Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED

JUNE 1949

RESTRICTED

THE COVER PICTURE

When the pilot of the F-86 was unable to restart his engine after a flameout at 33,000 feet, he was confronted with the question whether to bail out or try to glide over the mountains and into a landing field. His map showed a landing strip 40 miles away and from his experiences in gliding jet aircraft he decided the glide could be made. The angle of his glide was such that he was still at 10,000 feet when he came over the town where the landing strip was located.

He circled the area but was unable to find the strip. Observing the wind direction from smoke on the ground he looked for an open area to belly in. He selected a stretch of relatively smooth farm land, opened the canopy, lowered half flaps, unlocked the wing slats and cut off all fuel and switches. He landed tail low at an airspeed of 125 mph. The plane slid about 250 yards on an even keel before turning slightly as it came to a halt.

Although the plane was considered a wreck, the pilot suffered no more than sore back muscles from the initial landing jolt.

The investigators considered that the flameout may have been caused by water or foreign matter in the fuel.

★

SHARE YOUR IDEAS

FLYING SAFETY Magazine welcomes comments, criticisms and editorial contributions from all members of the United States Air Force. Readers can help the magazine promote safe flight by offering information on procedures, equipment or training methods that have been effective in decreasing aircraft accidents. Address your letters direct to the Editor, FLYING SAFETY Magazine, Langley Air Force Base, Virginia.

FLYING SAFETY

DEPARTMENT OF THE AIR FORCE

The Inspector General, USAF, Office of The Air Inspector, Flying Safety Division, Langley Air Force Base, Virginia

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FLYING SAFETY is published monthly with the approval of the Bureau of the Budget, Executive Office of the President of the United States.

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HOW LUCKY CAN YOU BE?

Few airplanes ever cross the Cascade Mountains of Washington and Oregon off airways at 7000 feet, but a C-47, being flown on instruments, crossed this range of mountains at that altitude, under almost unbelievable circumstances.

The plane departed Hamilton Air Force Base early one morning with McChord Air Force Base as point of first intended landing. The flight plan called for VFR direct to Red Bluff, California, and IFR at 11,000 feet on Amber Airway One to McChord. The flight proved uneventful until instrument conditions were encountered in southern Oregon, with moderate icing and turbulence and attendant poor radio reception. ARTC at Seattle cleared the airplane to descend and cruise at 7000 feet from Eugene, Oregon to McChord. The change of altitude helped somewhat, but a few miles north of Eugene the radio receivers became useless because of static conditions.

No position report was received at Portland, 105 miles north of Eugene, but at the time the plane was due over Toledo, Washington, 60 miles north of Portland, the pilot reported in the vicinity of Yakima, Washington, which lies on the east side of the Cascade Mountains 110 miles off his course!

Seattle Air Route Traffic Control and Flight Service were somewhat amazed at this report, to say the least. However, ARTC cleared the C-47, with radio receivers now functioning normally, to Seattle via Stampede Pass to cruise at 8000 feet westbound on Green Airway Two. More of the same kind of trouble was in store for this crew on the new route of flight. About halfway to Seattle in the narrow Stampede Pass the pilot encountered severe turbulence and icing which made further flight westbound inadvisable, if not impossible. Radio reception of range signals again became extremely poor and the pilot did a 180 in the pass and flew back where he knew the weather wasn't so bad, finally locating himself in the vicinity of Ephrata, Washington. He landed at nearby Moses Lake Air Force Base as a result of a Flight Service advisory message. On the following day the pilot flew to his original destination, McChord Air Force Base, and talked over the incident with McChord Flight Service.

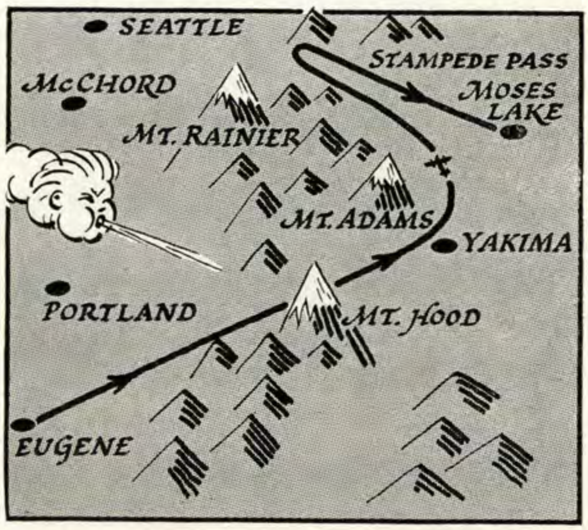
A review of the weather and the terrain indicated that the plane flew at 7000 feet past Mount Hood, elevation 11,245 feet, and past Mount Adams, elevation 12,307 feet, both almost on assumed direct line of flight, and over terrain which averaged 6000 feet above sea level with many small peaks up to 7000 and 8000 feet! Just how this pilot made it across has resulted in considerable conjecture.

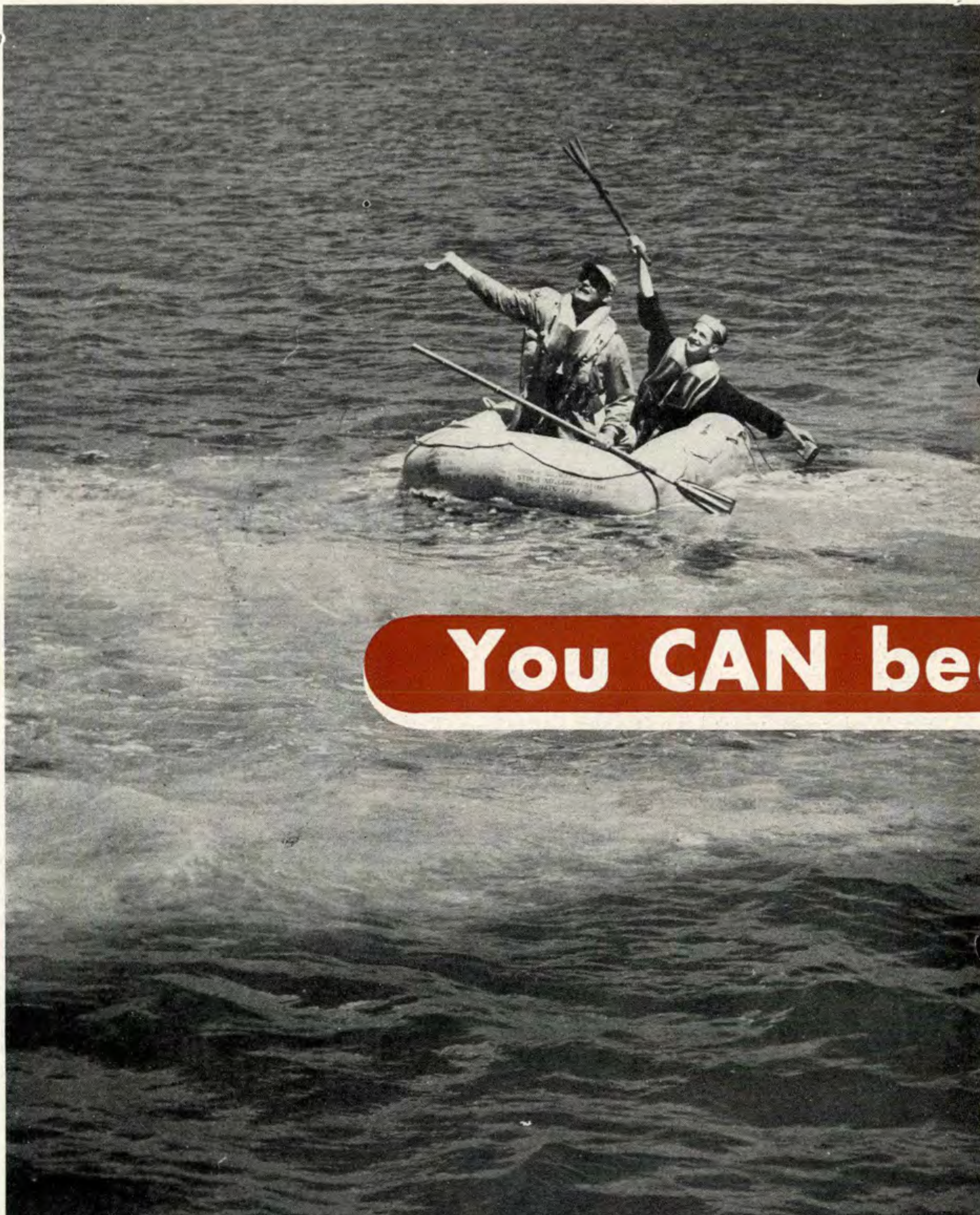
A strong frontal weather situation existed on the day of the flight. Winds were northwesterly, and at altitudes of 6000 to 10,000 feet were around 50 to 60 miles per hour. This condition, coupled with the funneling effect of the Columbia Gorge from Portland to The Dalles, Oregon, explained how the C-47, without radio orientation on the range course legs, was blown across the mountain range.

