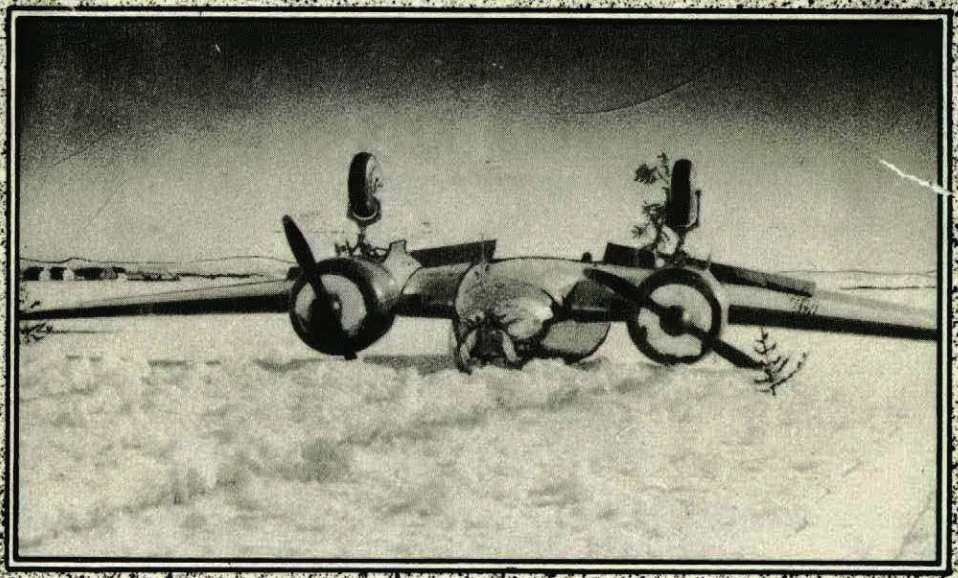
CRASH COMMENT

ACCIDENT PREVENTION

OCTOBER NOVEMBER DECEMBER 1949



ISSUED BY
ACCIDENT INVESTIGATION BRANCH
R.C.A.F. HEADQUARTERS OTTAWA ONT

LEARN BY THE MISTAKES OF OTHERS

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THE EASIEST WAY TO GAIN EXPERIENCE

Editorial

WHY WERE THEY WRITTEN?

It seems that every action taken in the line of Air Force duty is governed or dictated by some regulation or order; or by more than one. As we go through life we encounter people who assert that we have too many regulations; or that regulations are a bind; or that some particular order is erroneous in that a laid-down procedure is wrong; or that a specific order, instruction or regulation is unnecessary or impracticable. We also find that some order, instruction or regulation was not observed because those responsible were unaware of its existence. This is probably the experience of all of us whose service is lengthly enough that we cannot justifiably be termed either recruits or sprogs.

It requires no lengthy examination of AIB's records to establish that many of those concerned with the operation of aircraft are among the types described and that many actual and potential flying accidents have resulted from the actions of such people. Let us look at the record.

A pilot completed a flight with the knowledge that the fuel system was not in proper order. HE MADE NO ENTRY IN THE L. 14. On the next take-off the aircraft crashed and four men died.

The book says that all occupants of an aircraft shall be properly secured when an aircraft is taking off or alighting. Despite the presence of harness not one of the four who died in that crash had obeyed the instruction. As the aircraft came to rest the fifth occupant, who had used his harness, undid same and clambered out of the wreckage.

The accident not yet on the records is the one which will occur when the crewman of a Dakota, not secured in his seat but assisting the co-pilot in raising the undercarriage, loses his balance and falls forward.

In another accident an aircraft was written-off and an airman lost his life. That one would not have happened if those responsible had completed the fuel state in the L.14 in accordance with the relevant instructions. We admit, though, that in so stating it is assumed that the inevitable indication that one fuel tank was not draining properly would be detected by those whose duty it is to examine the record. This accident would have been averted, also, by checking of the fuel flow following removal and re-installation, on the previous day, of part of the fuel system. That was just another instruction disregarded.

Two engines in one aircraft were extensively damaged when failures resulted from improper oil dilution practices. The airman responsible stated that he did not agree with the instructions and so did what he thought was right.

An aircraft was damaged when a landing was made in near-zero visibility. The flight was planned and cleared VFR although the forecast ceiling over part of the route was 1200 ft. It is our interpretation that the regulations then in force required a minimum ceiling of 1500 ft. for VFR flight since the pilot is required to maintain 1000 ft. above terrain and also to have 500 ft. vertical separation from cloud. That is, of course, unless the flight is authorized for one of a number of specified purposes. This one wasn't. An interesting footnote to this story is the remark of an experienced pilot who saw the accident. He stated that under the circumstances it was fortunate that both pilot and aircraft were not lost.

