Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED

JUNE 1948

RESTRICTED

THE COVER PICTURE

It is seldom that a photograph is made of an accident while it happens. Usually pictures are taken some time after the dust or smoke has cleared. The action photo on this month's cover was taken by alert photographer Sgt. Jack Hurley at Williams AFB, Arizona. He happened along with his camera just as the AT-6 caught fire as its engine was started. The result was a photo showing the importance of the regulation which requires that a fire guard be on duty ready to combat a sudden fire during starting operations.

★

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FLYING SAFETY

RESTRICTED

Volume 4 No. 6 June 1948

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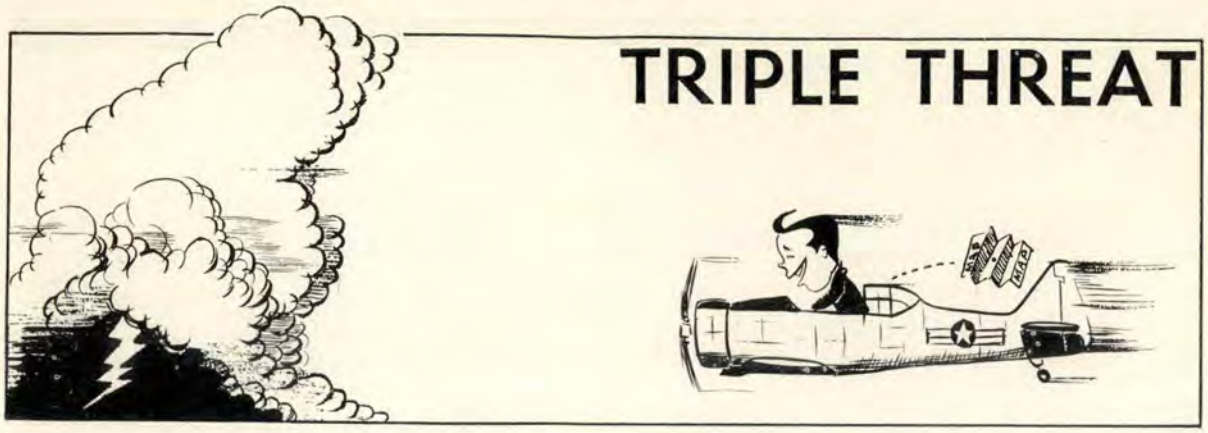


TRIPLE THREAT

THERE IS A close relationship between the problems of navigation, communications and weather in many accidents. A successful cross-country flight is made when the pilot has met these problems adequately. If he misses one of them in his flight planning or in the air, he stands a chance of running into difficulties with the other two.

Here is a simple illustration of how these problems are related. A pilot ignores his navigation as he flies along. He gets himself beyond the range of radio communication with the airways station he had expected to call. Since he is unable to read the station, he misses a weather advisory. Soon he is in a thunderstorm he didn't know had moved in on his skylarking route. From then on, anything can happen, depending upon his ability to pull himself out of such a jam.

It is entirely possible that one reason for the excellent in-flight safety record of the airlines is the fact that airline pilots are constantly in touch with the ground as they fly predetermined courses along the airways and are able to obtain information on weather at any time during flight.

This is the time of the year when weather conditions can change quickly after the pilot takes off—it is the season of sudden thunderstorms. It calls for the fullest use of weather reports on the part of the pilot and conscientious observations and reporting by weather personnel. Failure to keep in communication with ground stations and careless navigation may allow the pilot to fly into hazardous weather areas. Flights into thunderstorms in 1947 contributed to 17 major USAF accidents in which six airplanes were wrecked and six persons killed.

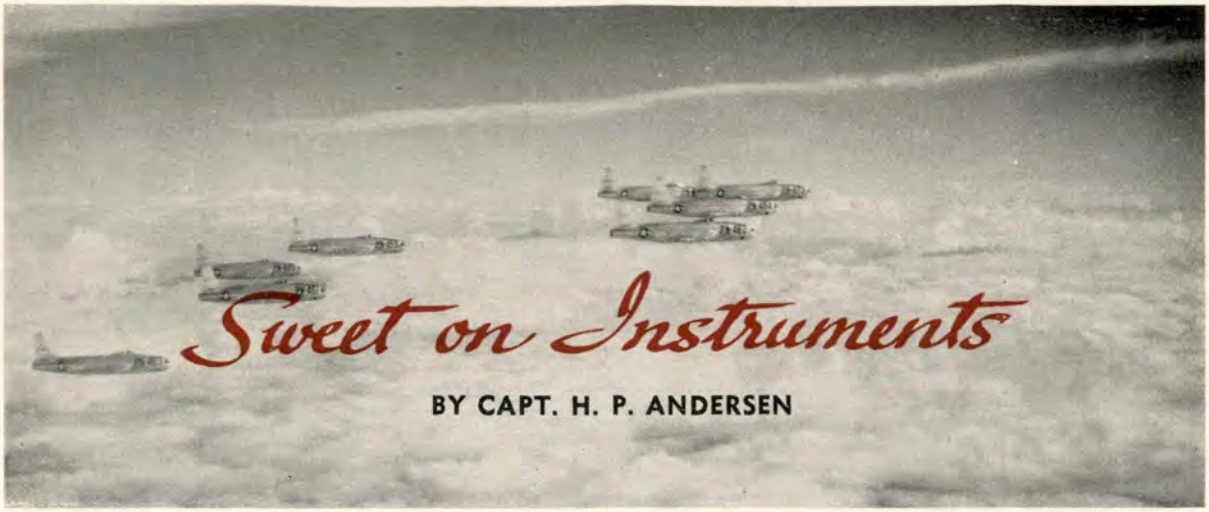
The first place to attack the triple problem of poor navigation, lack of communications, and bad weather is on the ground. And two groups of people must combine to do it—pilots and clearing authorities. The pilot is a customer of the clearing authorities, he "buys" what they offer.