Somewhere in the lower glacial ice on Mount Rainier, Washington lie the remains of a C-46. Northwest of Seattle about 5000 feet up on Mount Pilchuck is the wreckage of a T-11. "'Tis an ill wind that blows nobody good." If you are really lucky, it might blow you right through a mountain pass!

But don't depend on it!

— Capt. W. E. Swartz
McChord Flight Service





You CAN beat

them. As one of the procurement officers for the airmail operations later testified, "We didn't have an airplane that had more than half of its instrument panel operating . . . had no radios . . . and were working with planes at least seven years behind the commercial planes."

However, the lack of proper instruments and of instrument flying proficiency was only a part of the story. For those who were lucky enough to have planes properly equipped and who knew how to make use of the equipment, there arose another problem — standardization. This lack of uniformity is best described by a letter to the Chief of the Air Corps from Lt. Col. H. H. Arnold, then CO of the Western Zone of Air Corps Mail Operations. The letter, written in April 1934, stated in part as follows:

"Upon starting airmail operations, it became apparent that the present lack of standardization in locating instruments in airplanes could not help but have its effect on the manner in which pilots handled their airplanes at night and in thick weather. A survey of the instrument boards installed in Army Air Corps planes indicates that there are almost as many different locations of instruments on these boards as there are types of planes. Obviously then, no pilot can step from one Army plane into another with the full understanding that the instruments will be located where he is accustomed to look for them. Such state of affairs is in direct contrast with that now existing on commercial airlines where maximum efficiency is expected from their pilots." Colonel Arnold went on to state that, "In approaching the solution of this problem, it was found extremely difficult to get any two experts to agree on the location of all instruments."

This, then, was the instrument predicament with which the Air Corps was confronted in early 1934. It is doubtful whether the problem would have been so dramatically and disastrously presented at that time if the airmail operations had not been undertaken. Yet, had the full worth of such a costly lesson been realized, the benefits could possibly have been accepted as a counterbalance to the cost.

In the years following the airmail operations and leading up to World War II, there was a marked advance in the development of instrument flight.

To sum up briefly: Starting in 1936, simple radio sets were installed in all tactical aircraft, adding another advancement to the art of navigation without visual reference to the ground. The advent of the station altimeter, combined with the use of radio communication, allowed the pilot to adjust his own altimeter so that he could determine his altitude before landing. The sensitivity of flight instruments as a whole was being steadily increased so that it was no longer a matter of variations of a few hundred feet or half a dozen degrees, but just a few feet or one or two degrees. With this increased sensitivity, better methods of shock proofing instrument panels lessened the effect of engine vibrations on instruments. New methods of cockpit lighting, instrument arrangement, and dial markings assured pilots of quick and efficient instrument reading and interpretation.

All this progress meant one thing. That planes of

A Shock Mounted Instrument Panel Used in 1934.

Demountable Flight Group Panel, in Center. 1937.

the Air Corps just prior to World War II were far better equipped for instrument flight than the ones that were used to carry the mail.

It seems somehow incredible that the parallel of this progress in instrument development, namely the progress of pilots' proficiency in instrument flying, was by no means equal. If two graphs were drawn depicting these parallels (one for the year of the airmail flights and one for the year prior to World War II) their similarity would be amazing. In both cases the line representing progress in instrument development would reach much higher than the line illustrating pilots' progress in instrument flying proficiency.

The accelerated program of instrument training which the airmail flights definitely proved necessary had not been fully developed. True, a regulation was published requiring all pilots to complete 10 hours of instrument flying a year, but this did not suffice. In the first place, 10 hours per year were insufficient. Secondly, pilots as a whole were still content to "sit the weather out." The fact that a majority of commanding officers shared the same viewpoint and did little to encourage instrument flying did not help much. But the war was to change all that.

As great as our dislike may have been for the mustached little man with the unruly hair and for his ideologies, we must credit him with a direct contribution towards furthering instrument flight. He started a war. The rapid acceleration of scientific and engineering progress stimulated by that war did much for all things airborne. Consequently, it did much for instrument flight. There was no longer any room for the doubters—instrument flight became a must.

Undoubtedly, the long-range bomber was the war's largest single contributor to the far-reaching developments and indoctrination of pilots in instrument flight. As early as two or three years prior to the war, a few outfits equipped with the early types of heavy bombers became aware of the importance of instrument flight in bombing operations. But before they could acquaint the rest of the Air Corps with their findings, the war had started.

During that relatively short period of five war years many changes took place. The old 1-2-3 or "needle-ball-airspeed" system of instrument flying was replaced by the more advanced system of attitude instrument flying. The Link trainer was developed and proved invaluable in teaching pilots the fundamentals of instrument procedures. Existing flight instruments were perfected to a degree hitherto unheard of. New instruments and systems such as radar and GCA were devised. The necessity of having proficient instrument pilots to conduct tactical and strategic bombing missions, regardless of weather, was realized. An All-Weather Flying Center was established to study the far-reaching possibilities of all-weather flight.

The part played by instruments during the war is familiar to the majority of pilots in the Air Force today, and these particular developments illustrate only a small cross-section of the progress accomplished. The war brought a revolutionary change in the average pilot's regard for instruments, in instrument development, and in training systems.

Even though it may have been "learning the hard way," the holocaust had brought with it the Transition Period of instrument flight. Men of military aviation no longer regarded instrument flying as taboo, and the implications of its importance both in war and peace were realized.

—Sgt. E. P. Magaha.

Standard Instrument Panel Showing 2¾" and 1⅞" Dials. 1939.

Example of Instrument Mounting from Front of Panel.

WELL DONE

TO

1st Lt. JOSEPH M. NEIDER
Davis Air Force Base, Adak, Alaska

PILOT SKILL and a courageous determination on the part of an Air Force crew to fulfill its mission against great odds — this is the story airmen in Alaska are repeating with pride.

Lieutenant Neider, with copilot 1st Lt. Daniel W. King, engineer T/Sgt. Fred S. Sartain and radio operator Pfc. John T. McLaughlin, took off from Davis AFB, Adak, Alaska, in a C-47 on a flight to Shemya AFB, Alaska with a cargo of mail which weighed 2504 pounds. Thirty minutes west of Amchitka the right engine failed.

Later inspection at Davis AFB revealed that five broken pistons had caused the malfunction.

At the time of the incident, the flight was on instruments. Because of the unfavorable winds, icing conditions, and distance remaining to be flown, it was necessary to attempt a return to Amchitka. The weather at Amchitka was lowering, and by the time the flight arrived over the field there, local conditions were, considerably below operating minimums. In addition, ice continued to accumulate to the extent that the power of one engine was insufficient to maintain altitude, thus forcing the airplane to descend from the original 8000-foot flight level to 2300 feet. Local weather at Amchitka was a ceiling of 100 feet with visibility three-sixteenths of a mile, surface wind of 40 knots with gusts to 52 knots, 90 degrees to the runway, and no GCA. A single-engine approach under these conditions was out of the question.

After radio consultation with Amchitka, Lieutenant Neider decided he would be forced to jettison the cargo and proceed eastward 100 miles to Tanaga.