While on the subject of VFR flight the regulations at the time of writing this require that an alternate shall be designated on a VFR Flight Plan. There has been a lot of objection to this regulation which appears to be generally regarded as unnecessary. We will admit that it may require up to twenty-five seconds to plan an alternate and obtain a brief report on the weather there. That against a lifetime is cheap insurance. Just in case the "Weather Controller" crosses up the forecaster, which happens once in a while.

In our last issue we reported an accident which occurred because the pilot did not stop and look down before attempting to raise the flaps. He was by no means the first to disregard the instructions in the Pilot's Notes.

During the investigation of a fatal crash which occurred when a sprog pilot was getting some practice in formation flying it was learned that the formation had been diving at speeds far higher than the maximum permissable laid down in the Pilot's Notes. The crash was due to structural failure of one wing. An inspection of the aircraft flown by the formation leader revealed that a similar failure had started on both wings. The formation leader was, until then, quite sure the speed restriction was unnecessary.

What is behind the introduction of those regulations, orders and instructions which deal with aircraft operation? Everyone will admit that many of them should not be necessary. The best answer we have seen to date came to our notice a few days ago when we ran across the phrase "Twas experience wrote the rules."

In the interests of soft living for the AIB we earnestly counsel observance of all instructions. If you don't agree with one, don't disregard it. Put your argument on paper.

The accident descriptions in this periodical are paraphrased from courts, investigations and AIB inspectors' reports. The remarks are a combination of those contained in the above mentioned documents and the opinion of the AIB staff.

Comments on controversial matters should be addressed to:-

CAS/AFHQ
Ottawa, Ont.
Attention AIB.

SPECIAL MENTION

EXTRACTS FROM ACCIDENT RECORDS

WHY DID THIS HAPPEN?

The flight was authorized for homing practice and an airman was carried as passenger. Some twenty minutes later, at a point about twelve miles from the base, the witnesses first arriving at the scene removed the bodies from the bent and burning Harvard. While it seems that the actual crash was not observed, witnesses saw the aircraft enter a spin as it completed the second of two rolls. The spin continued until the aircraft passed from view behind a slight rise. The altitude of the aircraft when rolling was estimated at 2000 ft. below the minimum laid down for aerobatics.

The court of inquiry ascertained that the pilot had originally planned to practice spinning and had authorized the flight accordingly, but the O.C. Flying happened along and ordered the authorization changed to homing practice. The decision was accepted by the pilot although an entry in the L.14 indicated that, due to absence of a "D" channel crystal, homing exercises in this aircraft were not possible. Other aircraft in the Squadron were similarly deficient but this had not been made known to the officers responsible for the training program, nor to the Engineer Officer.

The pilot had qualified, and was employed, as a pilot during World War II and had retired from the Air Force in 1945. His flying up till then had been on Tiger Moths and Ansons. He joined the Reserve some three or four months before the crash and had since flown a total of 65 hours on Harvards. In common with other pilots of the Squadron he was permitted to authorize his own flights "since having qualified as a pilot."

We later learned that his training since joining the Squadron had not included more than one hour of spinning and aerobatics.

The court of inquiry expressed the opinion that the spin probably resulted from over-controlling when recovery from the second roll was attempted. The failure of the pilot to recover from the spin is not explained. Engineer officers failed to find evidence of technical failure. It was noted, however, that the control column in the rear cockpit was installed, permitting control from that position.

The causes of this accident will never be known. Lacking information on the manner in which the aircraft was being flown it cannot be positively stated that the rolls which preceded the spin were intentional, or that aerobatics were intentionally performed. Nor can it be stated that the passenger did, or did not, have control of the aircraft; or that, if he did, his actions interfered with the pilot's efforts to recover from a spin. What course would have been followed if the unsuitability of the aircraft for the prescribed exercise had become known to the O.C. Flying is beyond our knowledge.

What of the pilot's training? On the one day that he was checked in aerobatics and spinning, might he not have been "on the bit" and turning in a performance which surprised even himself? What steps did the Unit take to ensure regular practice and check flights in these exercises? The circumstances of the authorization of the flight, coupled with the fact that the pilot was empowered to authorize his own flights, point to an absence of planned training designed to ensure a high standard in all phases of flying.

As we have said, the cause of this accident will never be known, but there are many points on which one might base a theory.