Operations must be prepared to offer him every aid to navigation, up-to-date radio facility charts, VFR maps, Notams and especially the tools and space needed to plan a flight before takeoff. Thus with navigation assistance, the pilot has a good start at licking the other two problems.

As a customer of the weather man, the pilot wants a description of the weather along his route. Because some pilots do not recognize and understand the hazards of various types of weather, or because some weather forecasters do not give an adequate description of the weather, a bad purchase is sometimes made. Pilots have been known to sign for weather information they didn't get.

Communications people, tower operators, Flight Service, and Air Traffic Control are middlemen who deal in primary commodities a pilot needs after he climbs into his airplane. There are few quicker ways for a pilot to go busted in the flying business than to ignore the free services of these middlemen. They have direct wire hook-ups with operations and weather people everywhere and can give their customer, the pilot, the very latest tips on good deals or probable crashes.

It's sound business for pilots and ground agencies to deal with one another as often as they can. That way there is less chance for the Air Force to lose on its investment in men and airplanes.



Sweet on Instruments

BY CAPT. H. P. ANDERSEN

IF YOU GIVE an experienced jet pilot his choice between a propeller-driven plane or a jet-powered one for flying in the soup, he will take a plane like the P-80 every time.

To the man who has flown the P-80 on instruments in actual weather, it is just another airplane. Once you get your procedures down pat, you can wing in on IFR with confidence. Those are the opinions of pilots who know their P-80's. And they are affirmed by Col. Leon W. Gray, of Tactical Air Command, who has flown jets on the gages for 200 hours.

But even as the jet plane is easy to fly, is responsive to the controls and makes a pocket-size storm out of the average front, its very nature brings new problems not usually encountered in instrument flight in the conventional airplane. The primary problems, according to instructors at the Training Command's jet transition school at Williams AFB, Arizona, and to experienced pilots of the 12th Photo Recon Squadron, March AFB, California, are high speed and high fuel consumption. These affect every phase of instrument flight and call for higher quality flight planning and quicker decisions in the air.

The high speed of a jet plane accentuates the problems of icing and turbulence. While it is usually accepted that ice builds up in direct proportion to the speed of a plane, jet pilots have experienced variations of the rule. Few pilots interviewed at March and Williams have had difficulty with rime ice. They reported flights in which rime built up on the windshield and antennas, but not to any serious degree on wings or control surfaces. Clear ice, they agreed, is another matter, and no jet pilot wanted to fly too long in an area of such icing conditions. As an illustration of how rapidly clear ice can build up, one pilot reported picking up enough ice while passing through one cloud to reduce his airspeed 10 mph.

While the high speed of a jet gets you through a rough spot faster, it also gives a storm added force. Forward visibility is often lost even in a light rain shower.

Turbulence can play havoc with any instrument flight, and the high speed of jets accentuates the problems of rough air. A continuous "dancing around" may cause the gyros to drift, and even a small change on the indicator can lead to a large change in the flight path of a high-speed plane. You can lose 2,000 feet or more in a slight turn in a matter of seconds without detecting it if you are relying on the artificial horizon only. You must use the full panel. Jet pilots are taught, like any other pilot, that the best thing is to use caution in areas of extreme turbulence. While a conventional plane cruising at 200 mph can be slowed to 150 in rough air, a jet "slowed down" is still doing 300 mph unless you dump flaps, gear and extend dive brakes. Jet jockeys are the first to point out that you can't fly cross-country with your wheels down. So in moderate turbulence encountered on instruments, they bump along through it.

Jet pilots are unanimous in their desire for planes equipped with flight indicators that won't drift or tumble in unusual positions.

Navigating by radio during an instrument flight keeps a jet pilot busy. Because of the speed, you

pass range stations in some areas as fast as you can tune them in. Taking fixes with the radio compass, jet pilots agree, has to be done quickly or the distance between two or three fixes becomes so great you end up knowing only what state you're over. What is needed, they argue, is a radio compass with two needles on the same dial giving the bearings to two stations simultaneously. They figure that if you could get two lines of position at the same time you could keep yourself oriented.