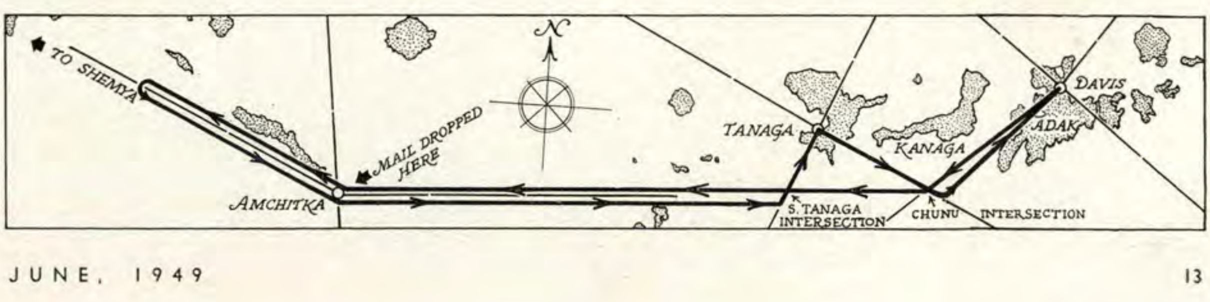
To prepare for jettisoning, the pilot approached Amchitka from the west along the radio range course. Jettisoning of the cargo was started at the moment the plane passed over the cone, and was continued for 30 seconds only, because of the proximity of the range course to the ocean. Lieutenant Neider than executed a 180-degree turn, returned along the range course and, with more land area on this course, again ordered cargo to be jettisoned over the range station. At the end of one minute the plane was able to maintain altitude, and the remaining bags of mail were retained aboard.

The flight proceeded on instruments to Tanaga. The weather was lowering there, and upon arrival the ceiling had lowered to 100 feet and visibility had dropped to one mile, precluding the possibility of a safe landing on the steel mat runway. Meanwhile, the weather at Adak remained constant, and it was determined by Lieutenant Neider that the safest procedure for both equipment and personnel would be to continue to Davis AFB.

Over Chunu Intersection, 20 minutes southwest of Davis AFB, it was necessary to use the full power of the good engine to climb to 3000 feet in order to clear a pass on the approach route. This was accomplished, and a GCA approach and landing in gusty crosswind, with one prop feathered, completed the flight.

The entire flight was on instruments, under icing conditions. Under the circumstances there could be no criticism if the cargo had been jettisoned at sea. At great risk the airplane was flown to Amchitka, where a commendable effort was made to drop the cargo so that it might be recovered by personnel on the ground.

Recommendations for awards have been made for the entire crew by their commanding general for a job "Well Done."



AN AVERAGE DAY

IF TODAY is an average day, Air Force aircraft accidents will kill one person, injure another, wreck one airplane, inflict major damage on three, and minor damage to two. Look at the pictures on these two pages. They represent one typical day's accidents. Will we do the same thing over again tomorrow?

With the cost of replacement aircraft steadily mounting, this terrific drain on Air Force personnel and money is a matter of vital concern to all of us. The Flying Safety Division's efforts to attack this problem from top-side has many interesting facets. You see the efforts being made to eliminate the hazards to safe flight at your own base, yet like many others you may wonder just how Flying Safety assists your efforts. To illustrate how Flying Safety performs its mission, here are a few examples of its work:

During 1946 it made a detailed study of pilots who had been involved in two or more aircraft accidents. The study disclosed that of the 461 major accidents caused by pilot error during a three months' period, 153, or one-third, involved pilots who had had one or more previous major accidents during the past five years. This study further disclosed that during the period covered, approximately nine pilots had their third accident each month and that one or two of them were killed in their third accident. It is realized that chance, materiel failure, or plain bad luck precipitate some accidents; but, when a pilot is involved in as many as three major aircraft accidents in which pilot error is a contributing cause factor, it is believed that in the interest of the pilot and the Air Force, his proficiency should be thoroughly reviewed. Accordingly, a regulation was published on 26 March 1947 requiring that all pilots with three pilot error accidents within a five-year period meet a Flying Evaluation Board.

Meeting a Flying Evaluation Board is not to be regarded as punishment—nothing is farther from the spirit of this regulation. The purpose of the FEB is to help a pilot stay alive—to find where he has trouble and assist him in correcting it. And when he is returned to flying status after meeting a board he should wear no black eye.

Since the publication of that directive, action has been initiated on 244 "repeater" pilots. Of this number, 119 pilots were returned to full flying status, 35 were permanently suspended, 85 cases were closed, as the pilots were not actively participating in military flying programs, and five cases are pending. Of the pilots returned to flying status, three have been killed in accidents, two as a result of their own errors. Three others have had another pilot error accident resulting in flying evaluation boards grounding two of them and returning one to flying status.

Another study conducted by Flying Safety revealed that in accidents not involving disintegration where shoulder harness was available and used, only five per cent of the persons involved were killed. In similar accidents where shoulder harness was not available, or was not used if available, 11 per cent of the persons involved were killed. These facts were brought to the attention of the Chief of Staff and as a result a program has been approved to place shoulder harness in all USAF aircraft.

Flying Safety, in studying accident causes, found that improperly executed tactical approaches con-

1 PERSON KILLED

1 PERSON INJURED

1 PLANE WRECKED

tributed to 17 accidents, eight of which were fatal, during 1947. Pilots were using this type of an approach as a pretext for an acrobatic exhibition in the traffic pattern. This matter was called to the attention of the Deputy for Operations. A regulation was published in October 1948 placing stringent limitations on the execution of tactical approaches. Since that time only one accident has occurred in which an improperly exeuted tactical approach was a contributing factor. This, of course, was a violation.

It should be noted while discussing regulations that the USAF shoulders a heavy responsibility in formulating flying regulations. In every sense, effort is made to keep these rules realistic and practicable. In conceiving flying regulations the principal guide must always be that the rules themselves embody the safest practice.

Violations have been declining over the past two years, but in 1948 we still had 467 confirmed violations. Some commanders regard violations more seriously than others. In one place a pilot involved in an accident caused by buzzing may be court-martialed, fined and reprimanded. At another place a pilot who commits the same offense may get off with an administrative reprimand only.

While on the subject of discipline, we should include the 377 taxiing accidents in the Air Force last year. Roughly one-sixth of all our accidents occurred during taxiing. There is little excuse for a taxi accident, yet in very few cases is any disciplinary action taken. The new provision in the Manual for Courts Martial which enables commanders to fine an officer under the 104th AW, up to 50 per cent of his pay for a three months' period, should produce good results.

Most of the time, correspondence regarding the preventive action taken by bases or commands as a result of each aircraft accident reflects a genuine attempt to eliminate the difficulty. A good example of this was a recent accident due to improper handling of an airborne life boat. For corrective action, the flying safety officer put on a demonstration of the A-1 life boat for all pilots in the unit and submitted a photograph showing the accident study class receiving proper instructions.

Experience is undoubtedly the best teacher, but the Air Force can ill afford for each of its pilots to learn the causes of accidents by personal experience. The accident study classes required by AF Letter 62-5 were originated to enable pilots and maintenance personnel to spend about one hour every two weeks learning to profit by the costly mistakes of others as well as to assimilate other facts about safe operations.

These classes can and should be a potent force for safety if conducted intelligently. The publications disseminated by Flying Safety to every echelon of the Air Force are designed to implement this program of accident study classes since they cover practically every conceivable need for safety educational literature. Discussing lessons learned from local accidents and other accidents reviewed in Flying Safety publications, showing training films, reviewing flying regulations and pertinent technical orders, and securing speakers to discuss applicable subjects are all effective. Unfortunately, these classes are frequently conducted in a lackadaisical manner by disinterested officers. Another of the difficulties encountered with these classes has been the lack of interest by senior field grade officers which tends to set a bad example for their juniors.

The Air Force is noted for its men of vision. Of this we can be justly proud. However, don't let us fix so intently on the problems of possible war tomorrow that we fail to correct the actual tragedies of today.

PLANES MAJOR DAMAGE

2 PLANES MINOR DAMAGE

Once is enough!

THE LITTLE THINGS

So THE LITTLE THINGS don't count? They're too trivial to be bothered with, are they? Well, I was a hot rod once, ~~a rodger dodger~~, and the little things weren't important to me either. So I thought! All I did was bring the F-47 in, taxi to the ramp, swing around on one wheel into the parking space, cut the fan, and hop out and head for home.

