Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED

NOVEMBER 1948

RESTRICTED

THE COVER PICTURE

The first few trips into Tempelhof are uneasy ones for the new Operations Vittles pilot. Buildings loom up on each end of the runways. The GCA approach is at 750 feet per minute or an angle of four degrees. The buildings are cleared by 75 to 100 feet, and the GCA operators are extremely conscious of the pilot's desire to keep plenty of altitude. After a few GCA approaches, however, the pilots learn to rely on the GCA operators and fly their letdown as instructed. The glide path intersects the runway 500 feet from the end instead of the usual 1,000 feet used on average runways. A new runway, recently constructed with equipment flown in, measures 6,150 feet and has a slightly clearer approach than the one on which 11,000 landings were made during one month of airlift operations.

The cover picture shows a C-54 of the Airlift Task Force coming in for a landing at the proper glide path.

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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. Mail direct to the Editor, FLYING SAFETY Magazine, Inspector General, First Region, Langley Air Force Base, Langley Field, Virginia.

FLYING SAFETY

Volume 4 No. 11 **November 1948**

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

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IN COURT THEY'D CALL IT MANSLAUGHTER

THE MOST VALUABLE ASSET the Air Force possesses is the lives of its air crewmen and the men and women behind the planes.

In order to guard the lives of personnel who fly the vast reaches of several oceans the Air Force spares no expense to equip planes with adequate survival equipment. But the best survival equipment man can devise is useless if it is blown to pieces upon release when a plane goes down in the water.

When you face the brutal facts that men have died after a successful water landing because life rafts were improperly maintained and installed you find only one word for it. In court they call it manslaughter.

Unfortunately, people working on survival equipment rarely see the end results of their work. Parachutes, life rafts, survival kits, life vests, etc., make thousands of trips and are never called into use. This routine of normal activity is about the only result any personal equipment worker ever sees of his job — the stuff rides along, unused.

But when the emergency arises this equipment that has ridden "routine" suddenly means life or death. If personal equipment people have slighted their responsibility, men die.

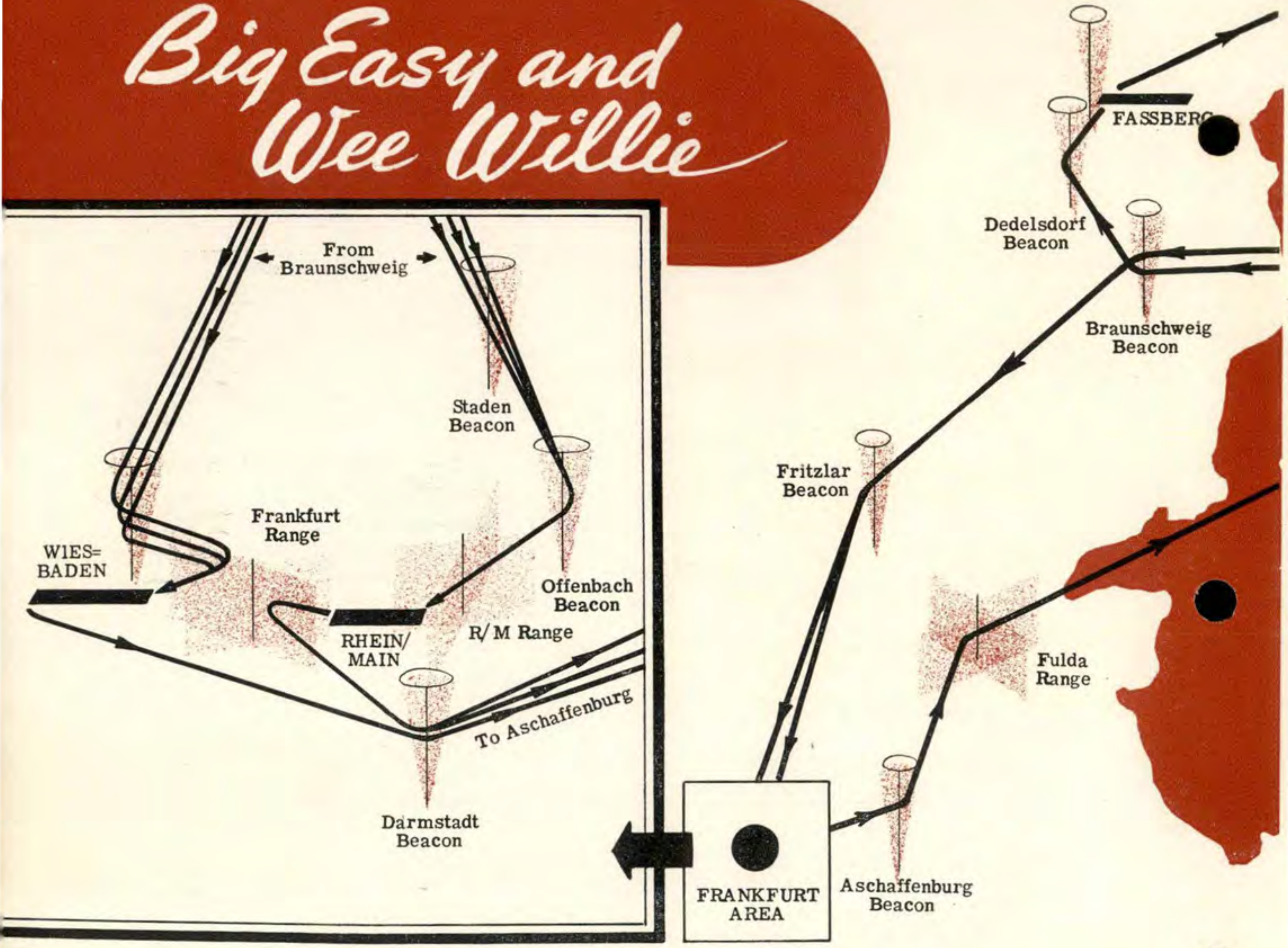
Inspections of emergency equipment this past summer disclosed life rafts at a Pacific base were installed in airplanes in such a manner that they would be destroyed upon ejection. At scattered bases over the world raft equipment was found incomplete, leaking water cans had caused bad deterioration of some rafts, cylinders of carbon dioxide were found improperly secured to rafts. Several cases were observed where a shift in the position of the CO_2 bottle would cause its release and eject the raft in flight.

It was found that trial releases of life rafts were not being made every six months as required by regulations. Lift vest equipment was incomplete, vests were not checked daily by users, some life rafts were installed so they would eject upside down. One-man rafts were being inspected every six months instead of every 30 days as required by tech orders. Inspections also found that some parachute personnel were lax in performing complete maintenance inspections in detail.

In the interest of safety, every airplane in the Air Force equipped with life rafts should be tested by actually releasing and expelling of the rafts with the actuating mechanism in the plane. Organizations receiving new planes with raft compartments should make a release check on the first raft installation. All equipment designed to save lives in an emergency should receive the very best possible care.

If you pack or inspect a parachute, handle that chute as though your own brother or son would have to trust his life in it tomorrow. If you work on personal equipment, check, maintain and install each item of emergency equipment as though your life would depend on its proper operation. If you fly and depend on other people for the proper functioning of emergency equipment find out for sure how much your life is worth to them, make sure the survival equipment you carry is dependable.

Big Easy and Wee Willie



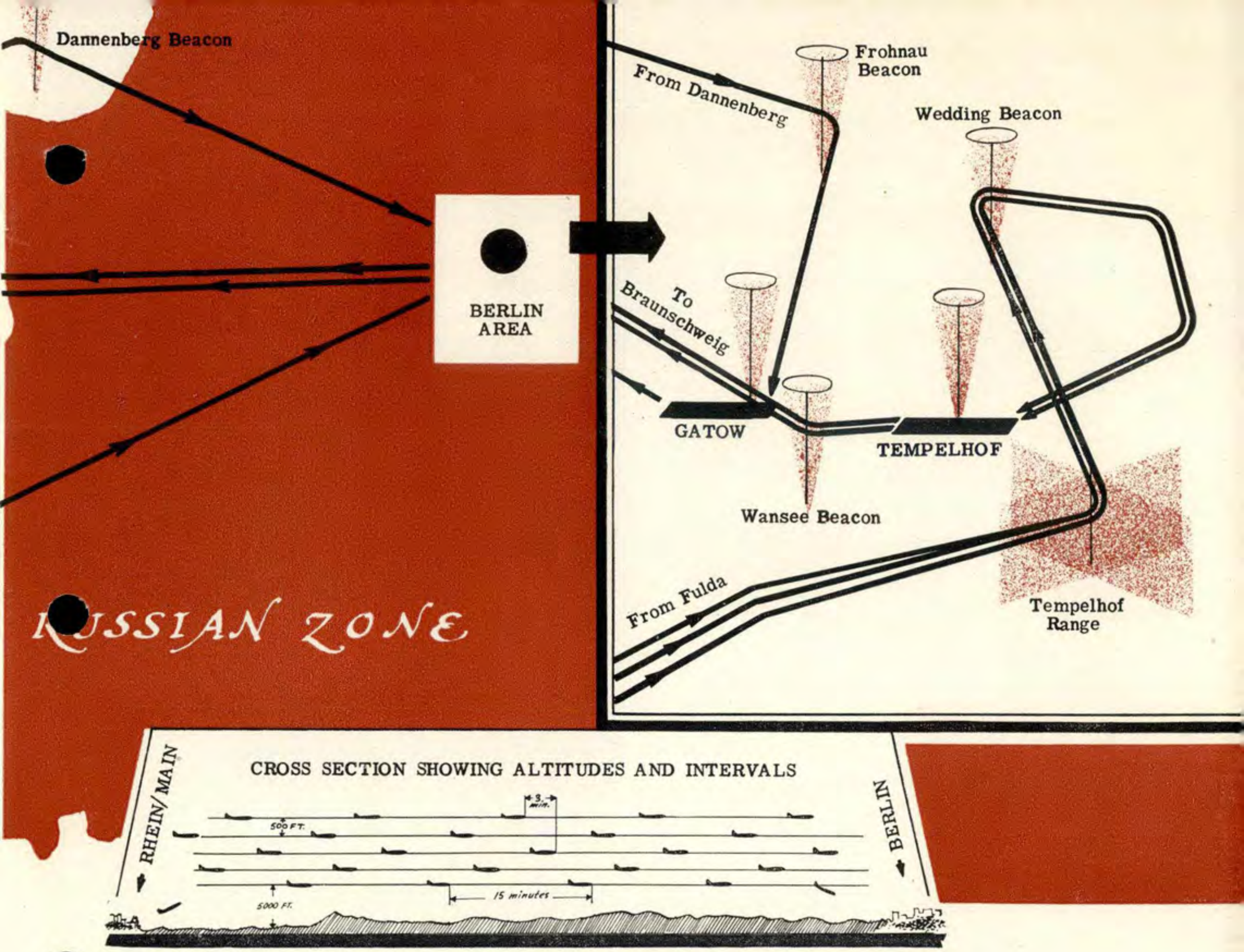
By CAPT. HOMER P. ANDERSEN
Flying Safety Staff

EDITOR'S NOTE: *This is the first of two articles on Operation Vittles written in Germany. A second story on the terrific maintenance job being done on "Vittles" will appear in the December issue.*

TO DELIVER COAL to Berlin in a C-54 you have to meet more rigid pilot requirements than the CAA demands of airline pilots. The reason is that the United States Air Force in Europe knows the only way it can keep the isolated city supplied is to do it safely. Although "Operation Vittles" has all the urgency of a wartime mission, safety and simplicity of procedure offer the only solution to the problem of overcoming the difficulty of limited air space.