STRUCTURAL FAILURE OR HUMAN ERROR?

A Mustang was observed doing aerobatics at an altitude of about 8000 ft. From one of these manouevres it started into a long, steep dive which terminated on impact with the ground. The extent of disintegration was such that the investigating officers were unable to form an opinion as to whether the accident resulted from technical failure.

The circumstances suggest either technical failure or incapacity of the pilot, for no great skill is required to bring an aircraft out of a straight dive. However, while we do not suspect that the capabilities of the pilot were a factor in this accident we did note certain

details concerning his training. These we shall relate since it is believed that a discussion of them might help to keep our accident rate at a low level.

The pilot's sole flying experience prior to joining the Unit was obtained at FTS and AAS on Harvards and Expeditors. During the ten weeks following his reporting he flew only Harvards and logged only one of the 59 hrs flown in that period as aerobatics. During the next week he made six flights in Mustangs, two of which were on aerobatics. He then logged sixteen additional hours on Harvards, mostly cross-country flying. Then, for the first time, he flew with the Unit Commander on what was described as check flight, logged as local aerobatics. The Unit Commander stated "I personally fly with each pilot in the Harvard ------- prior to sending the pilot solo in the Mustang." He observed that the deceased pilot handled the elevator controls harshly at times.

The Unit Commander apparently was under the impression that the pilot, at the time of the check flight, had not previously flown a Mustang. It is of interest to note that on the following day this pilot tested a Mustang which had just been subjected to a minor inspection. His second flight following that test terminated with his death.

The officer investigating the accident commented on the authorization for the pilot to practice aerobatics when having flown only four hours on the type, and again when total time on type was only 7 hrs 10 min. He discussed the possibility that the accident resulted from loss of control during recovery from an aerobatic manouevre. That possibility may not be too far removed from the actual cause.

The following details of the maintenance history of the crashed Mustang are also worthy of consideration. The L.14's maintained in respect to the aircraft indicate that the "fuselage tank line" was disconnected for a period of about one month, during which period the aircraft remained in service and was flown. It is not specified which line was disconnected but as the carburettor vent return exhausts into the fuselage tank we have been wondering where the fuel went during that time. Did it all accumulate in the fuselage tank? If so, what amount was accumulated? Aerobatics in the Mustang are prohibited if the fuselage tank contains fuel. Can we guarantee that this limitation was adhered to: Is it not possible that the aircraft was "aerobatted" with fuel in the fuselage tank, the pilot being una-

ware of its presence?

Continuing our perusal of the records we noted that the Fuel State indicated that the fuselage tank contained no fuel over a long period of operation of the aircraft. Each pilot, when examining the L.14 before flight, was provided with that indication and in consequence would likely use only the main tanks. There was no indication that the fuselage tank was drained between flights. Again we wonder what happened to the fuel returned via the carburettor vapour vent. We wonder, too, how many of the pilots flying the aircraft knew enough of the fuel system to question the entries in the L.14.

The performance of aerobatics in a Mustang with fuel in the fuselage tank may result in a reversal of stick forces. Undue stressing of the empennage might produce structural failure, and thus loss of control.

How near right was the theory discussed by the investigating officer?

Don't take chances

CHECK

THAT L-14

ACCIDENT RESUMÉ

VAMPIRE

NO. 1 -- ROUGH GROUND

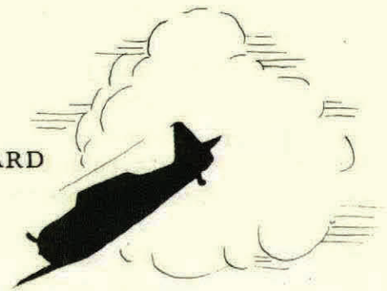
One leg of a Vampire was amputated when the aircraft landed with one wing slightly low at the edge of the button. The ground adjacent to the button had been eroded by slipstream and jet stream, leaving a shoulder with which the wheel first touching the ground collided.

On a similar accident occurring in 1948 both wheels were sheared off, transforming a wheel landing to one of the belly variety. The remedy is in the hands of those responsible for aerodrome maintenance.

NO. 2 -- MULTIPLE LANDING

A Vampire received severe damage when it bounced twice following the initial touchdown. This one was charged to inexperience.

HARVARD



NO. 3 -- LOOSE PANEL

A cross-country formation flight had just arrived over the destination aerodrome when one of the pilots observed that the port upper panel, containing the carburettor air scoop, was beginning to

break loose. He immediately broke formation and landed on the aerodrome. On inspection it was found that the dzus fasteners, at the bottom of the panel had not been properly fastened, permitting the panel to tear loose.

