewhat Unsafe Situations

A recent extended trip to various RCAF stations pointed out several situations, that are somewhat unsafe, at least for transient aircraft.

The use of non-standard R/T by RCAF approach controllers may be required for local conditions, but any aircraft not using a tactical call sign should be controlled by standard R/T procedures. Also, if a GCA is to be assigned, some attempt should be made to ascertain GCA frequencies and then assign a frequency by megacycles not by channel.

Tower operators should also give extra attention to transients. The use of geographical fixes for reporting points should be avoided, and, while NOTAMs may have been filed on runway obstructions, transient pilots should be reminded of them.

While some units may be excused because of a change in servicing personnel, an attempt should be made to have airmen qualified on type park and service visiting aircraft to avoid such problems as, too tight turns for parking, non-setting of fuel counters and non-topping up of oxygen after sitting all night.

Also, an organization should be set up to provide distribution of NOVAs to servicing, the messes, VMEO, etc., as applicable. While visiting personnel should not be pampered, every effort should be made to eliminate fatigue, especially when the visitor is just making a

short stop. Transport, such as a mule, should meet the aircraft to help carry any baggage. Then too, a room with sufficient lockers and suitable for student debriefings should be available. Also, Aircrew Between Meal Supplements should be readily available to visitors if the stop is between meal hours.

All the situations mentioned above occurred to some extent at the various stations visited. However, it should also be mentioned that the units often went out of their way to provide good service, but may not have been aware of some of these problems.

The USAF has a gimmick that should help overcome some of these deficiencies. I refer to their "Recommenced by Duncan and Heinz" certificate presented to outstanding bases for good transient servicing and maintenance published in "Aircraft Accident and Maintenance Review". Such a team could and should be organized to visit various RCAF bases, make recommendations to improve the care of transient aircraft and aircrew and present a certificate to outstanding bases.

L. B. Benson, F/L
RCAF Station Saskatoon

(We asked DAirS and DMEng for their comments:

DAirS — Non-standard R/T is not condoned. Standard R/T patter may be abbreviated but abbreviated standard R/T patter should never be used on itinerant flights. CAP 342, Vol I, art 111.10, prohibits the use of channel numbers when directing a change of frequency and arts 104.04 and 102.02 control the passing of information on runway condition, taxiing, parking, etc., to visiting aircraft. Approach control operation will improve gradually as more operators complete the 10-week advanced course given at the School of Flying Control.

DMEng — As for the servicing of visiting aircraft, it is not feasible to staff stations with personnel from which a servicing flight could be drawn that would be qualified to service all types of RCAF aircraft. To compound this difficulty, maintaining a complete library of EOs at each station is not practical. The best solution to servicing is, whenever possible, schedule servicing stops at stations that operate the same type of aircraft as you are flying.

CAP 100, art 114.20 and AFAO 59.00/03 control the dispatch and content of NOVA messages. The distribution of a NOVA message within a station, according to the AFAO, is "COs shall ensure.....prompt notification of all concerned.....".

We find this letter very interesting as it focuses attention on one of our problem areas - accidents that result from servicing crews not being familiar with a particular type of aircraft. Have you had any difficulties? If you have drop us a line; with enough evidence perhaps the not practical can be made practical. — ED)