Sure there were a few little things I'd noticed in the flight that day, and there were a couple of kinks in the controls when I headed on final. Like that right rudder pedal. The adjustment-locking pin must have been worn because you could slam that pedal the whole way to the wall and you couldn't get much control. I sure had to burn some rubber on that right tire to keep straight on the runway.

You're supposed to enter such things on the Form 1A, but it was just a little detail and the crew chief would probably catch it in the morning anyway. Besides I was in a hurry. I wanted to hurry home to the little woman and the kids. So I scribbled OK on the 1A and headed for my car.

Must have been about an hour after lunch the next day when one of the boys walked in and asked me if I'd heard about Joe. Of course I hadn't heard about Joe! I'd been buried behind a stack of paper work all morning and I was just getting started on an afternoon session with the stuff.

I was told that Joe's plane groundlooped and nosed over on him. His arm and nose were broken and he had some cuts and scratches. He was lucky. I was glad it wasn't more serious.

"What caused the accident, do they know?" I asked.

The right rudder pedal gave him trouble, I was told. The adjustment-locking pin must have been worn. He tried to apply right brake to keep the plane straight and the right tire flew off. He started to groundloop and the right wingtip dragged, caught, and cartwheeled him over. An examination showed that the tire tube had been damaged by heat from too much brake sometime before.

"Wait a minute," I said. "What kind of plane did you say it was?" "An F-47, No. ______."

"I guess I did look a little sick. I couldn't tell him that was the same plane I was flying yesterday.

A faulty locking pin. I knew and didn't do anything about it. Just because I was in a hurry, and the little things didn't seem to matter, Joe almost got it. Maybe the guy before me knew too, but maybe the little things didn't bother him either. That could have been me the day before instead of Joe that day.

You may not think those little things count until one of those big things that grow out of little things hits close to home. As for me, ever since that time, even if it's just a scratch on the wrong place in the windshield, it goes on that 1A. Yes sir, that little form gets religious attention before my John Henry goes on the bottom.

WHEN YOU TRANSFER THAT PLANE

BY COL. EDWARD G. KIEHLE
Chief, Maintenance Technical Section
Air Materiel Command

THE TRANSFER of military aircraft from one base to another constitutes only a small part of everyday Air Force operations. However, it should be readily apparent that this transfer of aircraft serves as one of the easiest means for the receiving base to judge the quality of the maintenance work of the shipping unit. Furthermore, the condition of transfer aircraft may well serve as a representative cross-section of the shipping base's maintenance work as a whole.

The fact that many repeated complaints, in the form of Unsatisfactory Reports, have been issued by receiving units does not speak well for the caliber of maintenance work done by the various bases transferring aircraft. The letters, and indorsements to these Unsatisfactory Reports coming through channels have directed that investigations be conducted to determine whether "supervisory personnel are negligent in the performance of their duty," or "to ascertain the reasons for the discrepancies, and provide information as to what action has been taken to prevent a recurrence of this nature."

Such investigations may prove embarrassing not only to the commanding general, but also to the base and unit comanders affected and would not be necessary if full and strict compliance with existing regulations (TO's 00-20A, 00-25-8, and 00-35D-263C) was accomplished. What is required is the realization that much higher standards of maintenance must be met.

Aircraft maintenance personnel and technical inspectors must look at the airplane through the hypercritical eyes of the receiving unit. No good is accomplished by saying that the receiving unit should make allowances for oil flecks and mud collected during the ferry flight, or for oil or coolant leaks that may have started since leaving the shipping unit. It is also foolish to ask "What does the receiving unit expect—a new airplane, or a depot reconditioning job?" The answer is an emphatic "yes" and the shipping unit has to do the best it can to provide it. To stand short in that respect will, if past experience is a guide, result in an acceptance inspection report coldly showing such items as dirty cockpit, leak in wing flap control valve, safety wire broken, etc.

Reports such as this result from only one thing—lax maintenance. Lax maintenance is one thing the Air Force cannot afford for it will ultimately cost men and planes.

There is also the question of professional pride. Technical orders are understandable and sufficiently detailed, and they should be taken seriously and obeyed literally. However, if a strong personal and professional pride and a desire to raise the standards of their work are not present among maintenance and inspection personnel, technical orders will be of little benefit. The fact that the transfer aircraft immediately comes under the scrutiny of the receiving unit marks it as a point from which to judge the maintenance standards of the shipping base and subsequently the particular personnel involved.

It is for this reason that the transfer of aircraft should serve as a good maintenance lesson. For if transfer aircraft maintenance is not up to par, it casts a reflection not only on the shipping unit as a whole, but also on the personnel immediately concerned with the aircraft in particular. If the personnel of the shipping unit put forth their best efforts in the preparation of transfer aircraft, they may give the next base a goal to strive for and at the same time raise the maintenance standards of their base and consequently of the Air Force as a whole.

SPARK PLUGS

and the

MAGIC WAND

ENGINE CONDITIONING—CONTINUED

A LARGE NUMBER of engine malfunctions could be eliminated if more care and precision were exercised in the installation of spark plugs.

First, in the installation procedure it is important that the spark plug bushing be tapped out or cleaned to eliminate carbon accumulation in the threads, particularly at the combustion chamber end of the bushing. If carbon is not removed, excessive torque will be required to seat the plug, which in turn may cause the insulator in the plug to crack. Furthermore, it may cause the points on the plug to close up completely because the nose end of the plug is compressed as the plug is tightened in the bushing.

It is important that a spark plug be given a careful visual inspection to determine that the barrel insulator is clean and not cracked. The terminal at the bottom of the barrel insulator must be free of dirt. The spark plug gaps should be checked to make certain they are set at the specified values. The nose insulator should be clean and free of cracks.

When screwing the spark plug into the bushing, do it by hand until the plug and gasket have seated on the bushing. Then carefully torque the plug to 300-360 pounds.

After the plugs are installed and tightened to the proper torque value, the cigarettes on the ignition leads should be inspected and if black marks which cannot be cleaned off with solvent are found the cigarettes should be replaced.

Another important item is the proper application of DC-4 compound. It should fill the space in the barrel end of the spark plug. The compound is a non-conductor and the possibility of moisture collecting in this area will be eliminated. This is particularly important on airplanes used for high altitude flights to eliminate the possibility of flash-over in the barrel end of the plug.

The cold cylinder indicator, which is called the Magic Wand, should be used after each spark plug installation to insure that all plugs are operating properly and to check other phases of engine operation.

The cold cylinder check is primarily a check of relative temperatures between cylinders while operating on either the right switch position, left switch position, or both. Since maximum engine efficiency is obtained only when all cylinders are operating properly, it can be seen that faulty operation of any cylinder will be reflected by variation in cylinder temperatures. Hence, such things as faulty fuel injection systems, faulty valves, impeller oil seal leakage and intake pipe leakage will be located with the aid of the cold cylinder indicator. Although the magic wand will not tell which of these troubles is present, it will show the cylinder or cylinders which are faulty or borderline in operation, thereby reducing the work required to correct the trouble.

In addition, this check will indicate impending failures which if corrected immediately will result in more efficient and economical operation. Subsequent cold cylinder checks after corrective action has been taken will confirm that the trouble has been eliminated.

The check is normally performed by first running the engine at the roughest speed between 1200 and 1600 rpm with the ignition switch on either the right or left position or both. The engine should be operated at this speed long enough to allow cylinder head temperatures to come up to normal operating temperatures or to stabilize at their highest temperature.

Prior to stopping the engine, the magic wand should be made ready for use and a maintenance stand located near the engine on which the test is to be performed so that the check of relative cylinder temperatures can be accomplished immediately after the engine is stopped. The engine should be stopped by moving the mixture control to the idle cut-off position while the engine is operating at the established speed on the single ignition switch position.

As soon as the engine has stopped rotating the maintenance stand should be moved to the front of the engine to be tested, and the ground clip of the wand attached to some metal portion of the airplane engine or propeller. The tip end of the wand should then be pressed against a boss on the combustion chamber section of the cylinder or in the spark plug recess, whichever is the most convenient.