The airman responsible was subsequently placed on charge and disciplined by his Officer Commanding.

Some pilots have a tendency to overlook pre-flight inspections, or to carry them out in an offhand manner. As a consequence incidents of this nature occasionally occur, sometimes with far more serious results. As a pilot you cannot afford to overlook this phase of flying. Errors are usually revealed only by either a double-check or a mishap. This was an exception.

NO. 4 -- GROUND LOOP

During a check-out flight a swing to starboard developed after a normal touchdown. Port rudder and brake were applied as corrective measures and the report states that "the first action only appeared to increase the tendency to swing to starboard." Full left rudder and positive brake action was then taken but the swing continued with the result that the port oleo leg sheared off.

This accident was attributed to carelessness but the assessing officer did not indicate on whom the blame should fall. We wonder about that.

NO. 5 -- FORCED LANDING

While doing a practice spin a student pilot noticed that his engine had stopped. Efforts to re-start were unavailing and the resultant forced landing caused considerable damage.

The cause of the engine failure has not been determined.

NO. 6 -- HEAVY LANDING

A student practicing a controlled descent and precautionary landing at the home base opened the throttle at 150 ft altitude. The only response from the engine was a loud bang. After further manipulation of the throttle the engine "caught" but as it did so the aircraft struck the runway with considerable force. The pilot "went around" and landed. The starboard tire blew as the landing run was completed. Damage to the aircraft, apparently done at first contact, was categorized as "B", and included a damaged starboard wheel. The subsequent failure of the tire was probably due to a combination of the wheel damage and braking action.

The cause was reported as a heavy landing with mishandling of the engine during approach as a contributing factor. In our book the cause was "pilot error" in that he failed to concentrate on the primary objective, which was landing the aircraft, but gave too much attention to getting the engine going.

To what extent did training enter into this one?

NO. 7 -- CLOSE FORMATION

The trade of locomotive engineer can be hazardous, as one of its followers found during what should have been a peaceful and uneventful jaunt through a section of rural Quebec. In this case it was stated "my coal tender was struck by an aircraft and the ventilator on top of the cab was scraped. I looked out and saw three aircraft going away but one was a little lower than the other two."

Later some parts from a light series bomb carrier were found in the coal tender and a bomb carrier on one Harvard was found damaged. Also the starboard wing, to which the carrier had been attached, was damaged "beyond repair."

It was later established that the aircraft involved was one of three engaged in a formation flying exercise and was flown in No. 3 position. The formation leader said they were down "as low as 300 ft." The No. 3 pilot stated. "I was not conscious of being at a dangerously low altitude but as I was concentrating on keeping position in the formation it was not possible to observe the ground as well. I did not see any train.....and was most certainly not conscious of the aircraft hitting any object."

One should keep an eye on one's leader during formation flying, but if you are so close that his aircraft, or whichever aircraft you are following, obscures all other objects, then you are maybe a little too close.

The aircraft concerned was flown four times on the date of this incident and the damage was done on the first flight. The damage was not discovered until the next daily inspection. The various pilots concerned all made a pre-flight check of the aircraft.

Yes - a summary of evidence was taken. Disciplinary action is not known at time of writing.

In the last issue reference was made to two Expeditor undercarriage accidents which were to be the subject of future discussion. Here they are.

NO. 8 -- WHEELS UP

In the first of these an odour of burning rubber was noted, and failure of the electrically operated equipment occurred, about ten minutes after take-off. During the ensuing cockpit check it was observed that the undercarriage selector switch was in the "up" position. This was returned to neutral. All other switches were in their proper position. The odour died away shortly afterwards. The radio equipment was switched off to prevent too heavy a drain on the batteries.

The pilot decided to return to his base and while en route there tried unsuccessfully to lower wheels and flaps by normal procedure. He then tried to lower the undercarriage by the emergency method and, the wheels appearing to be fully down, believed he had succeeded. The subsequent landing was uneventful except that towards the end of the landing run the undercarriage warning horn started to blow. As the aircraft was taxied in, the electrical instruments started to function and were operating normally before the aircraft was parked.

Later it was observed that the undercarriage of the aircraft was not fully extended and that the slide tube on the port undercarriage was bent in such a manner that the undercarriage was locked in the position it then occupied. A check of the electrical system revealed no fault except that the batteries were flat and the level of the electrolyte was low. Examination of the port slide tube revealed a pronounced off-set at a point $5\frac{1}{2}$ inches from the rear end, indicating subjection to a shear force at that point, and a fairly sharp bend distant there-from by the length of the slide. Distortion of the lower end of the tube had resulted from upwards bending.