The United States Air Force in Europe, commanded by Lt. General Curtis E. LeMay, had two groups of transport planes — C-47's of the 60th and 61st Troop Carrier — before the airlift began. The pilots were flying missions to many points in Europe and the Mediterranean, and flights to Tempelhof AFB in Berlin were routine. They were not in the freight-carrying business, but performed such special missions as liaison, as couriers carrying military and government officials on business, and they carried some cargo not desired to be shipped by rail.

When the blockade of Berlin was clamped on, 9,000 Americans and more than two and a half million Germans and Allies were faced with the prospect of slow starvation or evacuation from the



city. Within a few hours, the USAFE pulled in the C-47's from all parts of Europe and organized the airlift. A total of 80 tons of food were carried the first day, June 26, by these transports. As the battle of logistics got underway, the entire command was combed for pilots. Men from headquarters left their desks to help fly the C-47's, some pilots flying two missions a day without a break for two to three weeks.

The first month was almost 30 days of continuous bad weather. Yet the airlift gained momentum. By August 1, "Operation Vittles" was carrying 2,000 tons daily despite the bad weather.

A solid foundation had been established by the C-47 crews flying their hearts out in war-weary planes. But there was too little airspace to accommodate 899 C-47's (making four trips a day) needed to haul the required tonnage, even had that number of planes been available, so the C-47 pioneers were joined and one group replaced, by squadrons of C-54's from as far away as Tokyo, Hawaii, Alaska and the Caribbean. The combined USAF planes in Germany for "Operation Vittles" were designated as the Airlift Task Force.

In September the Airlift broke tonnage records almost daily, reaching a climax on Air Force Day when 652 flights were made by USAF planes carrying 5,582 tons despite bad weather. In addition, the British made 244 flights carrying 1,405 tons. Out of the Frankfurt area two groups of C-54's and one group of C-47's had a loaded plane arriving at Tempelhof every three and a third minutes, while one group of C-54's operated with the British Yorks and Dakotas in the Northwest corridor at even closer intervals. Thus a plane was heading for either of the two Berlin fields, Tempelhof or Gatow, about every minute and a half.

The development of such an aerial freight line was not a haphazard growth of shuttle-plane operation, but a combining of the versatile abilities of USAF pilots with the experience of air traffic control personnel to avoid jams in the airlift pipeline.

Figures can best illustrate the sudden growth of the traffic problem as the airlift began. Frankfurt Air Traffic Control, operated by the 5th AACS Wing, was handling 548 U. S. Military IFR flights in the week in June before the lift. After the first full week of "Operation Vittles," U. S. Military IFR flights climbed to the figure of 2,234. That was only a starter for the AACS men, however, for in the week ending 4 September, Frankfurt Air Traffic Control cleared 4,647 Air Force IFR flights.

Frankfurt Airways was fairly busy with 6,000 voice contacts per month prior to the airlift. Now 24,000 voice contacts is an average figure. While there is eight times as much traffic in the area, the system has been simplified so that there are only four times as many voice contacts between pilots and airways.

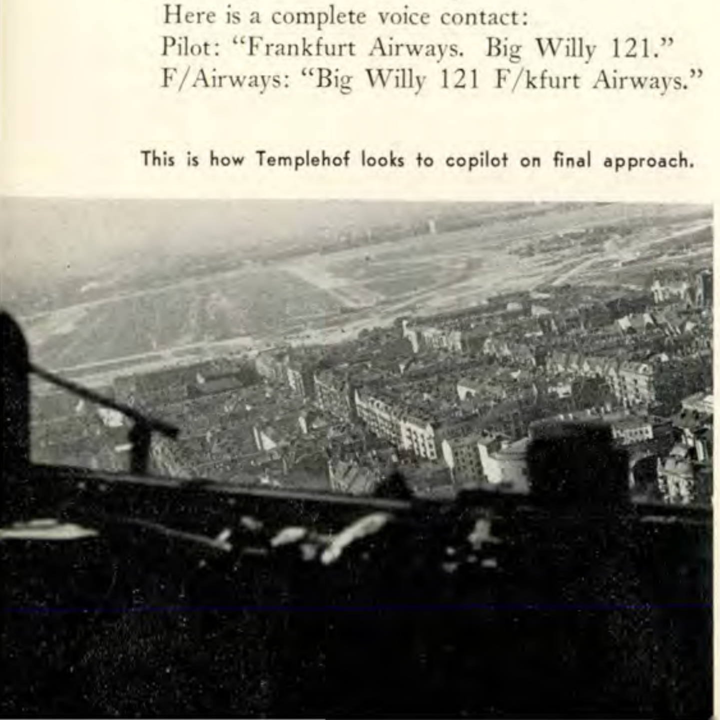
There would be unending screech and chatter over the air if pilots and traffic control men had not simplified radio procedure. The system starts out by using easy-to-remember and understandable voice procedures. A C-54 plane flying east en route to Berlin is "Big Easy 202," or whatever the serial number may be. On the return trip west the C-54 is "Big Willy 202." The C-47 pilots flying east call in as "Little Easy —" and on the return trip "Little Willy —" which most crews have changed to "Wee Willy."

Here is a complete voice contact:

Pilot: "Frankfurt Airways. Big Willy 121."

F/Airways: "Big Willy 121 F/kfurt Airways."

This is how Templehof looks to copilot on final approach.



Pilot: "Big Willy 121 over Fritzlar 5,000 at 48."

F/Airways: "Frankfurt ATC clears Big Willy 121 to descend to 4,000 immediately. Call Frankfurt Airways when over Staden."

Frankfurt Airways knows upon receiving the call that the plane is a C-54 returning to Rhein/Main from Berlin on the airlift. They know the airspeed and the plane's ETA over Staden, because every pilot has been briefed and checked to the point that the standard pattern of operation does not vary. Every pilot flies the same pattern to and from either Rhein/Main, Fassberg, or Wiesbaden every trip, and every trip is by instrument flight rules.

Little Easy always flies to Berlin at 150 miles per hour. Wee Willy always returns at 160 mph. All altimeter settings for a given block or flow of airplanes is from the same source, and pilots hold altitude and airspeed as close to those assigned as is humanly possible. And with the pilots of the Airlift Task Force "close" is not within 100 feet on the altimeter or 5 miles on the airspeed indicator, but right on the money. Pilots know they have a safe interval and spacing when they stick to the standard plan, to deviate then would be reckless.

Precision flying and sweep-second timing have become synonyms for "Operation Vittles" in the glossary of Airlift Task Force pilots. Safety factors are guarded by a strict check pilot system, the high experience level of pilots, continuous briefing and training, and close supervision. Airlift Task Force Headquarters and Headquarters USAFE are not paper mills for "Operation Vittles." Every man responsible for planning or making changes in the operation personally has flown the airlift.

The check pilot system is responsible for holding pilot skill at a high point. Check pilots are selected at group and squadron level, and rotate their rides with crews continually. If a pilot does not fly with the exactness demanded, he makes the next trip as copilot or not at all.

During the early "barnstorming" days of the project, to avoid dangerous fatigue, a maximum of 110 hours flying time in any one month was allowed airlift pilots. Flight surgeons are in constant attendance to keep crews in good physical shape.

The average C-54 pilot on the airlift has 3,000 hours, many more than the 1,500 required before he can fly the corridors. Before he can check out as C-54 airplane commander he must pass an examination covering every phase of C-54 operation. In addition he must know everything about the

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route to and from Berlin, the main check points, terrain, communications facilities, radio ranges and radio beacons, minimum instrument altitudes and traffic control, and approach control procedures on the main route and alternate routes.

He can miss no detail about main and alternate airfields, including their elevation, length and type of runways, surrounding terrain, and obstructions including the location of numerous smoke stacks and church steeples in Berlin.

After he has performed a satisfactory flight check, including three landings in darkness, and has evidence of at least 75 hours of first-pilot instrument time, he is ready to make four qualifying flights to Berlin as pilot or copilot to determine if he has learned the details of the route. After he is checked out there is little chance for him to relax into complacency, for there are frequent spot checks and line checks to see if he is still holding to the standards taught.

Copilots in both C-54 and C-47 airplanes on the Berlin run must have 400 hours total time to their credit. In addition, the would-be C-54 copilot is required to have at least 200 hours in C-47 airplanes or in any four-engined airplane and make four trips to Berlin as third pilot. Copilots are given oral exams on the type of plane they will fly and must pass a blindfold cockpit check.

As a result of these rigid qualifications, the airlift is operating with crews of the highest qualifications. The four-engine pilot requirements for the airlift are higher than those required by the CAA for scheduled air carriers, while twin-engine pilot requirements are higher than those established for domestic non-scheduled carriers.

Although the flights are all IFR, each pilot does not file a Form 23. Nor does he sit on the end of the runway waiting for air traffic control clearance. All pilots of a particular block of planes are given a mass briefing within an hour of the time the first plane is scheduled off. Each pilot is handed a flight plan showing course headings for each leg based on latest winds aloft and elapsed time intervals or ETA's from point to point along the route.

Out on the field the planes are lined up on the taxistrips or on hardstands in the proposed order of takeoff. When it is the pilot's turn to taxi to the runway he asks the tower for takeoff instructions and the tower, acting as representative for air traffic control, clears him and assigns an altitude.

The first plane off at Wiesbaden, for example, will be assigned to cruise the corridor at 5,000 feet.

Pilots are briefed daily on procedures in corridors.

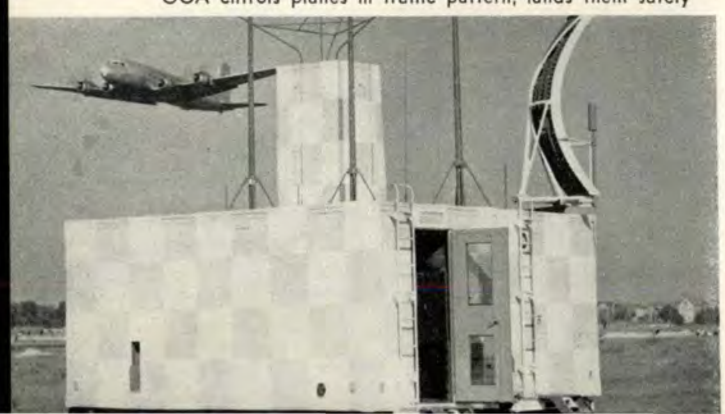
Day and night, without a letup, planes unload at Berlin.

Pilots munch sandwiches as Ops gives return trip data.

Control tower at Templehof is one of world's busiest.

Air Traffic Control guards spacing of planes in corridor.

GCA cntrols planes in traffic pattern, lands them safely



The tower will assign the next 6,000 feet, the third plane 7,000 feet. The second three airplanes off are assigned to 5,500, 6,500 and 7,500 respectively, and the system is then repeated with every sixth plane at the same altitude until the complete block of 40 or more planes is airborne at three-minute intervals.