Another aid the jet pilot would like when he flies IFR is a more complete picture of the upper air weather conditions. Most cross-country training missions are flown at high altitudes where there is insufficient knowledge of winds and clouds because of the gaps between radiosonde reporting stations.

High fuel consumption brings problems equal to those attached to high speed. "Once you make a decision to make an instrument letdown," Colonel Gray will tell the new jet pilot, "you don't have time or fuel to play around."

Instructors at the Williams transition school consider 110 gallons of fuel the minimum with which they advise a student to attempt a radio range letdown. "Even with that amount of fuel you have to do everything right the first time," Capt. V. Noriega, C.O. of the jet transition squadron, tells his students. An experienced P-80 pilot from March AFB hit the high cone at 24,000 feet over Denver and descended to Lowry AFB —all in five minutes, yet he used 45 gallons of fuel.

Letting down in a jet you have to carry a fairly good amount of throttle to avoid a flameout. On GCA approaches, flown at low altitude, the fuel consumption for a safe per cent of rpm is, let us say, nine gallons per minute. While at 40,000 feet, the same per cent rpm could be obtained on about three gallons per minute.

The IFR requirement that a plane have enough fuel to fly to an alternate field plus 45 minutes is difficult to meet in a jet plane. Jet pilots think the rule should be alternate plus so many miles, or maybe 20 minutes. Fuel for 45 minutes in a C-47 is good for about 100 miles, while a jet can cruise around 400 miles in the same time. Another problem of the jet on instruments is fitting it into traffic control holding. When a jet pilot is told to "wait" for a letdown he must almost certainly ask for immediate clearance to let down or go elsewhere. The jet doesn't fit too well into the holding pattern of slower, long endurance planes. Some jet pilots have met this problem by radioing their ETA 20 to 30 minutes ahead in order that Air Traffic Control can have time to clear the area for an immediate letdown.

With all these new techniques of instrument flight

Sgt. S. Bucheri helps Lt. Michael Smolen adjust instrument hood at Williams AFB as Capt. R. M. Perkins, Operations Officer, advises.

in jet planes, there was an obvious need for instrument instruction in the transition school. Accordingly, jet instrument training has been included in the course at Williams AFB. Of the 30 transition flights made by each student in the P-80, three are hooded instrument flights. The student flies the instrument missions with the conventional blue goggles and orange plexiglass. His instructor accompanies the flight in a second P-80, and follows the student through the required maneuvers. He also serves as a safety observer. The instrument missions, which combine climbs, turns, letdowns, and radio range and radio compass workouts, were organized with the aid of instructors from the USAF Instrument School at Barksdale AFB. The student flies each mission from a card which gives him the maneuvers required in sequence. His instructor checks on the flight from a duplicate card.

"The three flights are a bare introduction to the problems of instrument flight in high-speed airplanes," according to Capt. R. M. Perkins, operations officer for the transition squadron. "But Barksdale will soon be in full swing with a standardized jet instrument school."

The biggest news in jet instrument training, however, is the Lockheed two place jet trainer. Brig. Gen. Thomas C. Darcy, Commanding General of Williams AFB, says the new dual Shooting Star, termed the TF-80C, will speed the training of both aviation cadets and seasoned veterans in the operation of new jet tactical airplanes, both fighters and bombers. In the new trainer it will be possible to make accurate checks on the instrument proficiency of pilots in addition to drill in combat maneuvers, gunnery, high-speed navigation, formation flying, and other tactical operations.

The TF-80C (TF stands for trainer, fighter) has the same 38-foot 10½ inch wing span of the regular P-80, but the fuselage length has been increased about 37 inches to include the second cockpit which is completely equipped. An interesting feature is the power operated canopy which opens wide for crew entrance and can be jettisoned explosively by either pilot.

It would appear from Air Force planning data and the comments of pilots that jet instrument flight is here. Provided the plane is equipped with the proper instruments—all agree that on the gages it is flown full panel—and provided the pilot plans his flight carefully and masters operating procedures, an IFR flight in a jet is as easy as in any propeller-driven plane.

WELL DONE

TO

1ST LT. GLEN A. PEBLES
319th Fighter Sqdn. (All Weather)
Caribbean Air Command

A BIG HANDSHAKE is well in order for Lt. Glen A. Pebles for his outstanding performance in averting disaster by keeping cool and handling an emergency with commendable proficiency.

Lieutenant Pebles was participating in a navigational training flight of seven P-61s led by Maj. V. M. Mahr (Commanding Officer of the 319th) from Rio Hato to Borinquen via Jamaica. It was the latter portion of the flight which proved to be the most eventful for Lieutenant Pebles.