The AIB's reconstruction is that during take-off the port wheel was allowed to contact the runway after the "up" selection was made and retraction started. The result was distortion of the slide tube; probably not to the degree later found, but sufficient to prevent full travel of the slide. The undercarriage motor limit switch was, in consequence, not operated and, since the manual switch was not returned to neutral, the motor continued to operate under load, draining the batteries. At the same time the overloaded motor or the clutch, or both, became overheated and produced the evidence of burning. With the motor switched off, the evidence of burning died away. The batteries recuperated slowly, as is to be expected under such conditions, producing the behaviour of the electrically operated instruments as described.

The pilot had reason to believe that the undercarriage was fully extended, for on another Expeditor it was found that with the slide moved to the position where distortion of the tube had occurred on this aircraft, it was not possible to determine, by visual observation from the cockpit, that the wheels were not fully down.

The bent port slide tube bore evidence pointing to impact of that wheel against the runway during retraction on three, and possibly four separate occasions. It is therefore possible that this accident was not entirely due to the circumstances of the last take-off. Previous contacts between the wheel and the runway may have brought about initial distortion of the tube. One or more pilots may have contributed to this accident.

NO. 9 -- BY THE SKIN OF THE PROP TIPS

In the second of the two cases held over, the undercarriage re-

tracted during take-off. It was stated that the aircraft began to sink as the aircraft attained a speed of about 50 knots. The pilot succeeded in getting airborne but the propellor tips contacted the runway, shearing off considerable metal and producing a beautiful curl in each blade. It was stated that the engines vibrated "excessively." The undercarriage was raised during the circuit and subsequently lowered for the landing, which was normal.

During subsequent examination of the undercarriage and its electrical system no fault was found but eleven flying hours later it was discovered that the slide tubes were bent. As the proceedings of the investigation contain no indication of any trouble having been experienced during the interval it is presumed that this distortion had been present since the unusual take-off under discussion. However, it may not have been so.

On examining the slide tubes we noted that considerable filing had been done and we think that this was to facilitate movement of slide past "high spots" on the tube, produced by distortion. If the undercarriage worked satisfactorily during the last eleven hours of operation then it would not have been necessary to file the tube to remove the slide during dismantling. The assumption that it was filed at some previous date is therefore logical. When and for what reason?

In addition to the evidence of the above non-standard and non-approved maintenance practise we found that the tubes had been damaged by at least two severe shocks transmitted through the drag link or strut with the undercarriage partly retracted. The retraction, however, was in neither case sufficient to bring the propellers anywhere near the ground unless the aircraft was nosed down very steeply. There were also indications of the tubes having been submitted to numerous less severe shocks under similar conditions.

When casually mentioning this type of accident, one day a pilot assured us that on an Expeditor he could select undercarriage up during his pre-take-off check and go merrily down the runway, knowing that the wheels would not retract until the aircraft was airborne. We were thereby reminded of the old saw "Fools rush....." But seriously, is not this type of thinking likely to promote another of the "unnecessary" instructions (see editorial). Is there not a suggestion that the Pilot's Notes should include "Do not raise the undercarriage until the aircraft is airborne?"

Incidentally, we do not know the answer to that last accident. Your guess is as good as ours.

NOTE OF INTEREST

It was reported to us that while watching a visiting Expeditor (from a training unit) take off from Rockcliffe several persons found themselves listening for the crash alarm. They saw the aircraft rise momentarily and then settle slightly - a common occurrence with the Expeditor. They also saw the undercarriage start to move backwards as the aircraft sank. On hearing of this we watched for a casualty message from the home unit but none arrived, so either the undercarriage did not touch or the resultant damage was not sufficient to prevent lowering of the undercarriage. In the event that aircraft does become involved in one of these frequent accidents the slide tubes might provide interesting material for study.

What causes these accidents? Structural failure or pilot error? And if the latter, which pilot?

NO. 10 -- DEFECTIVE NIGHT VISION?

While taxying an Expeditor during night flying practice a Flight Cadet overtook a second aircraft of the same type. The lead aircraft was displaying all lights. Both aircraft were extensively damaged.

The cadet was advised that his training would not be completed until some two months later than the anticipated date. His voluntary contribution to the bill for repairs was fifty dollars.