C-54 and C-47 type airplanes are not mixed in the corridors. A block of C-47's take off from Wiesbaden so as to arrive at Tempelhof after the last C-54 has arrived from Rhein/Main.

When the planes take off at three-minute intervals, spacing in the corridor is then 15 minutes between planes at the same level. Differences in altitudes, slight margins of human error and calibration of instruments sometimes result in planes arriving over their destination a few minutes ahead or behind their proper place. Stacking is held to a minimum, however, and if an approach is missed the pilot will be directed to return to his original point of departure or if there are no other planes holding he may be diverted to a beacon to hold at a designated altitude.

GCA units are in operation 24 hours a day whether or not the field conditions are IFR. Even if cleared to the tower from the range or beacon by VFR, the pilot flies the same pattern he would use if working GCA. Seven GCA units are currently in operation for the Airlift Task Force, the latest of which is a new airtransportable unit flown from the U. S. and set up at Tempelhof. GCA has proved itself as a routine landing facility and as the approach control, capable of handling four planes at a time.

When a transport plane lands at Tempelhof the pilot is directed by a follow-me-jeep to a place in the line of planes unloading on the wide circular ramp. There the crew is met by an operations officer and weatherman, and briefed on the return route. Unloading is accomplished in a few minutes (fastest time to unload 10 tons off a C-54 is seven minutes) and the mobile snack bar pulls up to the plane. By the time the plane is unloaded the pilots have been briefed, fed and are ready to start up their engines and taxi into position for takeoff back to Rhein/Main or Wiesbaden for another load. The same quick handling goes on at Gatow, the British airfield in Berlin where the air task force C-54's unload coal from Fassberg.

The versatility of USAF pilots, traffic control men, maintenance personnel and commanders has made possible the safe operation of this unprecedented airlift.

THE WHITE KING STIRS

A FIERCE OLD MONARCH with frosty breath and hoary beard is peering down across the northern hemisphere from his throne atop the polar ice cap this month preparing for his annual pilgrimage south. Already the rumbling stir of his coming is evident in the northern states, in Alaska and in northern Europe as chill winds sift the fallen leaves and thrash the naked tree branches to herald the approach of their king.

On Air Force flight lines around the world engines start a little more reluctantly and warm up a bit more slowly, and winter flying jackets, rumpled and smelling of mothballs, are appearing more and more frequently. Weather observers and forecasters are watching freezing levels more closely now, and air installations men are looking to their winter equipment. Before many days King Winter will mount his southern dias to pass relentless judgment on transgressors of his winter flying code.

Each winter Air Force pilots must pass his bar of frigid justice. Each winter finds new members in the legion of pilots who calmly, confidently face the trials and added flying hazards tossed in their path by King Winter and go on their merry way. But each winter a few men die because they are ignorant or careless or heedless of the tribute the White King demands. It's a simple tribute — the pilot must recognize Winter's authority and dangers and must apply the correct techniques to meet them safely.

Last winter a C-45 pilot began a flight by failing to recognize one of the White King's first statutes, that winter weather means more instrument flying. This pilot was so reluctant to fly instruments, even 500 on top, he elected rather to attempt a wheels-down forced landing in a small field. That's his plane nestled in the snow at the foot of the rock bluff. Here's his story.

He cleared VFR from an eastern air base to a base 500 miles away beyond the Appalachian Mountains. This route was quite a bit out of his way, but he took it to avoid having to fly 500 on top part of his route to the place he really wanted to go. He had been briefed by weather to avoid the scattered snow showers he would encounter beyond the mountains.

About a hundred miles from his destination the pilot began to encounter these snow showers, let down to 2,000 feet and began threading his way through them. The ceiling lowered gradually, forcing him lower, and visibility decreased in light snow. In order to stay contact he was forced on down to 1,000 feet and was unable to raise any radio station on his VHF set to get weather information. He flew about for some time with lowering ceiling and visibility, keeping an eye on several small fields while he attempted to establish some sort of radio contact.

Finally, his gas supply too low to climb out on instruments and proceed to his destination on top, he elected to make an emergency landing in a small field. He put his wheels down in the hope that he could keep from damaging the plane, and came in

at 100 miles per hour. He bounced all the way across his 2,000-foot field, jumped a fence and crashed against the hill, damaging the plane beyond economical repair. No one questions the pilot's prerogative to elect an emergency landing when his fuel supply ran low, but his absolute refusal to fly instruments long enough to get out on top of the overcast while he still had plenty of fuel resulted in an investigation board's recommendation for evaluation board proceedings.

In the C-47 crash pictured here two men died when the plane struck a micro-wave unit after it stalled out one half mile from the end of the runway on final approach. The pilot departed from a northeastern air base for a destination 200 miles south. He had no de-icer boots and had been warned by the forecaster that the entire area around his destination would be affected by freezing rain and sleet. The flight proceeded to within 20 or 30 miles from destination where severe icing was encountered in freezing rain.

The pilot called the range station and advised that he was icing up rapidly and was not certain how far out he was. The station instructed the pilot to climb up to 5,000 feet where an inversion would be found, but the pilot declined to attempt this because he was already losing altitude at 200 feet per minute at normal power settings. The pilot then received a DF heading from his destination and was almost immediately picked up by GCA and put on a base leg. At this time he was descending 500 feet per minute with 2,400 rpm and 39 inches of manifold pressure. He was put on the final eight miles out at 2,000 feet and flew a good GCA approach until he put wheels down about three miles out. He stalled out half a mile short of the field and crashed.

This pilot ignored a basic winter flying rule by tackling a severe icing condition with no de-icing equipment. As a result two men died.

There are others on King Winter's list of transgressors who paid the penalty last winter. The mass of wreckage in the clump of trees behind the snowbank is what was left of a C-45 abandoned by a pilot and his engineer after they flew several hours on instruments at night while on a VFR clearance trying to orient themselves near their destination. Weather forecasters were partly to blame for getting the pilot into the predicament because VFR weather was forecast for the flight with light snow showers along the route. However, the pilot should have turned back and made a VFR landing when he was unable to obtain a change in flight plan by radio after IFR conditions were encountered.

A navigator passenger and a pilot with only 66 hours' flying time since recall to active duty died in the smash-up of the T-6. The pilot had logged only 30 minutes of hooded time in the last six months. He encountered snow showers only seven miles out and crashed while trying to fly instruments. Operations personnel should never have cleared this pilot when possible instrument conditions were known to exist because he had less than 200 hours total time and no instrument card. But King Winter doesn't ask why his rules are broken, he merely punishes the violators.

He punished others last winter. Some died, others wrecked airplanes. But every time he passed his stern judgment against a pilot, it was for ignoring or breaking the rules of safe winter flying.

The White King's rules aren't many in number and they are known to most every pilot, dispatcher and weather man. They consist in large measure of employing pure, simple common sense. Everyone knows winter brings icing conditions, snowstorms, poor high frequency radio reception, icy runways, and low ceilings and visibilities. Pilots who take the common precautions to overcome these hazards have little difficulty.

It's a good idea, with winter approaching, to bone up on winter operating techniques for the planes you fly, check your winter flying equipment and give a little forethought to the problems King Winter is going to toss your way. Before you tackle a flight in his domain be sure of your de-icing and anti-icing equipment, your heaters, your oxygen equipment. Study your route and know where the emergency fields are and the terrain altitudes along the way. Read the notams before each trip to check on field conditions. Keep a listening watch on the weather ahead, ask for weather reports as often as you need them; King Winter changes tactics very quickly sometimes. Brief your passengers and crews thoroughly. Make a position report at every single station you pass so you won't freeze to death before they find you if you have to go down.

Old monarch winter is not a new foe or an unknown one. His tactics and weapons are well known. Equip yourself to meet him confidently on your own terms, on safe terms backed by thorough preparation and constant alertness. We boast we are an all-weather Air Force. We can prove it by flying winter weather every chance we get, and flying it in such a manner that any winter trip becomes just another routine flight.

Four Engine ELEVATOR

By CAPT. JOHN J. HERBERT
Flying Safety Staff

WHEN HERB FISHER, chief test pilot of the Propeller Division, Curtiss Wright Corporation, starts an instrument letdown in his specially equipped C-54, he really lets down. While his copilot makes like a tobacco auctioneer as he reports leaving each 500-foot level, Fisher lets down at a mere 10,000 feet per minute. Don't reach for your bi-focals, that 10,000 feet per minute figure is correct — at only 175 mph too!

This is how he does it.

After passing out beaucoup bubble gum (Fisher readily admits that there is more than somewhat of a pressurization problem in this type of descent) all four Curtiss electric props are placed in the reverse thrust position. When the props go into the full reverse position, the airplane starts losing altitude rapidly but without a buildup in airspeed.

One of the amazing things about the 10,000-feet-per-minute letdown is the attitude of the C-54. It rarely exceeds a 15° dive angle from level flight.

Herb had several good reasons for making his four-engine elevator descents. For one thing, Fisher was groping for the answer to the possible structural effects of prop reversal on multiengined airplanes in flight. Second, he wanted to establish, if practicable, a standard procedure for such operation, and third, he sought to determine the feasibility of control of a large airplane during rapid descent.

Before we go any further, and before every pilot in the Air Force starts thinking too seriously about inflight reversing, it might be wise to say that this particular C-54 has four modified props which makes inflight reversing safe on this particular airplane. The limit of reverse pitch on the modified propellers has been set at minus 5°. Normal setting is minus 18°. When queried as to the results to be expected from installing reversible props on a conventional, coal-laden C-54 flying the "Vittles" run, Mr. Fisher warned, "Don't try it. We are still experimenting and are only starting to scratch the surface. We had to set our blades at a much lower reverse pitch because the conventional reverse thrust setting in wind tunnel tests caused considerable concern as to how long the wind tunnel would last because of the severe vibration."

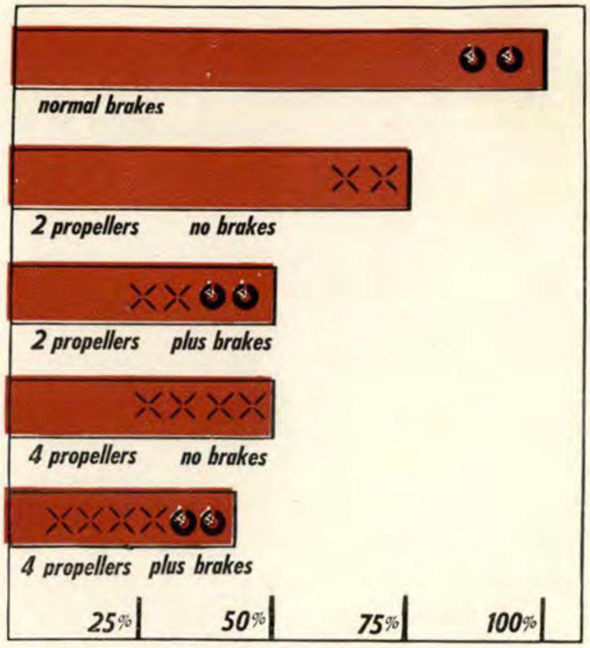
In other words, don't attempt to reverse the props in flight whether your airplane is empty or loaded with coal. Empty, you'll probably lose your bridgework, and coal-laden you'll undoubtedly come down with a bad case of miner's asthma.