Starting with cylinder No. 1, the readings should be taken as rapidly as possible, recording the readings obtained for each cylinder. After all cylinders have been checked, one or two cylinders having the highest reading and one or two cylinders having the lowest reading should be re-checked and readings recorded for comparison to establish the rate of engine cooling.

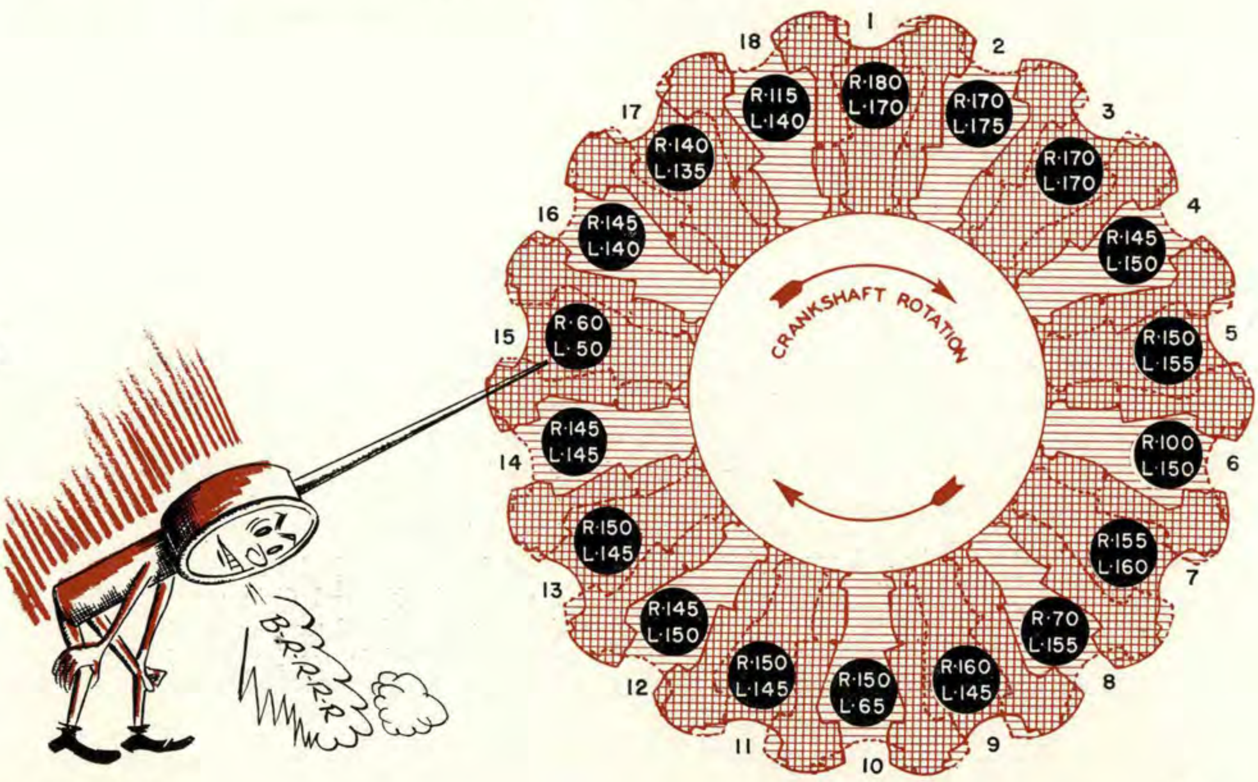
After the readings have been recorded, the engine should then be re-started and run on the other switch position, and temperature readings taken on all cylinders as previously outlined.

For example, the readings taken on an R-3350 engine were as shown on the drawing.

In analyzing the data obtained, it can be seen that cylinders 6 and 18 were intermittent and cylinders 8 and 15 were cold as indicated by the relative temperature on the right switch (front plugs); cylinders 10 and 15 were cold on the left switch (rear plugs). Cylinder 15 was completely inoperative and would have resulted in high manifold pressure reading during a power check and high fuel consumption.

The cylinders which indicated low temperatures had either intermittent firing spark plugs installed or some phase of the cylinder operation was not correct. Unless the cause of faulty operation was corrected, the cylinder on which this condition occurred would soon have beome inoperative, thereby necessitating trouble-shooting or replacement of spark plugs.

From this it can be seen that optimum stability of engine operation is quite dependent upon healthy spark plug operation.



A series of engine conditioning films is being produced, and it is estimated that they will be available by October 1949. This series will consist of five films: (1) Need for Engine Conditioning, (2) Basic Engine Operation, (3) The Cockpit Check, (4) Mechanical Phases of Engine Conditioning, and (5) Pilots' and Flight Crews' Role in Engine Conditioning. The technical shots were made at Castle AFB, California. The mechanics are actually conditioning engines as well as helping to produce a movie. Be on the lookout for the premiere showing of these films!

What Do You Know About Engine Conditioning?

1. Hydraulic lock can always be determined on reciprocating engines at the time it occurs.

T F

2. Hydraulic lock may occur in radial engines on initial engine start even though the engine has been turned with the starter prior to turning on the switches.

T F

3. Manifold pressures higher than those specified may be used for climb and cruise so long as cylinder head temperatures are within limits.

T F

4. When in flight a given RPM and MP is an indication of definite engine power output.

T F

5. Cylinder head temperatures are satisfactory as long as they do not exceed the maximum prescribed temperature as indicated by the red mark on the head temperature gage.

T F

Explanations

1. A partial hydraulic lock can occur which will only bend the rod, hence, the failure does not occur until later. The actual failure may occur as much as 100 hours after the hydraulic lock.

2. Anticorrosion oil can collect in low spots in intake pipes and due to low velocity of the air through intake pipes at cranking speeds, the oil will not be pulled into the cylinder until the engine is started.

3. Manifold pressures higher than those specified for a given RPM result in excessive BMEP which can cause detonation, crushing of piston heads, blowing of cylinders, etc., even though head temperatures are below the maximum allowable.

4. When in flight the propeller governor will shift the blade angle as necessary to maintain the set RPM. Since MP is a result of RPM and carburetor throttle setting, partial or total power loss will be covered up by the propeller governor action; hence it is possible on multi-engine aircraft to show proper manifold pressure and RPM even though an engine is completely dead. This same condition is true at takeoff power. However, in this case the engine must develop sufficient power to obtain takeoff RPM. The increase in manifold pressure after takeoff RPM is reached is a function of increased throttle opening and is, therefore, no assurance of increased power.

5. Maximum cylinder head temperatures are as the name implies and flight personnel should endeavor to keep head temperatures below the maximum prescribed in the interest of safety and increased engine life.

Answers: 1—F, 2—T, 3—F, 4—F, 5—F.

Violation!

THE PICTURES on this page show what can happen to you and your airplane if you try to maintain VFR when IFR conditions prevail along your route.

The weather along this pilot's intended course consisted of a cold front with extreme turbulence and a squall line which he would have to fly through at an angle, thus increasing his time in the squall-line weather.

His course was westerly with headwinds varying to crosswinds at speeds of at least 60 knots. His destination was reporting surface winds up to 40 knots.

After checking the weather, the pilot filed an IFR flight plan, requesting 8000 feet. He climbed into the T-11 with his copilot and crew chief and took off.

En route, the pilot reported to a radio station as being at 8000 feet, IFR. As he neared his destination, he called the radio station and was instructed to maintain 8000 feet and hold from the cone to a point four minutes out on the southwest leg of the range.

Approach Control took over and had considerable difficulty in contacting the T-11 since the airplane carried only a command receiver. Eventually the pilot called and asked to let down through a hole. Approach Control cleared him to let down VFR to below 6000 feet. Then Approach Control came back and asked him his exact location, told him to remain at 5500 feet and advise them when he was over the range station.

About 30 minutes later, the range station established contact wtih the pilot, who advised that he was below all clouds at 1800 feet. The field elevation at his destination was 1200 feet. The pilot advised that he was canceling his IFR flight plan, and immediately afterwards reported that he had 30 gallons of fuel remaining. That was the last radio contact with the T-11.