NO. 11 -- A GROUND LOOP - AND THE CONSEQUENCES

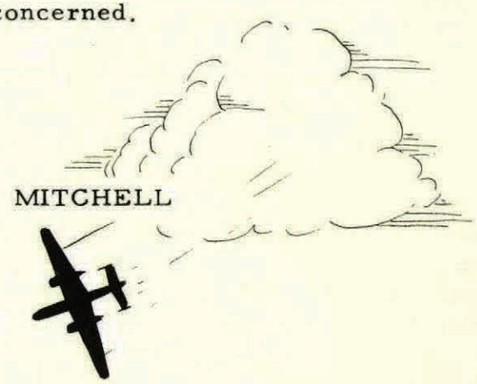
A pilot receiving dual instruction on an Expeditor made a normal landing but allowed a swing to develop shortly after the tail wheel touched the ground. The wind was reported as having been from 70 degrees to starboard at 12-15 mph. Full port rudder was applied as corrective action but was ineffective and the aircraft swung through 360 degrees. The pilot could not, when asked, remember

whether he had used the brakes.

The damage was categorized "E" but it later appeared that all the effects were not observed when the aircraft was first inspected. On two subsequent occasions the starboard undercarriage nacelle doors and their operating mechanisms were damaged. Investigation of this later damage revealed that the starboard oleo leg was not fully extending, thereby fouling and placing strain on the doors on retraction.

There can be no doubt that one of the major factors in this accident was the absence of dual brakes and similar accidents must be expected until all Expeditors are modified in this respect. The note regarding damage was written with the thought that a wider appreciation of the possible consequences of such accidents might assist maintenance staffs.

We have re-categorized the accident but we doubt whether this action occurred at the unit concerned.



NO. 12 -- FIRE IN THE AIR

A Mitchell engaged on a meteorological research flight took off from its base and climbed to 24,000 ft. The ceiling at base at that time was 1800 ft and lifted only slightly during the next several hours. Normal transmissions between the aircraft and the Tower were recorded at take-off. The next transmission was received by the Tower some forty minutes later when the captain reported that he had been to 24,000 ft and was then VFR at 4,000 ft forty-five miles south of base, with the port engine over-heating and over-speeding.

Ten minutes later the captain again reported his position and stated that the port engine was still over-heating. At that time the attention of people on the ground was drawn to the aircraft by the noise made by one of the engines, both of which were running but were not synchronized. The altitude at this time was estimated "as over 1,000 ft." The aircraft was seen by a number of people between the point of these observations and the position at which it later crashed. All spoke of the unusual noise made by the engines and the general impression was that the aircraft was "quite low" and flying at a greatly reduced speed. It appeared that the port propeller stopped turning for a brief period and then recommenced turning. Fire was observed only shortly before the crash. The aircraft had been on a track leading directly to base from the point at which the aircraft was first observed although two aerodromes were located only a few miles from this track.

The captain, in his transmissions, made no reference to fire in the aircraft until very shortly before the crash and on acknowledgement of this information by the Tower he immediately stated "abandoning aircraft." The captain left the aircraft as it dived to the ground but was killed, either by impact with the ground as his parachute streamed, or by collision with some part of the aircraft as he left. Information obtained later from the wreckage revealed that at the time of the crash the co-pilot and the two other crew members were in the navigators compartment and all were wearing parachutes.

The following reconstruction of the accident is based on the evidence obtained from the wreckage.

Initially, the port engine oil supply was lost through a leak in the oil coolers, caused by coring. This resulted in over-speeding and over-heating of the engine. The pilot attempted to feather the propeller but was unsuccessful. The flight was continued with the port engine operating without lubrication until internal failures produced vibration severe enough to make a reduction in airspeed necessary. The captain continued on, apparently confident that he could reach base and land on the aerodrome. At some point fire started in the rear section of the port engine, consumed the whole interior of the rear section, and then spread to the nacelle. Flames, undoubtedly preceded by smoke and fumes, and fire had taken hold in the fuselage before the captain

became aware of its presence. Realizing that there was nothing he could do to avert a bad crash, the captain ordered the aircraft abandoned and instructed the co-pilot to leave via the navigators hatch. He may have known that the other crew members were unconscious or he may have believed that all had left the aircraft. However, the evidence pointed to the existence of an intense fire behind him when he finally left the controls and attempted escape by the top hatch.

The cause of the fire could not be positively determined but it is obvious that the fuel was not turned off at the time of attempted feathering. Also, it appears that the ignition switch was left on, at least during the attempted feathering. The fire is attributed to a backfire occurring as the engine slowed down.