At this point the reader is probably wondering what practical application can be made of inflight reverse thrust.

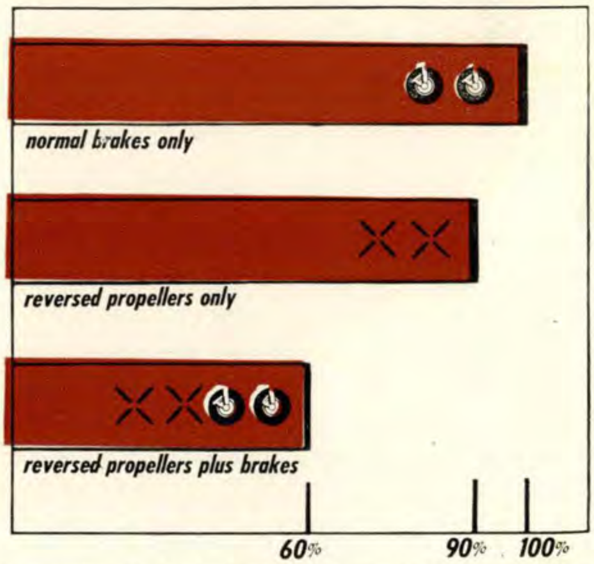
There are several possibilities. For one, assuming that pressurization and traffic problems can be mastered, the 10,000 feet a minute rate of descent may possibly be the answer to the stack and holding problem which has plagued instrument flying for the past several years. It is not beyond the realm of possibility that an aircraft so equipped could effect a landing from 30,000 feet in a matter of six or seven minutes.

Another very practical use has been proved in dive-bombing tests with reverse thrust. Prolonged vertical dives without the resulting high speeds that made them prohibitive during World War II can now be made. A pilot flying a dive bomber can practically lay the bomb on his target before starting his pullout. Mr. Fisher has made over 100 vertical dives in an F-47 equipped with a Curtiss electric reverse thrust prop with results that would make a believer out of the most skeptical pilot.

Reverse thrust has been tried and proved in ground operation of aircraft. If you were parked just off the end of the active runway and watched an airplane come over the fence, land and then back up, what would you do? Probably dash home and take an axe to that still in the attic, wouldn't you? It would appear to be as clear as the top line on an eye chart that you were seeing things. Using reversible props for backing up or maneuvering backward to a loading ramp or hangar area is one use which comes in mighty handy. It is completely overshadowed, however, by the primary purpose of reverse thrust props — braking the aircraft's landing roll.



four engine aircraft landing run decrease with aerodynamic braking



twin engine aircraft landing run decrease with aerodynamic braking

Today a 100,000-pound, four-engined airplane can be stopped in approximately 1,050 feet when wheel brakes and reversed props are used.

Aside from the fact that big airplanes can now use small landing fields, future designs of wheel braking mechanisms will incorporate quite a saving in parasite weight. And when you get up into the B-36 class, if the weight of the brakes can be cut 20%, the crew might well be able to carry its own staff car in No. 5 bombay.

THE COCKPIT CHECK

ENGINE CONDITIONING—CONTINUED

EDITOR'S NOTE: *This is the third of a series of articles on "Engine Conditioning."*

MANY PHASES of the cockpit check may already be familiar to crew chiefs and pilots, but there are several new angles regarding interpretation of readings of instruments presently installed in the cockpit which will result in a better analysis of engine condition and, consequently, safer flight.

In order to have a standardized routine in the Air Force for making the cockpit check, a "Cockpit Check Sheet" has been prepared to outline and arrange the tests to be made in a systematic manner, thereby permitting a rapid and complete analysis of the engine in a minimum amount of time.

Let's assume that you have completed the engine checks shown in the illustration. Things aren't up to snuff according to the data obtained, so let's analyze the various phases of engine maladjustment starting with Check 1 of the "Check Sheet."

Number 1, the ignition system check, revealed that the total rpm drop on the right mag was 150 rpm and that of this, the first 75 rpm drop was rapid and the last 75 rpm drop was slow. We also note that your check of the left switch position indicated 125 rpm drop total, of which 100 rpm drop was rapid and 25 rpm was slow. By tapping the instrument during your check it was established that the tachometer was sticking 50 rpm, which, if not taken into account would have resulted in only an indicated rpm drop of 100 on right switch and only a 75 rpm on the left switch position.

Considering the right mag drop first, you detected a fast drop of 75 rpm which indicates that this drop in rpm is caused by either faulty spark plugs or by a faulty ignition harness since the rpm drop occurred simultaneously with movement of the switch and the drop-off occurred rapidly. The 75-rpm slow drop encountered indicates that the magneto point-to-engine timing is late with respect to the left magneto point timing or some of the engine valves are maladjusted. This resulted in a slow gradual decrease in engine rpm after the fast drop of the initial 75 rpm.

The slow drop-off in rpm does not necessarily mean that the magneto contact point timing is slow, but indicates that the point timing may be slow in relation to the left magneto timing. Hence, if you were to start troubleshooting to determine the cause of the excessive rpm drops encountered, you would check the spark plugs, ignition harness, and magneto point timing on the right switch position and would check only spark plugs and ignition harness on the left switch position. On the other hand, if it was determined, when checking the timing of the right magneto, that the right magneto timing was correct, it would be necessary to check the left magneto timing.

COCKPIT CHECK SHEET

DATE 5-26-47 TEST BY PFA

AIRPLANE NO. B-29 ENG. SER. NO. 43-86752 ENG. POSITION #2

BAROMETER 29.1 TEMPERATURE 28C

1. Start engine and oil pressure permitting bring engine speed up to smoothest rpm between 1200 rpm and 1600 rpm.

2. Allow engine to run at this speed until cylinder temperature stabilizes or reaches approximately 150 degrees centigrade. Check to see that oil temperature is up to operating limits.

3. Run engine speed up to ignition system check speed and allow rpm to stabilize. When making ignition check on single ignition leave on single ignition long enough to allow rpm to stabilize and tap tachometer to eliminate binding of the instruments. Single ignition operation as long as one minute is not considered excessive. Note portion of rpm drop which is fast and portion which is slow and record in proper space.

1st Check

RPM Drop Total		RPM Drop Fast (Amount of total which occurs rapidly)	RPM Drop Slow (Amount of total which occurs slowly)
Right Switch	150	75	75
Left Switch	125	100	25

2nd Check

Right Switch			
Left Switch			

4. Check engine power and carburetor performance by setting up each of the following speeds with the mixture control in auto rich position and recording man. pres, then with throttle locked at that speed, move mixture control to auto lean position and record rpm and man. pres.

Automatic Rich		Automatic Lean	
Engine Speed	Manifold Pressure	Engine Speed	Manifold Pressure
800	22.0	850	21.1
1200	21.5	1350	20.5
1500	22.8	1625	22.0
1700	24.7	1775	24.4
2000	27.0	2000	27.0
2200	30.0	2175	30.2

5. Check idle mixture and speed and record. Check mixture on carburetor engines by leaning out mixture. Check mixture on fuel injection engines by enriching mixture with primer.

Idle Speed 700 Idle Mixture rich 150 RPM Manifold Pressure 24.0

6. Check engine acceleration in automatic rich position and record results of check.

sluggish and backfires

Referring to Check No. 4, we see that the manifold pressure at the 2200 rpm speed is one inch high as compared to other engines of the same model. This indicates that one cylinder of the engine is not operating or is cold. Reviewing the manifold pressures at engine speeds below 2200 rpm, we see that the manifold pressure is higher than normal for the given speeds. The auto-lean check shows engine speed increases. This rpm increase indicates that the idle mixture adjustment is rich; hence the No. 5 check will determine the extent of richness.

In Check No. 5 the idle speed increased 150 rpm during the manual leaning operation, thereby indicating an excessively rich mixture. The full extent of the rich idle mixtures was not indicated at the 800 rpm speed in Check 4 but was indicated at the 1200 and 1500 rpm where the speed between auto-rich and auto-lean is greater.

From Checks 4 and 5 we can see that the dead cylinder will have to be detected by use of the Magic Wand, an electrical device used in checking cold cylinders, and corrected, and that the idle mixture will have to be adjusted to obtain correct operation from the engine.

Since the check revealed that the idle speed increased 150 rpm when the mixture was leaned out, it will also be necessary to re-set the throttle stop after the idle mixture has been adjusted in order to obtain the specified idling speed of 450 rpm.

In Check 6, the acceleration check, the engine was logy during the initial part of the acceleration check, after which there was a tendency for the engine to backfire. This backs up our findings that the idle mixtures are too rich for proper combustion.

The tendency for the engine to backfire during the later part of the acceleration is obviously caused by either the defective spark plugs or ignition harness breakdown.

That completes the analysis of the engine's operation and we can see the practicability of the Cockpit Check Sheet. Use it and fly with better engines in the future.

NOTE: Check Sheet established in accordance with T.O. 02A-1-88, dated 17 February 1948.

What Do You Know About Engine Conditioning?

INDICATE ANSWER

1. An engine cutting out during the power check usually indicates a faulty connection in the magneto ground wire system. TRUE OR FALSE?

2. Proper engine starts should be made to eliminate possibility of hydraulicking engine. TRUE OR FALSE?

3. When the idle fuel-air mixture is changed, the fuel-air mixture is normally affected up to
   a. 1000 rpm.
   b. maximum cruise.
   c. minimum cruise.

4. Magneto breaker point setting
   a. does affect ignition timing.
   b. does not affect ignition timing.

5. The fuel-air mixture on an injection type carburetor is the same in both auto-rich and auto-lean at
   a. minimum cruise.
   b. takeoff power.

6. Proper adjustment of the idle mixture will
   a. increase spark plug life.
   b. save brakes.

7. If one or more cylinders have both spark plugs in the cylinder inoperative
   a. an excessive rpm drop will occur during the ignition system check.
   b. the manifold pressure will be high at the ignition system check speed.
   c. the engine will always be rough.

8. Intermittent firing spark plugs can always be detected by
   a. a high rpm drop during the ignition system check.
   b. high manifold pressure during the ignition system check.
   c. using the cold cylinder indicator.

9. Spark plug bushings should be tapped out
   a. only at time of engine overhaul.
   b. only at the 100-hour inspection period.
   c. at the time of each spark plug replacement.

10. Retarded ignition timing can best be detected during the cockpit check by
    a. high manifold pressure.
    b. hard engine starting.
    c. slow drop in rpm during the ignition system check.
    d. fast drop in rpm during the ignition system check.

1—F, 2—T, 3—C, 4—A, 5—B, 6—A, 7—B, 8—C, 9—C,
10—C.

WHAT A S

By LT. RODGER LIT

HAVE YOU EVER BEEN IN TROUBLE in a fighter or bomber, wanted to bail out, but couldn't? Were the G Forces or gymnastics of the airplane slapping you around the cockpit of the airplane similar to the way Joe Louis keeps his opponents strictly on the defensive?