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COMMENT

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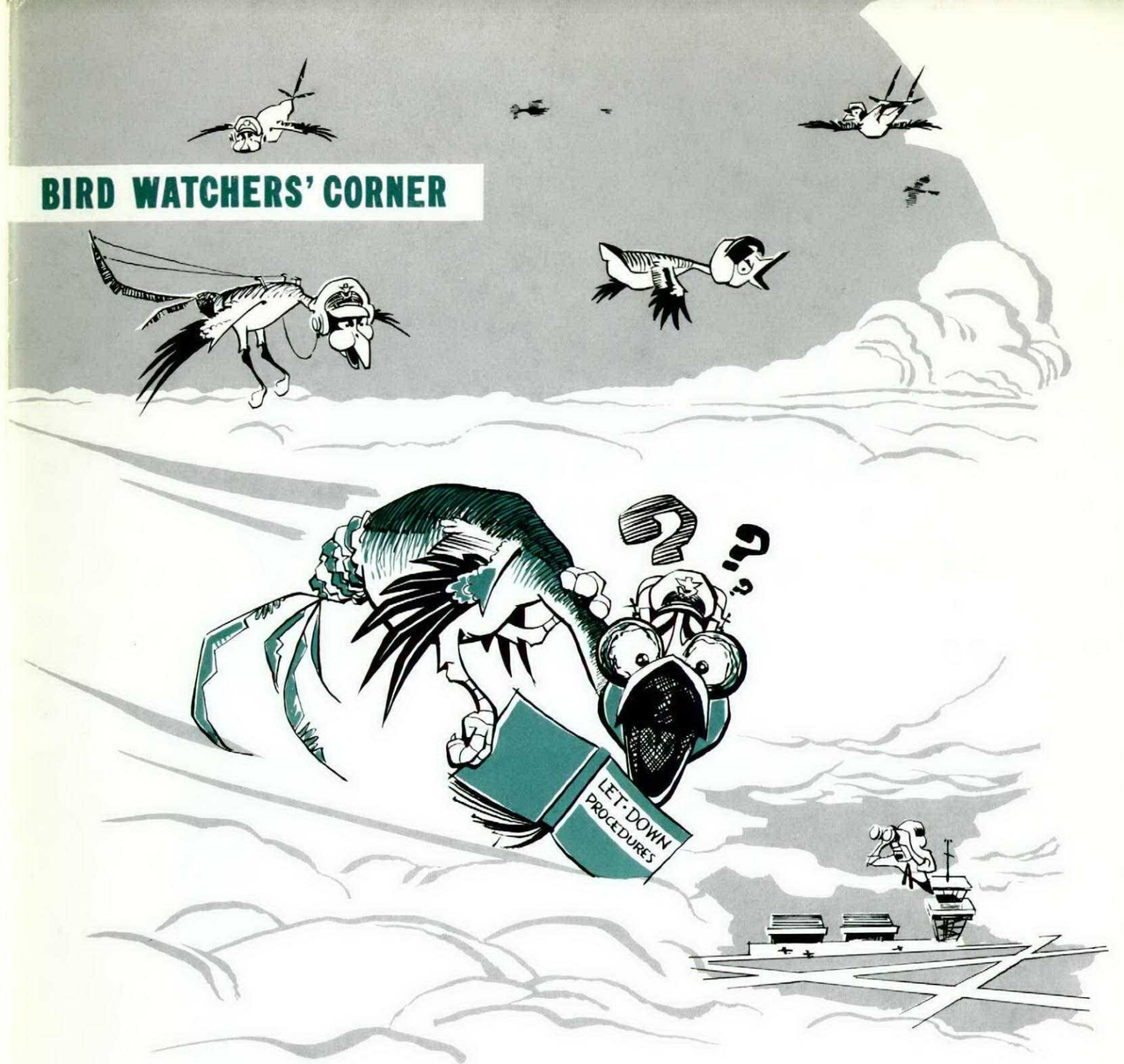
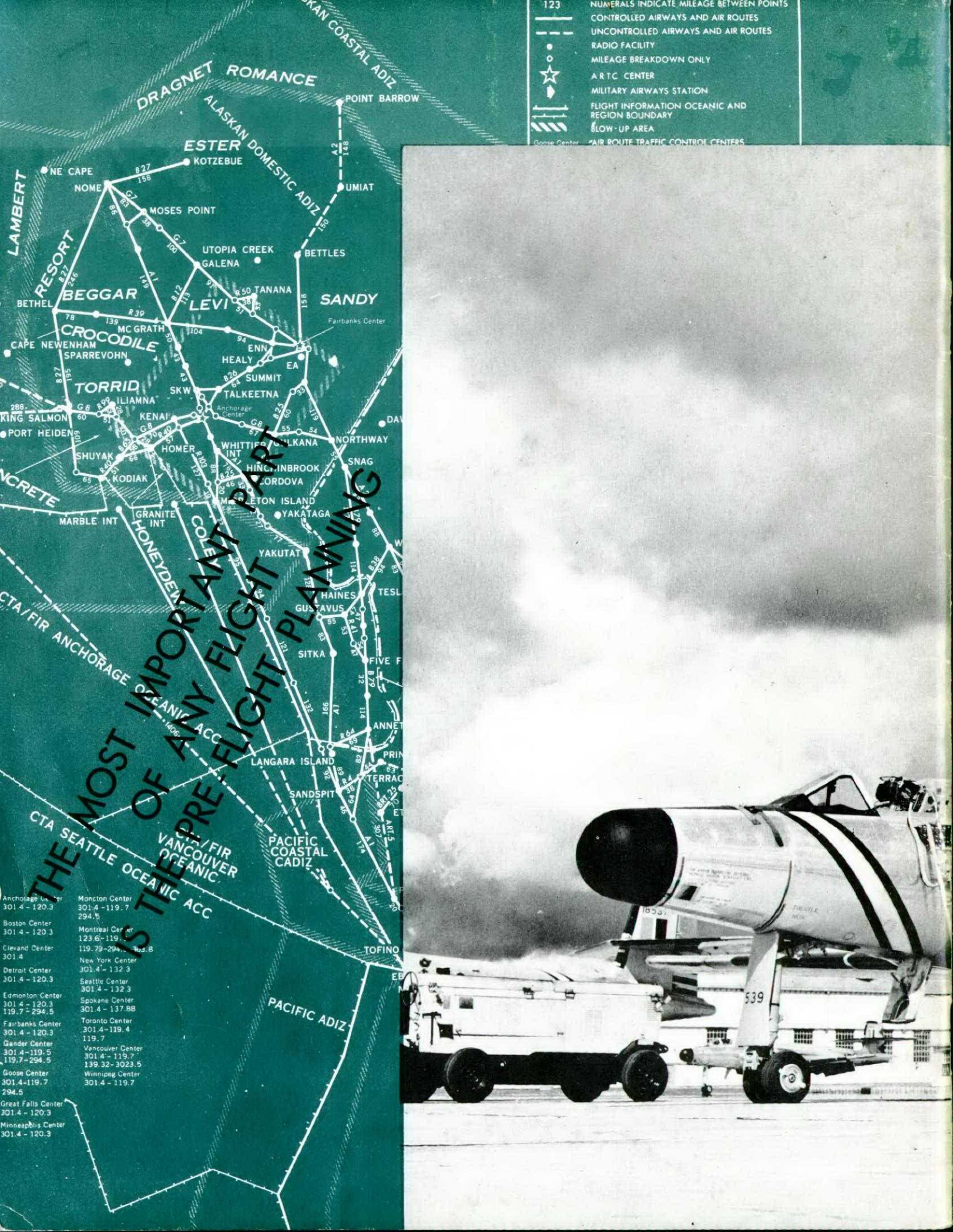


FAIR WEATHER COCK

This bird is a first cousin to the Sunday driver. He enjoys a pleasant flight in ideal weather conditions and can not be bothered to carry out any practice letdowns. Is caught short when he runs into clag. To this bird, what should be a normal letdown is a nightmare, which causes much consternation to others of the flock that are waiting their turn to return to the roost. You know when this species is at large by ATC's insisted call, "What is your present position?"

CALL: WHERE'MI WHERE'MI WHERE'MI



THE MOST IMPORTANT PART OF ANY FLIGHT IS THE PRE-FLIGHT PLANNING