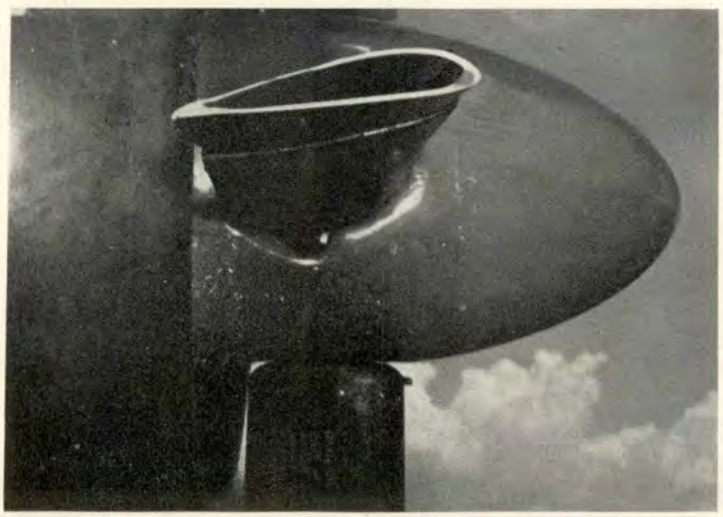
At 12,000 feet between Vernam and Borinquen, the left engine set up a terrific vibration. Lieutenant Pebles tried to throttle back, but the throttle cables and linkage were evidently wrenched so badly the throttle would not retard. The prop was feathered within three to four seconds, because he thought the engine had blown a cylinder, even though engine instruments were reading normally. When the prop stopped in the feathered position he could see that one of the blades was sheared about 18 inches from the hub. Full rudder trim was applied to hold the plane straight. The plane was controlled effectively with single engine procedure at 150 mph. Then the plane gradually lost altitude and Lieutenant Pebles jettisoned the wing tanks. Feeling sure the airplane could maintain altitude with the good engine at maximum cruise, he was at a loss to know why the P-61 continued to descend.

At first he decided to make Port Au Prince, Haiti, but when the coast was reached, he was down to 2,000 feet indicating 130, so the course was set to Jacmel, the nearest landing strip. His two wingmen dragged the runway ahead to clear it of animals and natives and to determine the best direction for approach. The rest was SOP and a safe landing was made.

What was found on the ground explained the plane's inability to maintain altitude. The prop sheared because of an internal defect in the hollow blade. The rods of the dead engine were sheared and the engine had twisted and dropped about a foot. The left boom was twisted so badly the skin was wrinkled.

"I guess I was lucky," said Lieutenant Pebles.

Yes, you were lucky, Lieutenant Pebles, but it wasn't all just luck. You knew your plane and how to handle the emergency. Your job was well done.



USUALLY RELIABLE

Two P-80 PILOTS walked into operations to get a local clearance. Just a routine flight.

"Charlie, take a gander at the weather, I'll get the clearance."

"O.K., got my ship number?"

"One-nine-seven, isn't it?"

"No, one-nine-one."

The pilot of two-seven-eight filled out the local form and handed it over to the A. O.

"What's the gory story Charlie, my boy?" asked Captain Don Addams, the flight leader.

"Just some local scattered showers," replied Charlie. "The John in weather says we can stay VFR if we make with the standard rate turns ever so often."

The pilots went to their airplanes.

"Hey, Charlie," Addams called as he hopped up on the wing of two-seven-eight. "I'll call the tower and you just follow me out."

"O.K. boy, let's get 'em churning," came the reply.

The two Shooting Star pilots taxied rapidly past an array of propellered contraptions which were being warmed up on the taxi strip. Two-seven-eight lined up on the left hand side of the take-off runway. One-nine-one rolled up to a stop just to the right and slightly to the rear.

"Tower, two-seven-eight I-16 on, 100%, full flaps, pressure up, ready to roll."

"One-nine-one, 100%, I-16 on, full flaps, pressure up."

"P-80 formation cleared to go," came the reply from the tower.

A staff sergeant on the alert crew commented on the formation the P-80's were holding as they became airborne.

"You can sure tell that those two boys have been up in an airplane before," he said. Two other alert crewmen nodded in agreement as they watched the jets disappear behind a cumulus cloud.

"One-nine-one, do you read?"

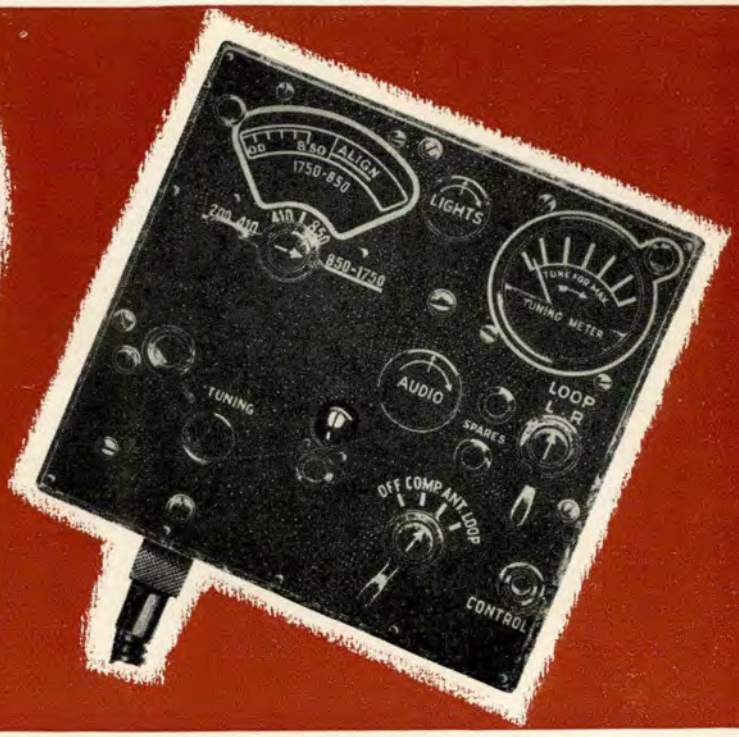
"Roger, R5, S5."