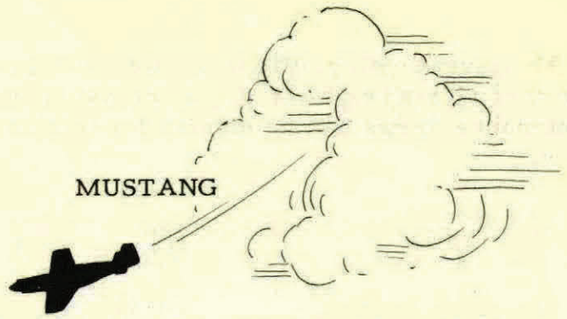
The reason behind the continued flow of fuel to the engine is not apparent. The crewman was wellacquainted with the Mitchell and should have known how to turn off the fuel if so instructed. A projected modification will give the pilot direct control of the fuel system.

AFRO's have already been published regarding the propeller feathering procedure and the carrying of a crew member qualified to operate the fuel system. The content of para 13 of the Pilot's Notes, AP 2341B, will be amended. Modifications to the aircraft, additional to that described in the preceding paragraph, are under consideration.

NO. 13 -- HYDRAULIC FAILURE

During a ferry flight from Unit to Contractor the Captain observed that the hydraulic pressure was gradually decreasing. At the destination aerodrome an attempt to lower the undercarriage by normal procedure failed, and the emergency system was employed. The aircraft was landed without incident.

This pilot knew his emergency procedure and consequently the occurrence is hardly worth reporting, but it could have been otherwise. Do you know your drill?



NO. 14 -- SELECTOR TROUBLE

The pilot of a Mustang selected wheels down but the undercarriage did not lower. He then selected wheels up and discovered that the selector lever was broken. Being left with no alternative he made a belly landing.

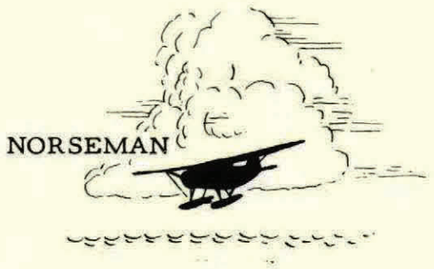
On examination of the broken lever it was noted that the fracture had been progressive. The cause was established as maladjustment of the linkage between the undercarriage up locks and the hydraulic selector, which resulted in a down selection and consequent loading of the locks before they were mechanically released. As the locks were released by actuation of the selector lever it therefore became necessary to apply more force than the lever was designed to withstand.

It appeared that the cause of this accident was introduced at the last assembly of the undercarriage retraction and lowering mechanism, or some part thereof.

One pilot stated that he had noted, when flying this aircraft, that the undercarriage lever seemed stiff when selecting wheels down but since this was the only Mustang he had flown he put it down to the "nature of the beast."

We think it likely that the resistance to movement of the lever would have been apparent to the mechanic who did the last minor inspection, presuming that one was done. Regardless of the type of aircraft, the need for unusual force in making any selection should have been investigated. All controls should operate smoothly and easily and when these conditions are not found the cause of impediment should be ascertained.

The investigating officer omitted to inquire into the maintenance history of the aircraft so we do not know to what extent the local maintenance crews can be blamed for this one.



NO. 15 -- ICEBREAKING AIRCRAFT

The report reads "After landing, the aircraft was taxied onto the edge of the ice to test thickness. Upon observing thickness of ice the aircraft was immediately taxied out but in so doing the front compartment of the port float was holed. The plywood panel in the nose bumper of the float was deteriorated and could be broken with the fingers."

Just that and no more. One might reasonably infer that, due to the condition of the said plywood panel, the ice penetrated the panel, the nose bumper, and the metal forming the front of the float. That is, of course, unless one has knowledge of aircraft floats and has a little experience in the operation of float seaplanes on water. However, we would suggest that the pilot who would taxi his aircraft against an obstacle at a speed sufficient to cause such damage would be better employed driving a bulldozer.

The accident occurred on a lake and it is obvious that not all the lake was frozen. We wonder whether it was anticipated that the ice would support the aircraft and also how the aircraft was taxied on to the edge of the ice. Further, it is our recollection that the nose bumpers on a seaplane which is at rest, or is taxied slowly, are well above the water line. Under certain conditions the nose of the floats can be depressed to bring the bumpers well down in the water, but speed is an essential factor.

The report reveals that the aircraft was flown to the lake for

changeover from floats to wheels. It is not revealed whether there was a ground party equipped with a boat and the equipment necessary to break a channel through the ice. We are therefore unable to estimate the contributions of others to this accident.