The day when pilots of high-speed airplanes have to fight their way out of cockpits is rapidly becoming a thing of the past, according to information from Air Materiel Command. A seat has been designed which will eject a human out of an aircraft and clear the tail from any altitude of flight within .25 of a second.

Yes, that's fast, about 60 feet per second! But actually, you're only taking 15 G's, which is well below the maximum which man is capable of withstanding. Also, you are exposed to the actual peak of 15 G's for only one-two hundredths of a second, so it doesn't have time to black you out. In fact, personnel who have ridden the seat on a mockup think it will soon be a part of the many rides in a carnival.

Personnel of the Aircraft Laboratory and Aero-Medical Laboratory say that this ejection seat is guaranteed to get you out of the airplane once the jig is up—but—you've got to know how to use it.

The first aircraft which will have this safety device in service-wide use will be the F-80C. The current ejection seat found on F-80B's will be made operational as soon as minor modifications to the seat pan are accomplished. The F-84, F-86, the B-45 and B-47 are other aircraft which are to be equipped with this seat.

The bugaboo of early jets, namely the canopy and its ability to whack a pilot in the head, has come in for its share of consideration. The new device to eliminate the pilot's worry about the canopy will be known as the M-1 canopy remover. This device will force the removal of the canopy down a track until it passes aft of the pilot's head. At this point an open slot in the track allows the slipstream to pick the canopy up and clear it from the aircraft. This device will be installed on the F-80C's, F-80B's, and all F-86's beginning with the 34th F-86A airplane. All aircraft coming off production lines in the future will be equipped with the M-1 canopy remover, or a system such as compressed air bottles which will insure a positive removal of the canopy.

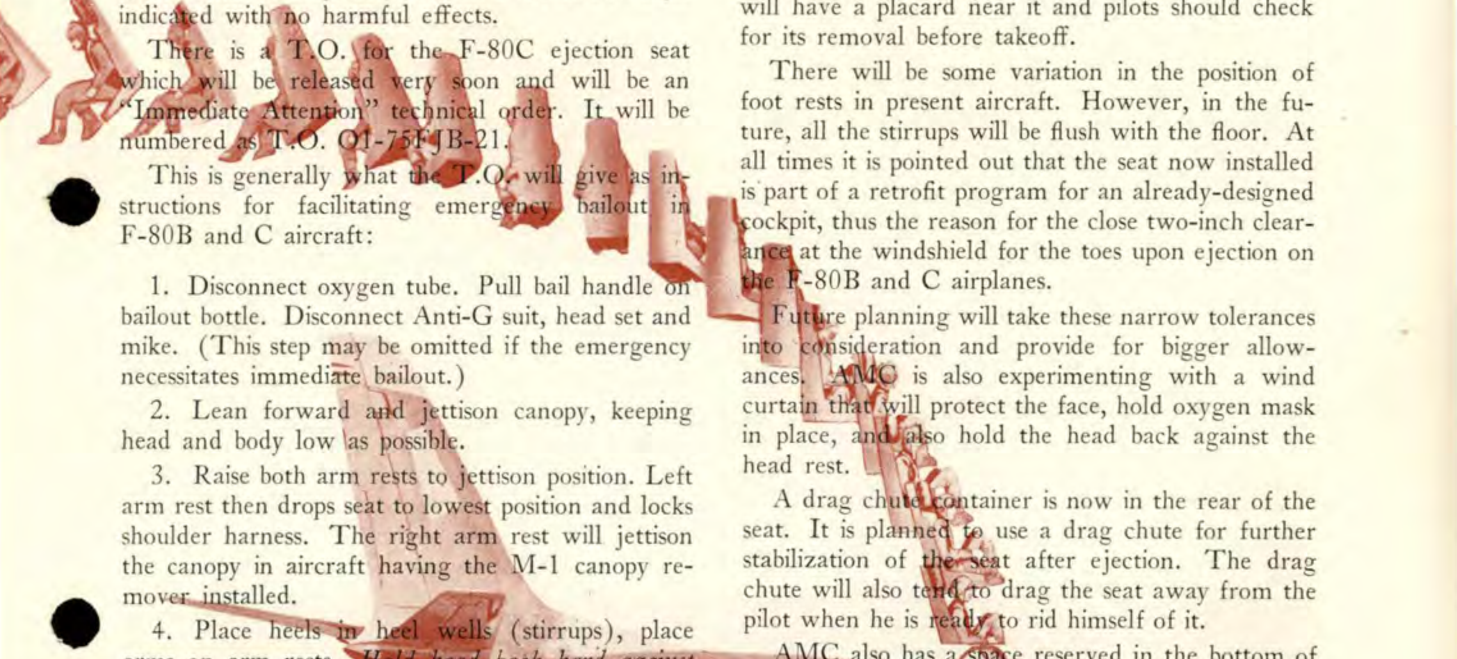
For advice to those pilots who will use the ejection seat prior to the installation of the M-1 canopy remover, it is pointed out that the canopy will have to be released in the conventional manner. To assist personnel in getting the head clear of the trajectory of the canopy in the early F-80C's, the emergency canopy release will be on the floor, thus forcing the pilot to get his head down and out of the way when the canopy is released.

As for the F-84D, Republic is designing its own system of removing the canopy. They plan to utilize two compressed air bottles to fire the canopy vertically and clear of the tail.

AMC says that the ejection seat will clear any tail surface on the current aircraft in which it is installed. They have theoretical knowledge of the

ENSATION

TLE, ...ing Safety Staff



performance of the seat at speeds of 550 to 650 mph. But they have ejected dummies at 470 mph indicated with complete success. The TF-80C will be utilized for testing the ejection seat at the top speed of the jet.

AMC stresses that the ejection seat is not just a means of supplementing high-speed bailout, but should be used at the lower speeds for bailout as well. A man was ejected from an F-61 at 304 mph indicated with no harmful effects.

There is a T.O. for the F-80C ejection seat which will be released very soon and will be an "Immediate Attention" technical order. It will be numbered as T.O. 01-75FJB-21.

This is generally what the T.O. will give as instructions for facilitating emergency bailout in F-80B and C aircraft:

1. Disconnect oxygen tube. Pull bail handle on bailout bottle. Disconnect Anti-G suit, head set and mike. (This step may be omitted if the emergency necessitates immediate bailout.)

2. Lean forward and jettison canopy, keeping head and body low as possible.

3. Raise both arm rests to jettison position. Left arm rest then drops seat to lowest position and locks shoulder harness. The right arm rest will jettison the canopy in aircraft having the M-1 canopy remover installed.

4. Place heels in heel wells (stirrups), place arms on arm rests. *Hold head back hard against head rest.*

5. Then squeeze right hand grip to fire catapult.

6. After ejection and clearance of the aircraft release the safety belt and shoulder harness and "kick away from the seat as soon as possible."

7. Delay opening your parachute as long as altitude will allow to permit seat to clear parachute canopy and to reduce the parachute opening shock.

That's it—now here's the dope on how fast you decelerate right after ejection from a top speed of 600 mph. You slow down about 90 mph before you go over the tail and after a few seconds you are down to about 160 mph. This deceleration is not dangerous and during it you can think and act as necessary.

As for you ground crewmen who think that since the seat is armed at all times it might take you for an unexpected ride, the engineers have so designed the trigger mechanism that the canopy must be completely removed from the aircraft before the seat can be fired.

A safety pin with a red streamer attached is inserted in the neck of the catapult as an added safety feature to prevent firing on the ground. This pin will have a placard near it and pilots should check for its removal before takeoff.

There will be some variation in the position of foot rests in present aircraft. However, in the future, all the stirrups will be flush with the floor. At all times it is pointed out that the seat now installed is part of a retrofit program for an already-designed cockpit, thus the reason for the close two-inch clearance at the windshield for the toes upon ejection on the F-80B and C airplanes.

Future planning will take these narrow tolerances into consideration and provide for bigger allowances. AMC is also experimenting with a wind curtain that will protect the face, hold oxygen mask in place, and also hold the head back against the head rest.

A drag chute container is now in the rear of the seat. It is planned to use a drag chute for further stabilization of the seat after ejection. The drag chute will also tend to drag the seat away from the pilot when he is ready to rid himself of it.

AMC also has a space reserved in the bottom of the seat for the emergency bailout bottle, dinghy, and survival kit. It is planned that these will be left in the airplane and can be attached to the pilot's chute, thus obviating the necessity of the pilot having a 6 x 6 truck to bring his equipment to the airplane for each flight.

Whenever possible the back type chute should be used with the ejection seat. In the F-80 a one-man life raft provides the necessary filler in the seat and thus you can use a back type chute. The back type is preferable for a very good reason — during a dummy ejection, a seat pack chute was opened by the compression of the seat's acceleration.

Although engineers have an operational ejection seat and a reasonably sure means of escape, they are still striving for the ultimate in safety and perfection.

VIOLATION!

THREE MEN walked nonchalantly to a parked B-26. The chatter was light and breezy. The three couldn't know they would be dead within an hour because the pilot would violate not only several Air Force regulations, but all the flying rules of common sense.

Let's go back a little and look at the pilot's flying history. He was considered to be very experienced, having flown over 800 hours in twin-engine airplanes. The key to this accident may, however, be the fact that he had flown only six hours in the B-26. He was considered a proficient instrument pilot and had maintained this proficiency with 18 hours of weather time in the six months preceding the accident.

Just prior to the fateful takeoff, the pilot had been briefed on the weather to be expected en route to his destination. The forecaster indicated several thunderstorms reported in the area, but had advised the pilot that the flight could be conducted under VFR conditions if the thunderstorms were avoided.

Not more than 20 minutes after takeoff, the B-26 came upon a line of thunderstorms. Dropping down a few thousand feet, the pilot was able to maintain VFR. A few minutes later though, it became necessary to descend another thousand feet to maintain contact with the ground because of the heavy rain. If at this point the pilot had elected to change his flight plan to IFR or return to the base from which he took off, you probably would not be reading this story. But this pilot was soon to volunteer himself as exhibit A in future flying safety discussions on the facts of flight. The pilot lost contact and descended in a shallow dive — still trying to regain contact with the ground. A few seconds later, he made contact — permanently. The crash occurred in a near-level attitude which resulted in the wreckage being strewn over a large area.

This story doesn't jibe, you say? And you are right, it doesn't. No one will ever know why an experienced instrument pilot would attempt a VFR flight in heavy rain under a thunderstorm. There are two strong cause possibilities—the scanty record of his checkout in this airplane and a foolish sense of pride. The records revealed no formal checkout. If he had known this airplane as well as he should, he might have proceeded on instruments instead of yielding to the temptation to try to stay contact.

WELL DONE

TO

MAJOR FRANCIS J. VETORT
14th Fighter Group, Dow AFB, Maine

LANDING A JET FIGHTER on two wheels with the nose gear unlocked, and snapping the nose gear into the locked position before lowering it to the runway is a good trick if you can do it. Major Francis J. Vetort did it recently.

Major Vetort was returning to Dow AFB, Maine, after the Cleveland Air Races and was leading his flight into Selfridge AFB, Michigan, for refueling. Shortly after takeoff from Cleveland, the main hydraulic seal came loose. This made it impossible to extend the landing gear with hydraulic pressure. The main gear was lowered and locked without much trouble, but the nosegear would not lock.