"O.K., we'll climb VFR until we top this scattered stuff."

The two jets leveled off at 22,000 feet. Captain Addams went through a series of tight turns in a playful effort to shake his wingman.

"One-nine-one, drop back a little and we'll try some acrobatics in trail."

"Roger, lead the way."



By CAPT. JOHN J. HERBERT, JR.
Flying Safety Staff

Don Addams, former AVG ace hadn't lost a bit of the skill acquired in maneuvering up behind 13 Nips in the sky over China. Carson was duck soup for him and Addams didn't improve Carson's coordination any, each time he came out with BANG BANG, YOU'RE DEAD. Addams came home from China in 1943 and knocked around the Training Command until VE Day. VE plus one found Citizen Don Addams en route to Alaska with big ideas. Eighteen months of bush flying was brought to a screaming halt when Don got a wire telling him that he had made R.A.

That was almost a year ago.

"Two-seven-eight, it looks like that stuff is getting pretty solid underneath. Better tune in the range station on your compass and home in."

Charlie Carson tacked on Addams' wing just as several vertical flashes of lightning could be seen in the west.

"Hey Addams, let's go around that one, or our dogtags will beat us home."

"Roger, extend dive flaps, one, two, three."

The two jets, descending rapidly, headed out to the northwest. Addams decided to go through a light spot to the right of the thunderstorm.

"Two-seven-eight, are you sure we're heading for the field? I think it's in back of us. We flew 270° after takeoff for a good 20 minutes."

"Get off the air Charlie, we're O.K., I'm homing on the station now. My needle is a little erratic, but I think we're quite a way out."

"You think? Well, let me tell you what I know. You'd better get us home or have them send a fuel truck up to meet us."

"One-nine-one, hold on top of this stratus. I'm going to get under the overcast. South Shore just reported 1200 feet and four miles. I'll call you when I'm VFR."

"Roger, I'll hold 270° until you call."

Addams tried to contact one-nine-one just after breaking out in the clear and finding himself over water. "Carson was right," he said to himself as he reefed the P-80 around to a heading of 80°. "I can't figure that out," he mused as he got his first view of land in the past 45 minutes. This radio compass has usually been reliable."

Addams tried to raise Carson again.

"Charlie, let down, I'm VFR crossing the coast, ceiling is about two thousand."

Addams didn't know that Carson had bailed out

at sea. While he had been trying to contact the tower on "B" channel, he hadn't heard his wingman's last transmission: "Two-seven-eight, two-seven-eight, Addams, answer me! This is Carson, fuel pressure dropping. I'm going over the side at 4500 feet."

Captain Addams made a straight-in approach to an ex-Air Force Auxiliary field which was now being used by one of the major commercial airlines for instrument practice.

Parked in front of operations, he got rid of his chute quickly and ran into the office of the field manager. Addams didn't even ask if he could use the phone, he just started dialing. That didn't work. He finally got the operator to put through his call.

"Did Carson land yet?" he asked. "This is Captain Addams, did Carson land back there? No? Well, get Air Rescue out, he must have gone down out at sea somewhere on a line 270° from the airline school."

Charles Carson and his P-80 were never seen or heard of again.

* * *

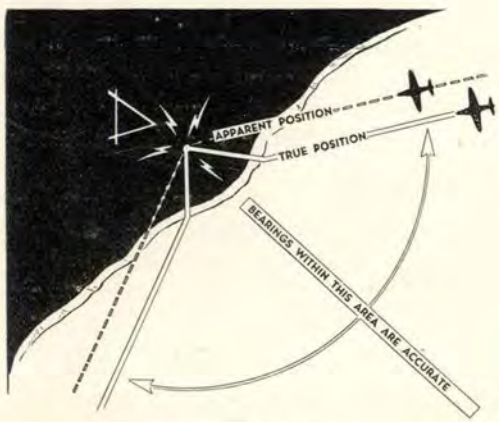
"Captain Addams, the instrument board feels that several induced errors in your radio compass caused the predicament which resulted in the loss of Captain Carson and that P-80," said Colonel Bradford, senior member of the investigating board. "Do you think the board is correct in this assumption?"

"Well, Sir, I'm not too familiar with this error business you spoke of. I would appreciate it being explained to me."