Our picture of this accident may not be accurate and it may be that our remarks are a trifle unjust. If that is so then the report is incomplete and the blame must fall on those whose duty it was to give us the facts. Maybe the float was holed at a point not afforded protection by the bumper but we have to accept the implication.

Incidentally, we noted that the report contained no comment by technical personnel despite the implication of technical failure. From the text, we received the impression that some information on float construction might have been obtained by consulting technical "bods." The report might then have read differently and some people may have realized that aircraft floats were not designed for the same purpose as the N.B. McLean.

NO. 16 -- LACK OF CO-ORDINATION

Minor damage resulted from the docking crew casting off a float equipped Norseman without receiving a signal from the pilot. While this looks like an error on the part of the docking crew we feel that those responsible for instructing the said crew in their duties might also be to blame. The report does not indicate whether there was a crewman on the float of the aircraft but implies that there was not and we therefore feel that the pilot must take a share of the blame. Let's get hep to the potentialities of such a situation before real damage occurs.

A pilot should ensure that those assisting him know their drill.

NO. 17 -- SKI DAMAGE

The tail shock strut of a ski-equipped Norseman was broken when the skiis broke through a top layer of shell ice while taxiing at slow speed. It appears that the tail ski also broke through, or was caught in the edge of the track made by a main ski, as the aircraft was turned. We might profit by this experience and when taxying under similar conditions, keep the stick forward and the weight off the tail ski. In the days when ski operations formed a large part of

the Air Force activities that procedure was part of our training.

NO. 18 -- OLD STUFF

After landing an Auster on the right side of a runway, in a strong wind, the pilot experienced difficulty in turning left to taxi back to the hangars, due to a weak port brake. He elected to turn right, which brought the aircraft on to the grass. When about 50 feet from the runway the starboard wheel sank in a rut and the aircraft nosed up, causing damage to one blade of the propellor.

Although an airman was carried as passenger the pilot neglected to have the area in which the aircraft was to be turned inspected for taxiing hazards. The pilot stated that he did not take this precaution as he required the weight of the crewman in the rear of the aircraft when taxiing down wind. It may be that keeping the aircraft stationary until the ground was inspected would have caused depletion of the fuel supply.

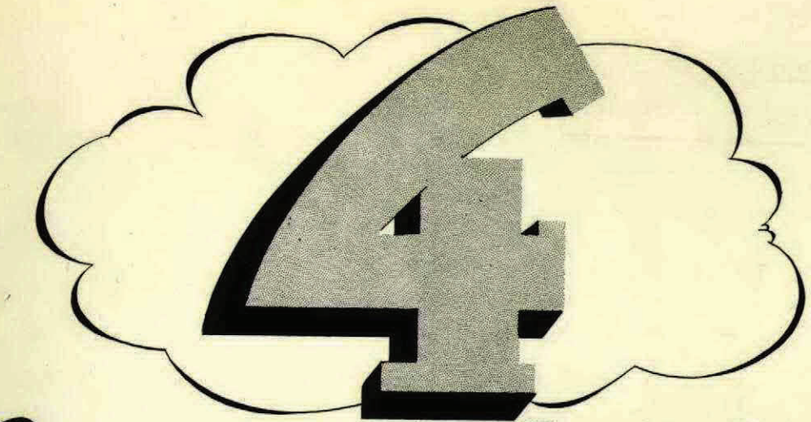
A long time ago those Air Force officers who instructed in ab initio flying taught that in turning light aircraft down-wind it was desireable, if the wind was strong, that a second party exercise a braking effect on the inside wing. The correct use of elevators in such turns and in down-wind taxiing was also taught so that the hazards encountered in these operations could be safely countered. Have these practices fallen into disuse?

NO. 19 -- A DEMONSTRATION

Ten persons were injured, seven of them seriously, when a Hadrian Glider crashed during demonstration of the use of the arrestor parachute in glider landings. The demonstrating pilot opened the arrestor chute and, as is necessary, depressed the nose of the aircraft to maintain airspeed. As the aircraft neared the ground the pilot attempted to jettison the chute but was unable to do so. For unknown reasons the aircraft failed to round out and struck the ground in a nose-down attitude.

No evidence of malfunctioning of the elevators or elevator controls could be found. Failure of the arrestor chute to jettison was traced to an omission on the part of the pilot when opening the chute. Part of the drill was forgotten.

We understand that gliders can be landed without jettisoning of the parachute but that on practice flights it is jettisoned as an economy measure.



Causes of Accidents

① *I didn't* **KNOW**

② *I didn't* **THINK**

③ *I didn't* **HEAR**

④ *I didn't* **SEE**

Don't Take Chances!