When the airplane was reported as missing, a visual search of the area was instigated. The wreckage was spotted on the side of a 2600-foot mountain three days later. The crash was fatal to all three occupants.

Evidently the pilot was not sure of his position when he let down on this flight. His desire to get VFR and remain VFR despite reported weather of 800-foot ceiling and four miles' visibility is what killed him.

If there is the slightest possibility of the existence of instrument conditions or even marginal weather, stay on your IFR flight plan, make your letdown and approach according to IFR and you'll be sure to get to your destination even though it may take a few minutes longer.

INSTRUMENT FLIGHT IN CONTACT WEATHER

TUNDRAS, some vast in extent, are common in the arctic regions. When they are covered with deep snow and there is an overcast, the horizon disappears and no ground references exist.

Under such conditions the ceiling may be 10,000 feet and the visibility 50 miles, which in no way meets the ordinary concept of instrument flight. Yet it may be as real as if the flight were being made in an overcast.

Considerable difficulty from this source is experienced in crossing the Greenland ice cap.

Flights should not be attempted under such conditions unless the pilot is qualified to fly on instruments and the plane is properly equipped for that purpose.

DANGER OF ELECTROCUTION

Volunteer rescuers narrowly escaped electrocution while removing airmen from a burning airplane which had crashed through a power line. The broken wires were reenergized while the rescuers were at work and only the fact that they were out of contact at the moment saved their lives.

Investigation developed that it is standard practice for power line operators to reenergize lines upon which overloads, shorts or grounds have tripped the automatic circuit breakers. Broken wires are made lethal at stated intervals by robot control or at will by manual control, and this procedure may continue until the location of the trouble is found.

Immediately after any power line wires have been broken or an airplane is in contact with such wires,

the power line company should be notified of the nature and place of the accident. They will at once cut the current and render the wires harmless. All airmen and all who might assist as crash crews should consider any broken power line wire as "alive" and dangerous until a representative of the power line company gives assurance that it is "dead."

Every base operations should keep up a chart of all adjacent power lines and the telephone numbers to be called in case of accident involving broken wires.

HURRICANES

The safeguarding of aircraft and equipment during a hurricane involves protection from floods and protection from high winds. It is considered good practice to leave a crack in the hangar doors to allow internal and external pressure to equalize more readily.

It is not advisable to fly in the vicinity of a hurricane because of severe turbulence, heavy rain and reduction of visibility, strong winds, and extreme gustiness near the ground during landing.

In flying around a hurricane keep at least 250 miles away from the center and, if possible, fly to the right of the storm to take advantage of tail winds.

ORNITHOPTER

"Let's make like a bird" has long been a favorite Air Force expression. Now it appears that some of us might in the future actually fly in flapping-wing aircraft.

An engineer at AMC, Wright-Patterson AFB, Ohio, has recently designed an ornithopter (mechanical flapping wing bird). It gets the flapping motion of the wings from the principle of resonance.

Resonance, or shimmy as it is known to drivers of autos, is the factor which causes uncontrollable flutter or vibration to develop in the air frames of our present fast airplanes.

The resonance or vibration is originally created in the ornithopter by an unbalanced rotor driven by a rubber band or a tiny motor. Applied to the ornithopter, the vibration is transmitted to the wings via the wing spars of the mechanical bird and sets the wings to flapping in resonance with the rotor.

In practical application the ornithopter might some day be used operationally with more versatility and greater capabilities than the helicopter. Maybe da Vinci had something!

DISTRESS SIGNALS

There are three basic classes of distress signals.

1. *Safety:* Use this procedure when you are uncertain of your position or when you expect an emergency, but when you can proceed or can land at a suitable field with the aid of a ground station.

On CW, use the international safety signal, TTT.

On voice, use the word SECURITY.

The station which answers you will identify itself and request you to transmit for a fix. To do this—

For CW, transmit a 20-second dash followed by your call sign. If your VHF command set has a TONE button, press it for 20 seconds.

For VHF voice, count 1 to 5 and back.

For HF voice, press the microphone button for 20 seconds. Do not transmit on voice during this time.

2. *Urgent* or *Emergency:* Use this procedure when you are in trouble and require immediate navigational aid.

On CW, to call an unknown ground station, use the international urgent signal, XXX. To call a known ground station proceed in the normal way, but use the precedence prosign O.

On voice, call PAN.

Make your call and request your fix or course as you would in the *Safety* procedure. Include in your transmission your estimated position.

3. *Distress:* Use this procedure when you are threatened with serious or imminent damage, and need immediate help.

On CW, use the international distress signal, SOS, in this way: SOS SOS SOS V ABC ABC ABC (20-second dash) ABC K. Listen, and if there is no reply, repeat.

On VHF voice, transmit MAYDAY three times, followed by the call sign of your airplane three times, then press your TONE switch for 20 seconds.

On HF voice, transmit MAYDAY three times, followed by the call sign of your airplane three times, then depress your microphone button for 20 seconds and give your call sign once more.

Remember: Before ditching, turn the IFF EMERGENCY switch ON.

IMPROVE YOUR RADIO RANGE FLYING

By THE FLYING SAFETY COMMITTEE, *USAF Instrument Pilot School*

RADIO NAVIGATION differs little from contact navigation in that following a beam or flying from one fix to another is done in somewhat the same manner as following a railroad or flying from one visual check point to another. The only difference is a substitution of aural signals for visual references or check points. These signals emanate from a network of over 600 stations operated by the CAA, the Air Force and the Navy, and are used in both contact and instrument flying conditions for purposes of navigation and communication.

There are three types of radio ranges in common use in the United States today—the loop type range, the Adcock type range, and the visual aural range. Until the new VHF omnidirectional ranges are in full operation, Air Force pilots will continue to use the four-course aural ranges. The loop type range was the first to be used in this country and a few are still in use today. The Adcock type range was built to overcome the disadvantages of the loop type range—night effect, lack of simultaneous voices and range—and are in use at important air terminals and important airway intersections.

The following information should help you improve your radio range technique.

Interception of an inbound beam leg and an outbound leg are identical. An angle of interception of from 30° to 45° is used regardless of the angle of the airplane's track to the desired beam leg. A 30° angle of interception is normally used at high speed and a 45° angle for low speed. This will increase precision because very little anticipation or lead is required as compared to greater angles of interception. On the other hand, the wind might affect a smaller angle of interception so much that the interception cannot be accomplished, or is delayed excessively. If the distance from the station is unknown, then timing the width of the bi-signal zone will provide an estimate as to the distance from the station. The width of the bi-signal for a 45° angle of interception (with a moderate volume setting) three minutes from the station is approximately three minutes wide.

When the time is less than three minutes, the turn must be started slightly before receiving the on-course to prevent passing through the beam into the opposite quadrant. This, of course, varies with volume control. As soon as the last "N" or "A" signal is heard, or both station identification signals are equal, the airplane is turned to roll out precisely on a predetermined directional gyro heading. If the wind is unknown, the turn is to the published beam heading corrected for compass error. During this turn, the aural signal is momentarily ignored. As soon as the wings are level the aural signal is again closely monitored to determine the position of the airplane relative to the beam.

Beam following is nothing more than controlling the magnetic heading of the airplane by interpreting the aural signal, and if off the beam, correcting the heading of the airplane to intercept it. The airplane leaves the beam because of improper compass heading or a cross wind. The first can be eliminated by frequently synchronizing the directional gyro with the magnetic compass and then accurately flying the gyro heading. A cross wind is a little more difficult to counteract. The winds aloft report for the particular cruising altitude is used as the basis for initial correction and planning, but winds are sometimes unpredictable. The rule to remember is that a 30° correction is sufficient to counteract a cross wind of one-half the true airspeed of the airplane.

During the initial interception of a range course, if the wind is known, the airplane is turned to the beam heading corrected for the wind. If the wind is unknown, the turn is made to the published beam heading. After the turn is completed the radio signal is closely monitored and interpreted in respect to the on-course signal. The position of the "N" and "A" quadrants relative to the on-course must be memorized so that corrective turns in the proper direction can be made as soon as the first off-course signal is recognized. If the signal indicates that the airplane overshot or undershot the beam during the intercepting turn, the airplane is turned to a new heading which will place the plane on the beam. This correction should be substantial in order to get back on-course as soon as possible. In low-speed airplanes (TAS up to 250 mph) the initial correction is from 30° to 40°, and at high speeds (TAS over 250 mph) it is from 20° to 30°. After applying the correction, close interpretation of the signal is necessary to observe the results. The signal should indicate that the beam is being approached; if not, excessive winds are present and additional correction is necessary. As soon as the on-course is heard, the airplane is again turned to either the published beam heading or the heading which will counteract the known wind.