"Addams," said Major Williams of the instrument board, "I am going to assume that you are not familiar with any of the several types of errors that may be encountered when using the radio compass. They are mountain effect, inter-station interference, heavy static, pulsing of the indicator needle, coast reflection, and night effect. Now, I believe that heavy static from the scattered thunderstorms in the area caused your radio compass needle to point toward the center of the electrical disturbance, giving an erroneous bearing. I also feel that since your position was known to have been over water and the radio range was at such an angle from your position, the radio waves were refracted by the shoreline so as to cause a further error. This could be as much as 10° or 20°. There is also a possibility that since you were homing on the station at dusk your loop receiver was liable to be seriously in error. The reason for this is that part of the signals arrived by reflection from the heavy side layer or ionosphere in such a manner as to induce electro-motive forces in the horizontal portion of your loop. This may sound too technical, but I will show you an illustration in this Training Command Radio Compass Manual. The effect is variable and cannot be predicted and the error from this cause might be 10° or 20° or even more."

"Frankly, Major, I'd heard of this error business before but I never knew it could throw you that far off," Addams conceded.

"You were lucky, Addams," said Major Williams. "Carson, wasn't, I guess. But if I were you, I'd spend a few hours in the books and get these things down pat. The radio compass is an extremely useful radio aid if you know its limitations. If you don't know what these limitations are, you might as well sit up there and follow a darning needle."



SHORE LINE EFFECT

ELECTRICAL DISTURBANCE EFFECT

Give me a POWER SETTING!

By MAJ. WILLIAM P. BENEDICT
A-3 Div., Hq Air Training Command

I WAS JUST ABOUT to sign the incoming officers' register at a B-29 base when lo, and behold, who should walk up but Capt. James Martin, who had been my instructor at the Barksdale Instrument School.

"What are you doing here?" he asked.

"I'm down to get the latest poop on personal equipment," I replied.

"You're still at the instrument school?" I asked, making conversation so that old man Martin wouldn't run off with the staff car.

"That's right, I'm just here for a few days to help work out standardized power and flap settings in the Baker-29. They are having a little trouble getting the big bird to perch on the glide path on GCA approaches."

"Why don't you arrange your work so that you can come along with us," Martin said, "we're going up this afternoon."

"Good deal, I've never been up in a '29' and this equipment conference is slated for tomorrow morning," I said.

At 1300, we became airborne, Martin and I were riding just to the rear of the pilots.

The pilot, a major, made several unsuccessful simulated GCA approaches. He did O.K. until he intercepted the glide path. It seemed to me that the pilot was overcontrolling. Martin took notes on each approach.

After the fourth approach, Martin asked the pilot to climb 3000 feet.

The major got up and offered his seat to Captain Martin.

"Give me a power setting," said Martin, as he buckled his safety belt.

I guess the crew looked as confused as I did.

"Any setting," said Martin, "that will give me close to 130 mph with gear and one-fourth flaps down."

I guess the major thought Martin had blown a stack because he told the copilot to make tracks and he took over the right seat.

Martin experimented with different rpm, manifold pressure and flap settings for about an hour.

"I think I have it," he told the major. "Put the hood up again and don't hesitate to take over if I get into any trouble on the approach."

Martin made 10 GCA approaches. He could have landed under a 200 foot ceiling on nine of the 10. The one that he missed was the first. He had been too high on the glide path and elected to go around.

The pilot and copilot were amazed at the fact that Martin, who had never set foot inside a B-29 could while under the hood bring the airplane over the end of the runway at 40 feet.

You are probably wondering what legerdemain Martin used. There are no tricks to it. He experimented a little and found that with certain rpm and flap settings a constant rate of descent resulted from holding a constant airspeed. The only variable was the throttle settings and even these settings didn't vary much.

This system, which is standard with the Air Force Instrument School, is the easy way to a GCA or ILS approach. You still have to fly the airplane. Because of wind and load variations different throttle settings are necessary to hold the glide path. Try it yourself and see if you don't get away from the tendency to overcontrol which is common when pilots don't have the required power setting for the desired rate of descent.

CRUISE CONTROL

By LT. ROGER W. LITTLE

WILL A B-25 stay aloft for nine hours in an emergency on its normal supply of 974 gallons of fuel? What power settings should one use on a C-47 for maximum range or to prevent excessive wear and tear on the engine?

Each pilot should be able to answer questions of this type about every airplane he flies. This is cruise control, and it is as much a part of training as knowing the emergency procedure for lowering the gear and flaps. Every pilot should practice cruise control even if he is only making a local flight.

In these days of petroleum shortages, allotments of fuel are used quickly enough without burning it inefficiently because the pilot does not know the proper power settings for cruising his airplane. Accompanying this waste is always the risk of a forced landing or a bailout and a wrecked airplane because of fuel exhaustion.

To help the pilot estimate the safe range and most economical fuel consumption rate, the Flight Data Branch of the Engineering Division at AMC has devised a series of "Cruising Guide" cards for reciprocating-engine aircraft and "Flight Range Guide" cards for the jets.