Another F-84 flew alongside Major Vetort's plane to observe the gear as the full emergency procedure was executed. The observing pilot, Lt. Col. George Laven, Jr., reported that even the violent maneuvers executed by Major Vetort failed to snap the nose gear into the locked position. The crippled F-84, after having participated in the Air Races, was low on fuel upon reaching Selfridge so that every emergency procedure had to be tried immediately. Meanwhile, the hydraulic fluid leaking on the turbine wheel filled the cockpit with smoke. A hurried landing was necessary.

Major Vetort decided to try a hard main wheel landing at Selfridge in an attempt to force the nose gear into locked position. The maneuver called for the utmost in pilot skill — just enough of a jolt to snap the gear into place by the sudden deceleration, but not so much of a bounce as to wrinkle the wings or otherwise damage the plane.

The F-84 pilot flew a short approach, brought the Thunderjet over the end of the runway as slowly as possible in a tail-low attitude. Just as the main gear was but a few inches off the ground, the plane reached its stalling point. Carefully, Major Vetort had planned his landing so that the plane touched down in a complete stall. The jar snapped the nosewheel into the locked position and the plane rolled to a safe stop.

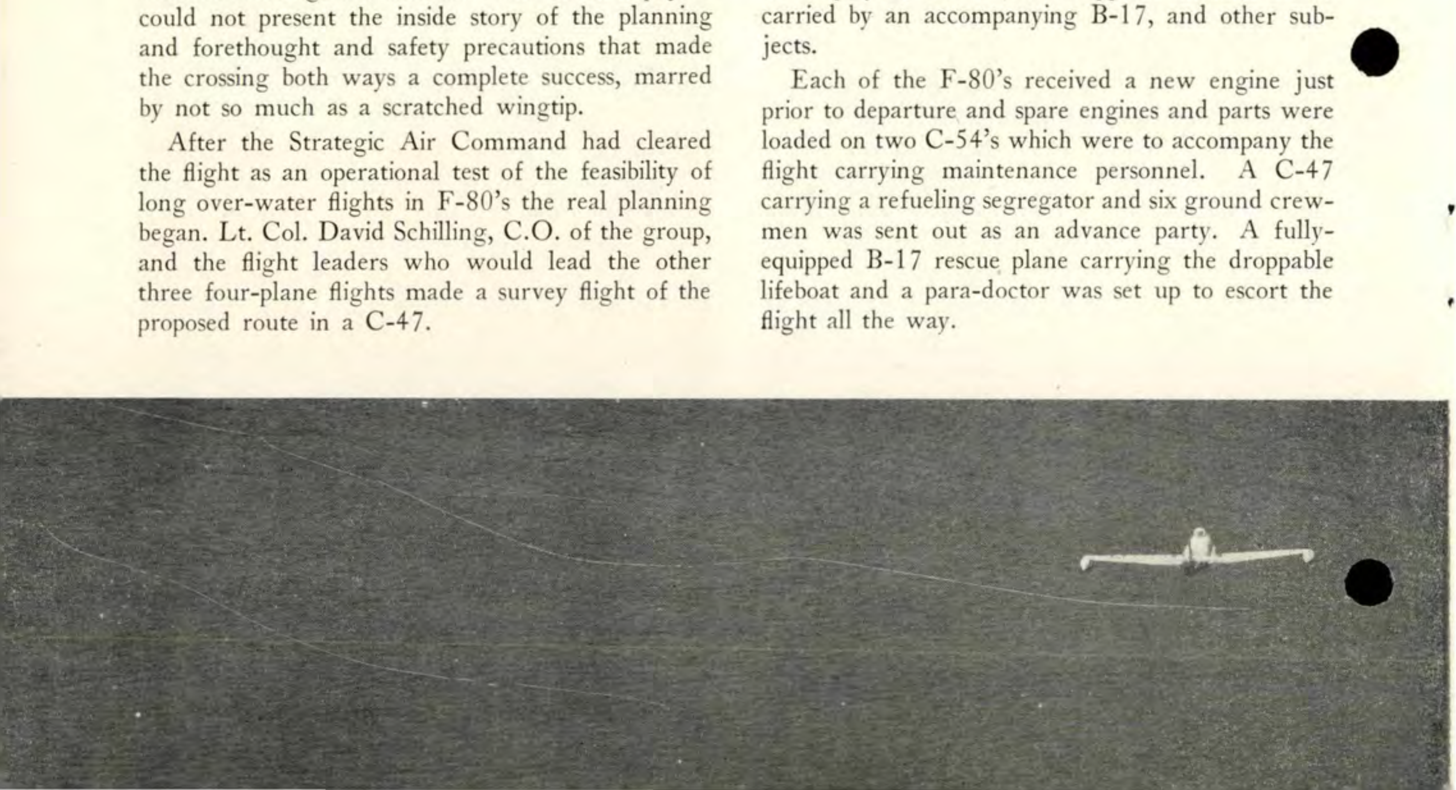
Atlantic Argonauts

Headlines from coast to coast heralded the departure and recorded step by step the progress of 16 F-80's of the 56th Fighter Group from Selfridge AFB, Michigan, as they flew their history-making Atlantic crossings last summer. But the newspapers could not present the inside story of the planning and forethought and safety precautions that made the crossing both ways a complete success, marred by not so much as a scratched wingtip.

After the Strategic Air Command had cleared the flight as an operational test of the feasibility of long over-water flights in F-80's the real planning began. Lt. Col. David Schilling, C.O. of the group, and the flight leaders who would lead the other three four-plane flights made a survey flight of the proposed route in a C-47.

With their proposed route carefully surveyed and conditions to be expected on the crossing known, the pilots of the 56th were thoroughly indoctrinated in emergency procedures, navigation to be employed, use of the droppable lifeboat to be carried by an accompanying B-17, and other subjects.

Each of the F-80's received a new engine just prior to departure and spare engines and parts were loaded on two C-54's which were to accompany the flight carrying maintenance personnel. A C-47 carrying a refueling segregator and six ground crewmen was sent out as an advance party. A fully-equipped B-17 rescue plane carrying the droppable lifeboat and a para-doctor was set up to escort the flight all the way.



Another B-17 stationed at each refueling base aided in the escort within its cruising radius. The flights of the weather plane and the B-17 rescue planes were so coordinated that the F-80's were never more than 75 miles from either one of the B-17's, the B-29 weather plane or one of the Navy's surface vessels on weather patrol in the North Atlantic.

With a glide ratio of 15 to one, any F-80 forced down would be only minutes away from medical aid and assistance from a rescue plane. The B-17's carried transmitters that broadcast on a frequency the jets could use for homing two out of every five minutes, thus providing check points en route to aid in cruise control and winds aloft computations.

Before each leg of the flight, a B-29 weather plane covered the route taking observations of bases and tops of all clouds, amount of cloud coverage, icing, precipitation, frontal activity, if any, and wind speed and direction at the flight altitude. If it was determined that the weather would remain well above VFR minimums for at least three hours the weather plane turned back and radioed the jet group to take off.

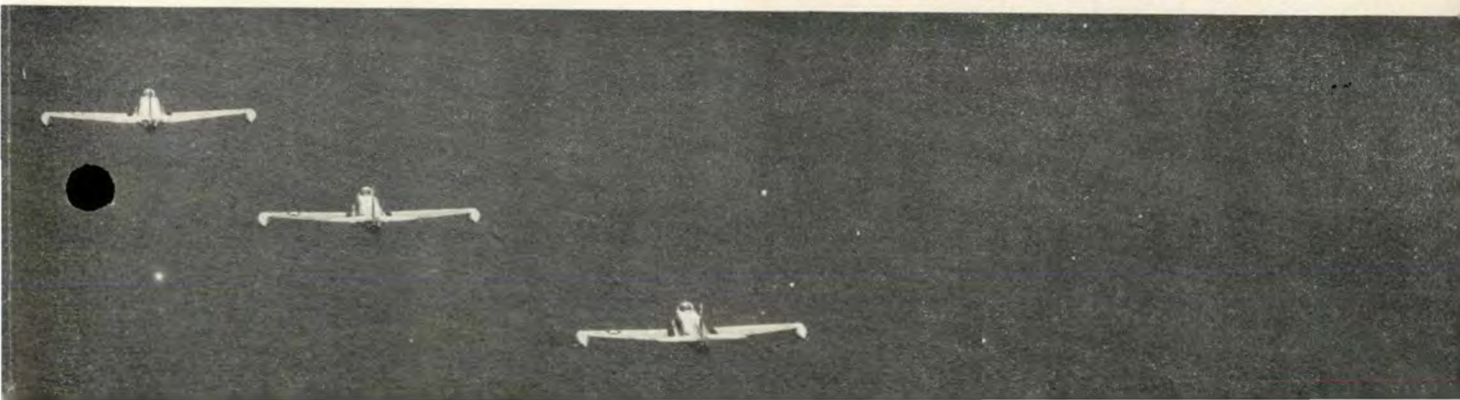
The F-80's departed in flights of four with five-minute intervals separating the flights to prevent letdown delays at destinations.

Because the flight was designed as a test of operational efficiency, the F-80's carried 750 gallons of fuel and were fully armed. Their longest hop was 776 miles. The entire flight was computed against a 100-mile-per-hour headwind as an additional safety factor.

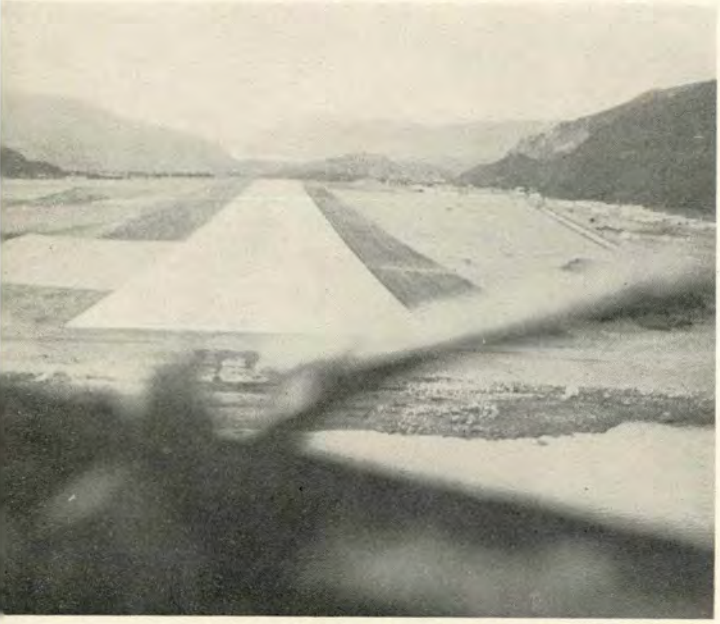
Maintenance efficiency was 94.2 per cent for the flight, and very little difference was noted in the amount of maintenance required on this mission in comparison with that required at the home station. Two engine changes had to be made because of high oil consumption and a third because of a bad bearing. A tailpipe change was accomplished at Bluie West Number One in Greenland while the F-80's were being refueled for the next hop.

Lt. Col. Schilling briefing his pilots before the flight.

Above—Getting their maps.
Below—F-80's being serviced in Greenland.