If after the initial turn to the beam heading the signal indicates the airplane is on the beam, the heading is held constant, and as long as the on-course is received no change in heading is made. The first off-course signal indicates the direction in which the wind is drifting the plane. Normally, if the wind velocity is unknown the amount of the first correction is the same as the one described in the example of overshooting or undershooting in the preceding paragraph. This correction is applied into the wind when the first off-course signal is recognized, and the time required to re-enter the on-course provides an estimate of the velocity of the wind. As soon as the on-course is received the airplane is turned toward the beam heading. The roll-out is stopped short of the published beam heading the number of degrees which is estimated to counteract the wind drift. For example, a pilot following an inbound beam of 90° observes that the wind is from the right, and estimating that 5° should be allowed for the wind, would roll out on a heading of 95° after re-entering the on-course.

This new heading is maintained until the signal again indicates an off-course position.

If the on-course was heard for a comparatively long time, only a small increase in drift correction is needed to stay on the beam, once the beam is re-entered. On the other hand, if the original correction carried the airplane into the upwind bi-signal zone it is apparent that the drift correction was too large. The plane is then turned to the published beam heading or a few degrees beyond to allow the wind to drift the plane back to the beam. As soon as the on-course is recognized a turn is made to a heading which will decrease the original drift correction a few degrees. The size of each correction is systematically reduced until finally a change in heading of not more than 5° is required to return to the on-course. Near the station the beam is very narrow and no bi-signal can be heard. An off-course is indicated by a clear "A" or "N" signal.

Beam following, similar to all instrument maneuvers, requires the coordinated use of the controls to insure coordinated bank. Slipping or skidding the airplane to effect changes in heading is very poor technique and precludes precise beam following.

During the approach to the station the volume will build at an ever increasing rate, and the volume control is adjusted to counteract this build. A constant volume is necessary. The frequency of volume adjustment indicates the proximity to the station and is a valuable aid in anticipating station passage.

In weather which allows clear reception of the radio range signal there is very little difficulty in recognizing station passage, but when atmospheric conditions produce disturbances such as static, recognition becomes difficult. Recognition of station passage and the techniques employed when static distorts reception will be discussed in a future article. This article will also discuss holding, stacking, procedure turns, letdowns and low approaches.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

COMMUNITY ASSIST

An idea that we found practicable at Otis AFB, Massachusetts, may pay off handsomely some day. The CO at Otis invited the fire departments and police forces from the surrounding towns to attend a crash and fire fighting school. Our base fire chief was appointed professor of crash fire fighting.

How to unhook a safety belt, unhook and remove a parachute, identify and operate battery and ignition switches and fuel selector valves were covered. Also included in the instructions were the operation of escape hatches and the proper method for cutting aircraft structures. All of the visiting firemen and gendarmes were very much impressed by the course. They literally ate up the professor's smoke.

After the course, one fire department went as far as procuring the recommended type of spray nozzles for its equipment.

It has often been said that the occupants of a burning airplane can be considered medium to well done if not removed from the wreck within the first few minutes after the fire breaks out. We feel that our school may some day mean the saving of a life when hook and ladder No. 99 loaded with graduates pulls up to the wreckage and begins a well-organized rescue.

Capt. Duke P. Martin
Otis Air Force Base
Cape Cod, Massachusetts

THE HARD HAT

The pilot training school at Williams AFB has for a long time sought to equip its instructors and students with protective clothing and equipment designed to minimize the hazards of the type of flying involved. In this respect, emphasis has been placed on the use of the P-1 protective helmet for high-speed fighters.

The value of protective headgear is evidenced by the innumerable times the P-1 helmet has been useful in saving lives and averting serious injury during the last six months at this base. In one instance a fighter plane collided with the ground at approximately 400 mph. The pilot lived and it was definitely established that the helmet had saved his life. Again, another pilot flew into the ground while turning on final, and his head smashed into the instrument panel. The gyro caging knob imbedded itself into the P-1 but not his head; he lived too. In another instance, a canopy disintegrated in high-speed flight and the pieces struck and tore the P-1 but did not injure the pilot.

The protective helmet has been a factor in averting accidents that might have been caused by violent and severe buffeting. Rough air can cause a pilot's head to strike the canopy with sledgehammer force.

It has been found that fighter pilots who wear a hard helmet enjoy higher safety morale and self-assurance.

Capt. Roy A. Barnes, Jr., USAF
Flying Safety Officer
Williams AFB, Arizona

HELP WANTED

Recently published AF Letter 50-49 pertains to refresher flying training. This letter prescribes a supervised refresher flying training program for currently rated pilots who, after being separated from the service for a considerable period of time, are commissioned in the Regular Air Force or are ordered to extended active duty with the Air Force.

It is the responsibility of the commanding generals, major air commands, to establish a program within their commands designed to qualify such officers to perform their flying duties safely and efficiently. It further states that the program itself should be reviewed periodically to insure that it accomplishes the desired results.

The sound reasoning of such a program is readily apparent, for the pilot who has long been absent from behind the controls will not be as safe and proficient as one who has been continuously engaged in the flying business.

FLYING SAFETY Magazine will welcome a story from any command or base that has established an efficient and workable program of such nature. The story could then be passed on to serve as a help and guide to others.

MITCHEL AFB TESTS SAFETY BELTS

After numerous complaints had been received from pilots concerning the inadequacies of the safety belts in the pilot's compartment of C-47's and C-45's, actual tests were made at Mitchel Air Force Base to determine the validity of these gripes.

Using the largest and smallest airmen available, it was determined that both types of men can be comfortably fitted with B-14 safety belts (44½ inches in length), although if parachutes are worn the large man must remove the seat cushions. In the course of the test, it was also found that certain airplanes were equipped with the long type safety belts (51 inches). This belt is fine for the large man, but the small man must be supplied with extra cushions if he is to be safely harnessed.

Mitchel Air Force Base is now standardizing all safety belts, and the long type belts will soon be replaced by the B-14 type in C-45 and C-47 airplanes.

Flying with a loose safety belt is asking for it, so check all safety belts—especially the one you are wearing.

DITCHING DUTIES

Because of the type and geographical location of the 23d Recon. Sq. on Okinawa, the major portion of our flying has been over water in B-29 airplanes. This has resulted in concentration on correct ditching procedures and positions in an attempt to make certain that all crews are well trained in this particular phase of flying safety.

To assist flight personnel in learning their ditching positions and serve as a handy reference, ditching position placards were prepared from TO-AN-01-20-EJA-1 and installed near each normal duty position for each individual crew member.

Another detail was developed as the result of flying different crew combinations including extra pilots, navigators, engineers and others who are not regular crew members. Since it is definitely considered a safety measure to have a ditching position assigned to each person flying in the airplane and because practically each flight resulted in a different crew combination, it was decided that there was a need for a method of assuring that individual ditching positions were assigned prior to takeoff for each flight.

To take care of this, a diagram of a B-29 was prepared showing each ditching position with spaces provided for each crew member's name so that the positions could be written in by the airplane commander prior to the flight. For convenience, this diagram was placed on the reverse side of the loading list.

These two procedures have been very successful in our organization and it is quite possible that other organizations may be able to use them or adapt them to crash-landing procedures, depending on their location and the type of flying done.

CAPT. HENRY J. WALSH, USAF
Flying Safety Officer
23d Recon. Sq. (VLR) Photo

OFF TO THE RACES

This is the story of a T-6 instructor pilot who started out on a cross-country flight with all the best intentions of complying with AF Reg. 60-2, but wound up going to the horse races.

While following a light line at night, the pilot started to panic when the lights of a large city near his destination failed to appear on the horizon. After his ETA had run out, he attempted to tune the command receiver to the radio range station at his destination, but found his receiver was inoperative.