RECIPROCATING ENGINES

With the Cruising Guide cards and the accompanying black plastic case in which they are inserted for ease of reading a pilot can estimate the performance of his airplane under almost any conditions.

These cards are especially valuable to operations and airdrome officers in checking proposed flight clearances, taking winds aloft into consideration also. AMC recommends that operations officers as well as pilots be equipped with the cards and that responsible operations personnel are checked out on their use.

There are sets of cards for all types of reciprocating-engine aircraft in present use. They are in Class 30-G supply and should be made available at base level. The black plastic case is a part of the pilot's kit.

The cruising guide cards cover the range of possible weight limits for the aircraft with a specific card for each type of external load items.

One side of the card is divided into five large columns numbered from I to V. Column I is the data for high-speed cruise and minimum range. Columns II, III and IV give progressive increases in range at sacrifices in speed, and in Column V is the best data for maximum range at minimum cruise. Each column is divided into three parts, giving quantity of fuel, and range in statute and nautical miles respectively. Thus, a pilot can check the amount of fuel he has on board and then refer to the card for a quick check of his possible range at the desired airspeed.

By reference to the other side of the card he can obtain information as to the required rpm, manifold pressure, and mixture setting at any reasonable altitude to obtain the specified range. This ready reference can be very useful during flights where it is necessary to change the flight plan en route.

The cards also contain range data and power settings for single-engine operation.

JETS

Through the medium of actual flight tests conducted by test pilots of Headquarters, Air Materiel Command, sufficient cruise control data has been obtained for the P-80A and B, the B-45A, and the P-86.

Takeoff distances, climb data, and descent data were combined with cruise control and are furnished to the pilot for ready reference in the form of five "Flight Range Guide Cards." These cards are 4" x 6½" and made of plastic so that they can be carried in the pilot's flying suit. They are in Class 30-G supply also.

Takeoff distance data covers altitude from sea level to 5,000 feet in a temperate range of —40° to 120° F. The card gives the distance of ground roll and the distance required to clear a 50-foot obstacle. Takeoff procedure is described on the card. This information is invaluable for strange-field takeoffs.

The Climb Data Cards give the fuel to be consumed in climbs from sea level to 40,000 feet, distance covered, time required, rate of climb, and the indicated airspeed. Separate data was obtained for a clean structure and a jet equipped with drop tanks.

AMC's warning to jet pilots in using the descent data is to be watchful for a flameout as it is necessary to reduce rpm considerably in the descent, depending upon wind conditions. With a tailwind at flight altitude it is a recommended procedure to fly to destination and then dive down. With a headwind it is best to use the descent data and start the descent the required number of miles before reaching the destination.

Flight range guide cards are figured for a jet with no tip tanks, with two tip tanks dropped when empty, and with two tip tanks carried all the way.

Range figures include allowances for prescribed climb, descent to sea level, and a 50-gallon landing reserve. This range is based on usable fuel and not the full tank capacity. With the 50-gallon landing reserve the average single-engine jet is able to make three go-arounds providing the pilot maintains a reasonably tight pattern, or it will enable the jet to fly at pattern power setting for about seven minutes.

It is possible to combine descent or climb data with the flight range data to get maximum range when a change in altitude is necessary during the flight.

The test pilots and engineers of AMC stress flying by rpm. The per cent rpm and range factor for headwinds or tailwinds is given on the card. Pilots are cautioned not to try to fly solely by the airspeed given on the card as it is only an approximate figure due to variations of temperature. If the per cent rpm is increased above that given for a specific altitude, the fuel used increases accordingly so nothing is gained in range.

No data is yet available for jet airplanes carrying bombs, but it will be based on 10,000-pound increments for bombers.

All of this information will be printed in the pilot's handbook on each type airplane along with sample problems on maximum speed with minimum range and minimum cruise at maximum range. The cruise cards take the guesswork out of learning the range possibilities of your airplane, and with them you will be better equipped for making cross-country flights.

TOO LOW—TOO LATE

IT HAD JUST BEEN a routine test flight and this was to be just a routine night landing. So thought the pilot of a B-29 as he called the tower at his home base for landing instructions.

The tower came back with the dope: "Left hand traffic, wind calm, runway 30, altimeter 3010, check base leg, over."

The pilot acknowledged the tower operator's instructions and entered traffic at an indicated altitude of 800 feet about two miles from the well-lighted runway. The checklist was accomplished on the downwind leg and preparations were made for the landing.

While turning on the base leg, permission to land was obtained from the tower with the usual "gear down and locked" reminder. The tower operator also advised the pilot of a corrected altimeter setting of 3021. Neither the pilot nor copilot made a move to correct their altimeters.

The complete pattern was close to the field and the base leg was just a momentary roll-out in which full flaps were started down. The turn onto final approach was made between 400 and 500 feet indicated and the B-29 was still descending at about 130 mph.

It wasn't until completion of the final turn that the pilot realized his dangerously low altitude. Too late the pilot began to apply the insufficient corrective action.