Getting a hack before takeoff from Goose Bay.



Above—200 feet from touchdown at BW-1.
Below—Accompanying C-54's.

As soon as the jets landed, refueling would commence. As soon as it was completed, the C-47 advance plane would take off with the fuel segregator to get the next station set up for the jets' arrival.

All of the F-80 pilots were experienced jet flyers with a lot of cross-country navigational training. Lt. Col. Schilling has let his pilots take trips all over the States and believes that this freedom gives the pilots a lot more experience than flying locally, boosts the morale, and in general makes for safer flying.

All except two of the pilots were capable of leading any of the flights. The average jet experience of the pilots was 167 hours and their average total time was 1,357 hours.

Each pilot received a mimeographed copy of the flight plan before takeoff and a Form 23A of the weather en route.

They carried one-man life rafts on the F-80's with a radar transmitter which the B-17 could home on. Also, dye was put in the nose of each jet which would explode on the water in event of a water landing, and extra dye was carried in the dinghy.

The rescue boat which the B-17's carried is a 3,300-pound motor boat which is dropped with

Lt. Col. Tice trying on his anti-exposure suit.

three chutes. After the boat hits the water rockets shoot in three directions carrying 100-foot lines attached to buoys. Thus the pilot can reach one of the lines and pull himself to the boat if it is drifting away.

The weather service supplied by the various agencies along the route was exceedingly good. The British weather bureau had a special forecaster with years of experience on duty at the Odiham, RAF station.

On the flight back home, the 16 F-80's flew from Scotland to Goose Bay, Labrador, a distance of 2,180 miles, in four hours 52 minutes, for an average ground speed of 445 mph.

The total elapsed time from the first F-80 takeoff at Stornaway, Scotland, to the last landing at Goose Bay was 12 hours and 32 minutes, proof that U. S. jet planes are only a few hours, not days, from any place they wish to fly.

Safety was the password for the entire operation, and it really paid off. There was no dipping of wings, no buzz job at any stop over. It was all strictly business. Hats off to the 56th Fighter Group for proving that long over-water jet flights are operationally practical and can be conducted with maximum safety.

Lined up at Odiham RAF station.

Above—Lt. Milliken's niece likes the jet, too.
Below—Tail pipe change.

Quick engine change at Furstenfeldbruck.

CAA WILL DOUBLE NUMBER OF POPULAR AVIATION FILMS

MORE THAN 600 motion picture and film strips dealing with aviation will be available soon on a loan basis by the Aviation Training Staff of the Civil Aeronautics Administration which began making distribution of such films 18 months ago.

Among the subjects treated, some of which are in color, are aircraft construction, engines, instruments and maintenance, flight training in all phases, instrument flight control, meteorology, navigation, electronic aids to navigation, radio, Loran, radar, safety, damage control (fire), first aid, flight, industrial, water safety and life saving, science of aerodynamics, and hydraulics.

The material is loaned free to any approved applicant, but the cost of mailing the films must be borne by the borrower.

The CAA also provides a bibliography of films and other aids in aviation education which are available from various sources both governmental and private. This bibliography is available from the Aviation Training Staff, CAA, Washington, or any regional office. Films are distributed from Washington and the nine regional offices of the CAA.

KNOB SHAPES

A survey of pilot preference regarding knob shapes to be used in coding aircraft controls was conducted by the Psychology Branch, Aero Med Lab, Air Materiel Command. The purpose of the study was to select a group of knob shapes easily distinguishable by touch, to be used in the projected ideal cockpit.

Eleven shapes, including three suggested by the Navy, were selected after extensive tests proved they were seldom confused with each other. A test, using A-11-A flying glove, showed that errors occurred more often while gloves were worn.

A questionnaire, filled out by the pilots used in the test, revealed that they believed the knobs of six controls should be shape-coded: landing gear, throttle, wing flap control, propeller pitch control, mixture control, and cowl flaps control. The pilots then identified knobs which they considered most appropriate for certain controls.

APPROACH LIGHTS

Air line pilots are placing lights at the top of the landing aids list. All of the systems now invented to bring the plane within landing distance of the

runway don't mean a thing if the pilot can't see to land when he gets there.

One of the most active experiments in runway and approach lighting is being carried on at Weir Cook Airport at Indianapolis.

The lighting units present a characteristic pattern when viewed from various positions. By means of these patterns a pilot with only a minimum of experience in flying this system will be able to estimate his relative position correctly from observation of as few as two pairs of lighting units.

There is a range of five brightness levels at which the lights can be operated and at the brightest level it should be possible to see them from approximately

one quarter mile during a night time visibility condition of one-sixteenth mile, or, from approximately three-sixteenths mile during a daytime visibility condition of one-sixteenth mile.

As the lights are operated from the CAA control tower, it is necessary only to request the tower to turn them on whenever interested pilots are in the vicinity of Weir Cook Airport.

was a bit unusual for him to be staring an Air Force pilot in the face as he gave him landing instructions.

Actually, tower personnel around the country are becoming familiar with the unorthodox antics of helicopters as the Air Force expands operations with the rotary winged craft, and are becoming more experienced in giving landing instructions and directions for moving about the ramp a few feet above the ground. All tower personnel should acquaint themselves with the peculiarities of helicopters, the effect of rotor downwash, and what maneuvers a helicopter can safely perform in the air at close quarters.

We were gassed up and out of Pope within the hour, heading south again with Shaw AFB our destination this time. After a couple of hours had elapsed Davis was following railroad tracks on a heading 30 degrees to the left of the course we had been holding. It couldn't be his gyro precessing. You don't have any gyros in an H-5, just a compass. Kohl must have had an idea we were lost too because he closed up the formation along with me.

The sun was behind a veil of haze and nothing on the ground was visible to the west. You can't see very far from 300 feet altitude anyway. Why didn't we go higher for a look around? Because the only way you get out alive if your helicopter catches fire or otherwise fails is to make an autorotative landing. The higher you are the longer it would take to get down. That's why in the interest of safety helicopters usually fly below 500 feet. You don't often have to worry about a landing field either. You land at zero airspeed.

Davis was not lost, however, just using sound judgment. With visibility very poor ahead he was following the railroad tracks into Sumpter, South Carolina. Shaw is only eight or nine miles west of Sumpter, but it would be very easy to fly between them and not see either from 300 feet. When Sumpter came into sight we cut across and picked up the highway leading to Shaw.

We came around the pattern in tight echelon to the right, moving into line abreast to the right as we came flying slowly down the ramp. We came to a hover line abreast straight out from the tower, and Davis signaled for a swing to the left. He held his helicopter still at hovering altitude as he turned, and Kohl and I swung around slowly like we were hinged on his plane. We sat down in line abreast facing the tower. By keeping the helicopters in close formation and maneuvering into position in this manner, a flight can be landed in a given parking area with a minimum of unnecessary maneuvering and a maximum of safety. The helicopter is so versatile and so completely controllable maneuvers such as these, while spectacular to watch, are actually routine for graduates of the Air Force helicopter pilot school.

Hangar space was a problem at Shaw, as it usually is with helicopters. Because winds approaching 20 miles per hour can wreck the rotors of a helicopter left outdoors, the rotary winged aircraft must be stored in hangars if at all possible. Moving three helicopters into a crowded hangar is a job that requires careful supervision of experienced helicopter personnel. Alert crews and maintenance personnel not assigned to helicopters should never touch the windmills without an experienced helicopter man present.

Lt. Raymond J. Haemmerle, whose place I had been taking on the flight, caught up with us that night in an L-5. Original plans for the trip had called for using the L-5 as a navigation plane, and we proceeded to Macon, Georgia, with Haemmerle and M/Sgt. Corbet C. Ballard leading the way in the L-5 flying up ahead at 1,000 feet.

After giving the helicopters a through inspection and some minor adjustments, the three 72nd Liaison Squadron pilots continued on to Eglin, where they are flying daily missions for Operation Combine as we go to press, erecting another milestone in Air Force progress in rotary winged flight.

BEHIND

WHETHER A PILOT IS mentally and physically qualified to make any given flight is well known to the pilot himself. Air Force medical personnel have repeatedly pointed out this fact, and have suggested from time to time that accidents classified under the broad title of "pilot error" are not always properly tagged since health and mental condition may have been factors.

Since the question of whether a pilot is in proper mental and physical condition to fly can be most readily determined by the pilot himself at any given moment, it is essential that pilots exercise judicious judgment in deciding whether to make a particular flight. Safety must be the first consideration.

A recent accident investigation disclosed a case in which the mental and physical condition of the pilot were definitely influencing factors in a major accident. Had the pilot played it safe he would not have made the flight which resulted in the accident.

The pilot took off for a night flight in a F-51. After flying a few minutes he noticed the engine was overheating badly, and he headed back to the field in a race to get down before the engine went out. He won the race and made his emergency landing safely. Investigation dislosed the electrical coolant shutter control was inoperative. However, the pilot had made no attempt to use the manual control.

THE ACCIDENT

The pilot took another F-51 and taxied out to takeoff position. He spent considerable time on his runup and finally taxied back to the line, advising the two mechanics who met the plane that he had a 200 rpm mag drop. The mechanics requested that he run the engine up on the ramp and allow them to listen to it and check the exhaust flames. This time the engine appeared to run normally, and the pilot stated that maybe it was him instead of the airplane because he was a little nervous. Right then he should have killed the engine and quit for the night. But he taxied back out to takeoff position.

He started the takeoff roll and covered half the runway when he decided the engine was missing and chopped the power. Because he was not sure how much of the runway remained ahead of him the pilot applied brakes sharply. The plane nosed up momentarily, causing major damage. There was still a 1,500-foot strip of unlighted gravel overrun the pilot could have used to stop the plane. The pilot had been flying at the station for seven months and was familiar with the runways.

Because the engine was run up with no further maintenance other than replacement of the propeller and found to be in good condition at all power settings the accident board could make only one conclusion—pilot error.

On the face of it both the accident and the overheating of the plane the pilot had flown the first period were largely the result of pilot error. However, the investigation disclosed that this pilot had received a typhoid shot the day before the accident and was known to be suffering some ill effects from it. Certainly the fact that he had just made an emergency landing in the same type plane just before the accident was not conducive to calmness and absence of nervous tension. The pilot admitted to the two mechanics that he was nervous and jumpy just before the accident.

As medical personnel have long been quick to point out, apprehensiveness and nervousness can greatly reduce a pilot's efficiency and good judgment. It is accepted that a below normal physical condition can also have a detrimental effect upon pilot proficiency. Aviation psychologists have frequently noted that pilots as a breed are prone to over value the importance of what other people may think. To be explicit, pilots are prone to fly when sound judgment says not to fly because somebody might possibly question their intestinal fortitude. It is sometimes difficult to understand that it takes *more* courage *not* to fly when the pilot knows he is not up to par physically or mentally at that moment.

It is essential that flying personnel be made to realize the importance of not underestimating the reaction and influence of a disturbed emotional condition. Such influence is insidious in its effect upon judgment because a pilot can feel in his own mind that he is giving the problem of flying his full attention when actually his subconscious mind is diverting a large measure of his concentration away from the job of flying without his knowledge.