Starting with "A" channel, he began screaming "Hey Rube." By the time he got around to punching "H" channel a GCA controller heard the commotion and attempted to pick up the now completely lost T-6 on his search scope. There were many unidentified aircraft in the area so GCA was unable to identify the T-6 in the scope.

After approximately an hour and 30 minutes of wandering, the pilot told the GCA controller that he was over a race track and requested that GCA get him the name of the race track he was circling over. The GCA operator called his control tower operator who in turn picked up the nearest phone and called the sports editor of the local gazette. The tower operator queried ye olde ed as to what track was open for business that night. The sports editor checked his dope sheet and replied that a track 60 miles from town was the only one at which the hay burners were running—or walking—on that particular evening.

The tower operator gave the word to GCA, who in turn informed the pilot of his position and gave him a steer from the race track to his destination.

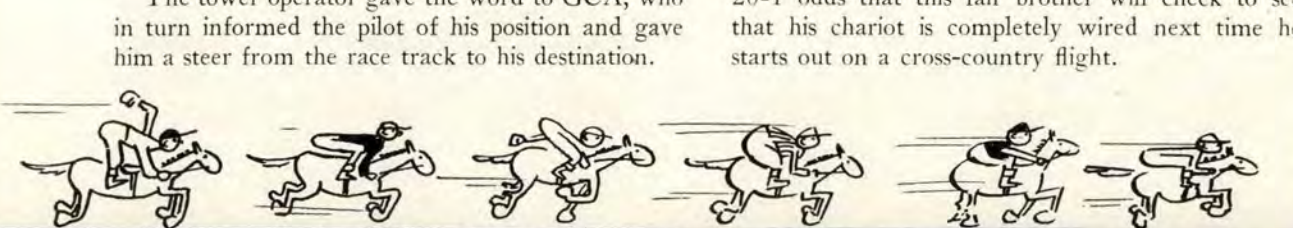
The pilot replied that he would be only too happy to go on to his destination where his dear old mother was waiting on the ramp, but since he now had only five gallons of fuel remaining, he requested GCA to contact the race track operator for permission to land the T-6 in the infield of the track.

Interest in the races was suspended temporarily while the pilot dragged the field, circled once more, dropped his gear, turned into the home stretch and made a perfect landing with tanks indicating zero, marred only by the fact that some short-sighted individual planted a flagpole near the end of the landing roll.

The right wing was more than somewhat dented when it collided with the pole.

The pilot was invited to watch the remainder of the races as a guest of the track. He was introduced to the crowd over the public address system. They gave him a big hand for bringing that airplane in on a "wing and a prayer." The pilot, however, did not enjoy his first night of watching the bangtails run. All he could think of was "What will my CO say when he hears about this?"

The T-6 was hauled away on a truck to the nearest Air Force base where a new wing was installed. The primary cause of this accident was the faulty installation of the command set antenna. It was not connected to the receiver but only from the vertical fin to the antenna mast. We'll give you 20-1 odds that this fair brother will check to see that his chariot is completely wired next time he starts out on a cross-country flight.



WHY?

THE PILOT of this F-51 called the tower for landing instructions and was told to land on runway 28 which is 4275 by 375 feet.

Wind at the time was 10 to 15 mph from the northwest. So the pilot requested to use runway 32; the request was denied because 32 was closed for repairs.

His approach was then made to runway 28 with power on and full flaps. He touched down barely within the first third on the right main gear at about 120 mph with approximately 18 inches of power on. The F-51 skipped and ballooned, so the pilot added power to ease it back down. This time the plane settled on both main gears and bounced about four feet into the air.

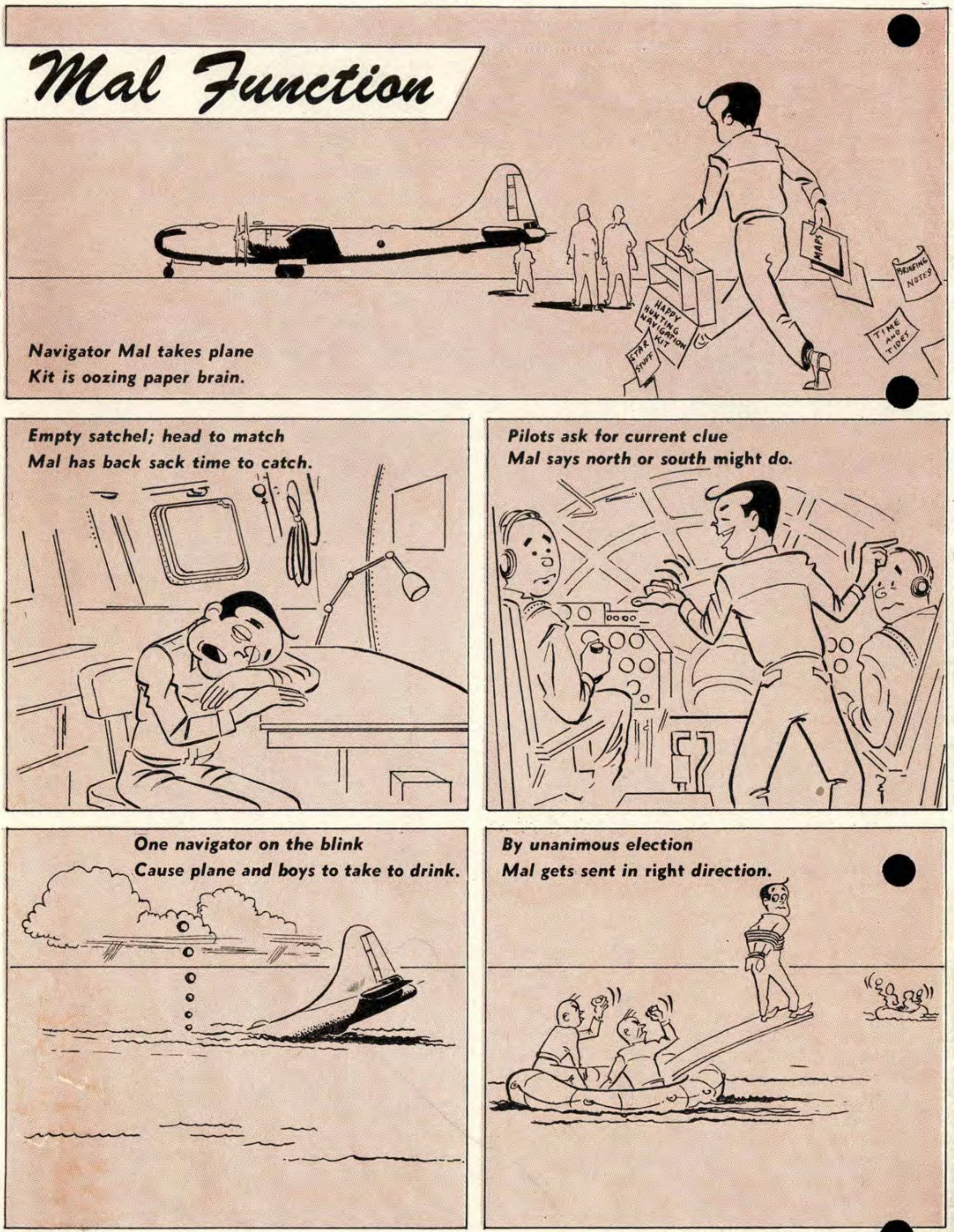
After this bounce the pilot poured the coal to her for a go-around. As he shoved the throttle forward to 40 inches of manifold pressure old man TORQUE jumped in the seat, took over, and violently turned the plane to the left. The result was a groundloop off the runway through a couple of ditches. The F-51 ended up with major damage to the left and right wings, sheared main gears, major damage to the fuselage plus a wrecked propeller.

The pilot was uninjured and later stated that he elected to use full flaps despite the crosswind because of the short length of the runway (4275 feet). Why?

In addition he landed fairly long on what he considered a short runway, applied power suddenly and then was unable to control the torque. Why?

Yet the pilot was considered thoroughly checked out in the F-51 because he had *four* hours.

Why?



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PHYSICAL ORIGINAL PAGES

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