The exact degree by which this pilot was affected by his physical condition and nervousness and the degree to which his condition was a cause factor in the accident cannot be measured, but this accident board considered the matter of sufficient importance to make a recommendation on the Form 14 that each pilot evaluate his physical condition and determine if he is in condition to perform flying duty. Pilots at the base concerned were further advised not to fly when in a nervous state or at times when they felt they could not adequately perform flying duty.

Medical research has found considerable basis for the belief that so-called "accident proneness" is a variable factor, that a pilot's immediate condition definitely affects his proneness to have an accident. This particular accident would seem to bear out these findings.

It boils down simply to the fact that you as a pilot are in an excellent position to know your mental, emotional and physical condition. It is up to you to decide whether your ability or judgment may be impaired for any given flight. If you're in doubt talk to the flight surgeon. Safety is the first consideration, your own safety.

LETTERS TO THE EDITOR

AN ALL-TIME LOW

One pilot speaks his mind on Air Force instrument flying.

Dear Editor:

During the war about one-half of the Troop Carrier Training Program was spent on instrument and weather flying. As a result, replacement crews had a good background for weather flying before shipping overseas. I was quite surprised when I arrived in Italy to find pilots, some former students of mine, avoiding weather flying. Numerous excuses were given: the most common was that sufficient aids to navigation were not available (although it was the only place I've ever seen where you could pick up your mike, and say "Where in the hell am I," and 10 seconds later get an answer). Observation led me to believe the attitude stemmed from above, operations and commanding officers of group, wing and command level, who, not having proper weather training due to its being discouraged when they were in training, didn't feel competent to fly weather and didn't want any of their pilots "sticking their necks out." Several of these same pilots crashed later trying to "stay contact."

This condition was evidently recognized as evidenced by the extensive instrument training that was given most pilots returning from overseas. Unfortunately, some of this training didn't take. I recently was given an instrument check by a check pilot, a Bryan Graduate, who expressed a reluctance to fly weather. He admitted his shortcomings but failed to see how they might discourage other pilots.

The "all-time low" is based on the information below copied from the back of a white "instrument" card:

3-2

Blank Bomb Group Minimums

Day T.O.	500 ft.	1 Mile
Destination	1,000 ft.	2 Miles
Night T.O.	1,000 ft.	2 Miles
Destination	2,000 ft.	3 Miles

No flights when F'cst or reported icing below 3,000 ft. above the highest terrain within 40 miles of line of flight nor when both instr. and thndr. storms are predicted.

(I fail to see why GCA is added unless someone is sticking to the "letter" of regulations.) The holder of the card above, an excellent weather pilot, told of a recent pilot's meeting in which the wing commander stated, "The best way to fly weather is to avoid it."

This attitude seeps down. In the past year or two, the first briefing I have received from weather is how to avoid all clouds. (Notice the next time you file a clearance.)

There is just one more "attitude" I would like to mention. After insisting on a second weather briefing, having your sanity questioned by the A.O. and probably calling in the base operations officer who wants to know "what are you going to do if you get in a thunderstorm and lose a wing," waiting on the end of the runway one-half hour for a clearance while the VFR boys pull around you, the flight gets off and goes according to your detailed plans. Icing was mild and you could get rid of it any time in the inversion you spotted on the pseudo-adiabatic chart plus evaporation in the clear air in case of emergency. The squall line that had been moving like an express train for two days was five minutes thick instead of the six minutes you figured but turbulence was moderate — no danger of losing a wing when going through at the airspeed you chose. Destination was 600 instead of the anticipated 700 feet, but the alternate held perfect. After landing you note gas consumption was 20 gallons more than expected because ATC insisted you climb a couple of thousand feet. You walk into operations and hear mumbling that's too loud for the range signal ringing in your ears, "That guy has no respect for weather."

In summary, I will try to hit everyone:

(a) Hq, USAF — Re-emphasize that an all-weather (all) Air Force is in immediate demand.

(b) Command and Operation — Recognize that it is going to be impossible to train a good weather pilot in the short time allowed when and if the next war starts.

(c) Weather Officers — Look for the "devious" routes that will give experience (stratus, towering cumulus, light icing, rain, and moderate turbulence.) Teach pilots to forecast.

(d) All-Weather Division, AMC — Publicize more broadly the fact that it can be done and recommend that everyone follow your fine example by installing "permanent" hoods in all two-pilot aircraft.

(e) Flying Safety — Remember that "Weather, a Contributing Cause" is sometimes a year late on an accident report.

(f) Instrument School — Request all pilots from VIP down take the course and see that every pilot who attends gets a taste of weather.

(g) AMC — Equip all planes with up-to-date instruments and weather equipment.

(h) Air Traffic Control and Flight Service — Check the possibility of getting Flight Service out of the traffic business. ATC could be expanded rapidly in the event of war if they had Air Force personnel to train and use within their organizations.

(i) Pilots — Think that soon you may be called on to graduate even if you aren't ready and instrument flying is a prerequisite for weather flying. A lot of weather study and a little weather flying may obviate the necessity for some of that insurance you contemplate buying.

(j) "Don't know how," "don't want to learn," and "can't be done anyway" Pilots — don't say anything. Just watch.

Henry F. Ledbetter, *Major, USAF—3-1*

Although we don't agree with everything the Major says, we like the way he says it. He may have some food for thought.— Ed.

★

Dear Sir:

. . . Would like to see a good article concerning "ADF, Aural Null," — taking bearings, formulas for time and distance to stations, tracking, proper tuning, plotting bearings, etc.

George Harchbalk, *Captain, USAF.*

★

Dear Sir:

My version of How to Prevent Many T-6 Accidents is by abiding by that old rule: Keep your stick all the way back upon landing.

I found myself relaxing the back pressure after a nearly full groundloop and gave myself a talking to.

The tailwheel of a T-6 has been made for the purpose of keeping it on course during takeoff and landings. It does absolutely no good with the stick forward even several inches because the tailwheel has no traction when aircraft is going 30 to 70 mph.

Walter W. Brass, *1st Lt., USAF.*

WHY?

"TURNING BASE LEG, gear down and checked."

Every tower operator has orders to obtain that assurance from the pilot before he can be cleared to land. Likewise, every pilot is taught again and again that he must inform the tower that his landing gear is down and locked before the final approach. That procedure is one of the most universal safety checks in the Air Force. Everyone uses it, everyone knows it, yet sometimes someone forgets.

A formation of F-51 Mustangs was cleared to land following a navigation training flight. The pilot of the No. 4 plane accomplished his before-landing check on the downwind leg, but failed to extend the landing gear. Turning on final approach, he lowered full flaps and retarded the throttle. He reported later than he did not hear the landing gear warning horn.

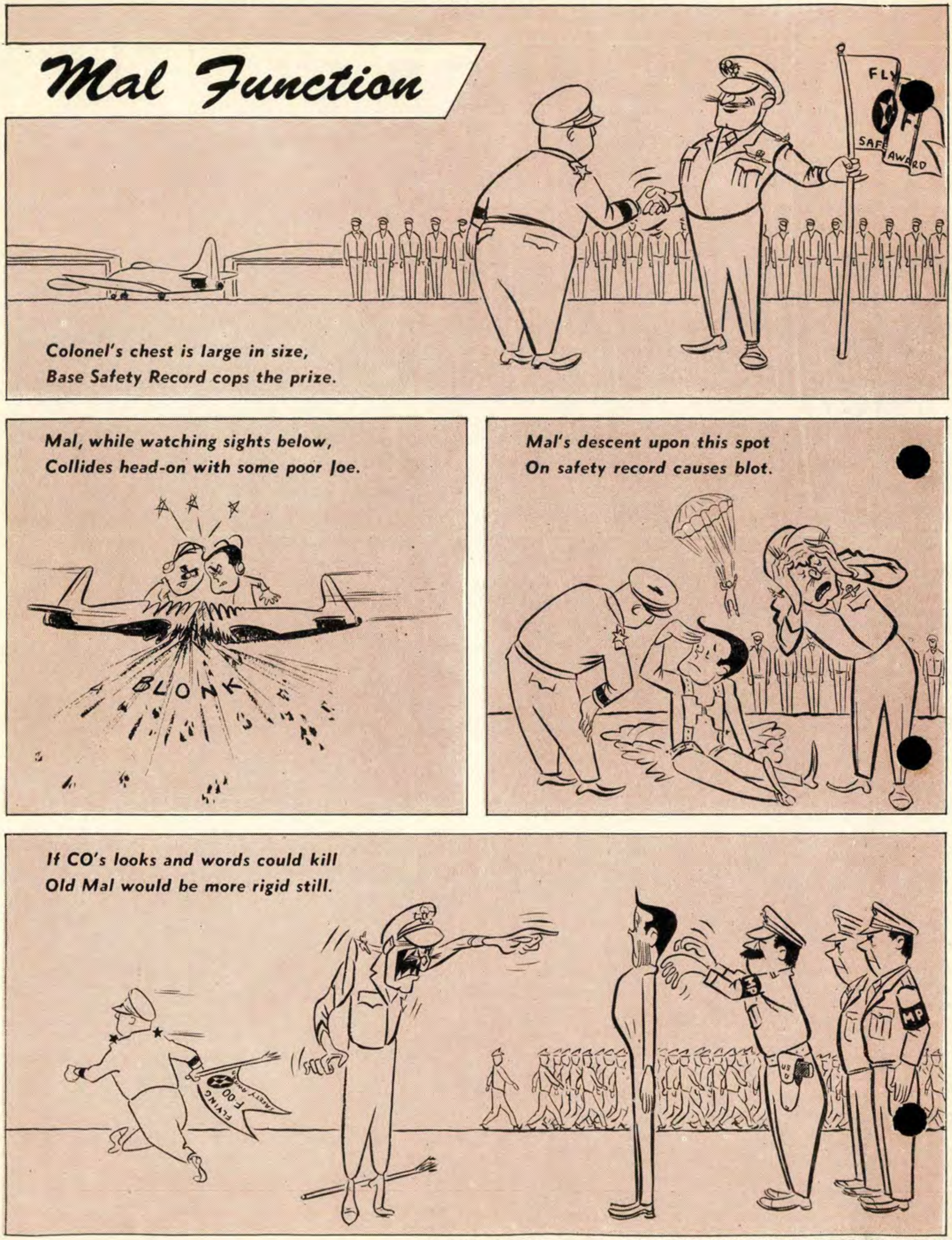
The control tower operator observed that the gear was not down as the plane turned on final approach. Unable to obtain any radio response from the pilot, the red warning light was flashed by the tower operator. The pilot did not see the light and continued on his landing approach. Several other pilots flying in the area reported that they heard the tower's warning on "B" channel.

The pilot continued the landing, blissfully unaware of the gap in his procedure. Touching down about 500 feet from the end of the runway, the plane skidded 300 yards, damaging wings, flaps, scoop, fuselage, propeller and engine.

Checked later, the landing gear warning horn functioned properly. The VHF radio set operated normally. (The accident board thought this pilot punched the wrong channel key.)

In the event that radio contact cannot be established with the tower, there is a procedure to be used to prevent such an accident—a pullup to check the tower for visual signals before landing.

This pilot ignored such sensible procedure. Why?



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PHYSICAL ORIGINAL PAGES

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