The Nos. 1 and 2 engines, left gear, and nose gear struck a dike. After the dike, the left wing struck an unlighted approach light approximately 1500 feet from the end of the runway. The B-29 suddenly started to burn as it skidded in a sort of groundloop to the left until it came to rest approximately 650 feet from the end of the runway, heading almost 180° from its original heading.

Within 30 seconds, after all crew members and passengers had evacuated, the plane was completely engulfed in flames. There were 12 men aboard, although only 10 were listed on the Form 23 at the point of departure. The hasty yet orderly exit from the B-29 reflects the knowledge and proper training of emergency evacuation by the crew.

In this accident a number of factors teamed up to make a fiery wreck of a good B-29, but the main cause was pilot error. The pilot did not realize the dangerously low altitude of the airplane and did not apply corrective action soon enough.

The pilot had violated base flying regulations by flying the pattern at an indicated altitude of 800 feet rather than 1200 feet as specified by the regulation. The accident indicated a lack of coordination between pilot and copilot. The copilot did not call out airspeed on the final approach and he evidently was not observing the flight instruments.

Either the copilot was not familiar with local flying regulations or he chose to ignore them also, maybe because he was just the copilot and had only one previous flight in a B-29. However, the copilot was an experienced flier and, regardless of the type of airplane being flown he should have been able to ascertain that they were dangerously low on the approach and warn the pilot.

The altimeter setting of 3010 given to the pilot on initial contact with the tower was actually the correct setting, although the tower, upon checking with base weather, gave the pilot an erroneous setting of 3021 when he called in on the base leg. However, the altimeters were not changed from their original setting of 3010.

If the pilot had changed his altimeter to 3021, it would have resulted in a higher indication on the altimeter and an even lower margin of safety.

A possible factor in the pilot's low approach may have been the fact that the approach lights were inoperative, but a Notam was in effect and available to the pilot at the time the flight originated. Also, the pilot should have noticed the absence of the approach lights when turning on the base leg and should have planned his approach carefully.

The famous and sometimes fatal last words, "I've got a thousand hours in this crate, relax!" really don't help you to fly the airplane. The pilot of this burned B-29 can verify that—vehemently.

FUEL STA

To CRASH LAND or bail out because of "fuel exhaustion" and then find that there is anywhere from 10 to 250 gallons of fuel still aboard the plane is embarrassing to say the least.

That is exactly what happened in several recent accidents.

Take the case of the P-47N engine in the first picture. The pilot took off on a proposed flight of one hour and 15 minutes with 270 gallons of gasoline in the mains and about 15 gallons in the auxiliaries. Shortly after takeoff, the pilot switched to the auxiliary tank for climb. After five minutes, while placing the mixture control in lean, the engine lost power. The pilot began switching gas tanks like mad, making the complete circuit at least twice on the selector. Several days after the bailout he was told the primary cause of the accident was engine failure due to fuel exhaustion in the auxiliary tank and his failure to take time between switching gas tanks to allow the fuel to feed in from the full main tanks.

The pilot of the P-84 in the second picture was cruising along when he noticed the main fuel gage going down and fuel not being transferred into the main tanks as it should. He switched the tank selector, but the main gage was still going down. Flameout occurred at 7,000 feet and he was unable to start the jet. The pilot was so occupied with his dead-stick landing that he did not use the emergency system for lowering the nose gear. After the crash it was found that the fuel in the wing and other tanks was not available because the circuit breakers for the forward and wing fuel pumps were in the off position.

The jockey of the P-51 in the third picture was the victim of "selectoritis." He turned the selector from right internal to what he thought was left internal, but since both ends of the selector switch are practically identical, and the airplane had only one fluorescent light, plus the fact that the pilot did not have a flashlight and was using gloves, he placed the selector on left external inadvertently. The external tanks had not been serviced and the pilot was fully aware of this. The engine ran 10 minutes and quit. After the first mistake, all subsequent changes of the selector resulted in placing the proper end of the selector on empty tanks. This took care of his power failure completely.

RVATION

The pilot of the pancaked P-47 in picture No. 4 switched tanks from main to auxiliary about 10 minutes after takeoff. On arriving over his destination, he proceeded to let down from 5,000 feet for his tactical approach. Although he knew he had very little fuel remaining in his auxiliary tank, he decided to wait and switch tanks during his landing check. At 2,000 feet he advanced throttle and nothing happened. He switched tanks, but neglected to turn up the emergency fuel boost rheostat. He landed wheels-up on the runway. The 250 gallons of fuel remaining in the main tanks was enough to make the return flight to his home base with plenty to spare.

The pilot who starved the AT-6 engine in the fifth picture was also a fast man when it came to switching gas tanks. He had just broken out of an overcast on an instrument approach to the field when the fuel warning light came on—he switched tanks without using a flashlight. The light came on again so he switched blindly to another tank and then on around the other selections while wobbling the hand pump. He crashed into a wooded area near the field with a later-measured 14 gallons of fuel remaining in the reserve tank. This was another case of a fast switch without giving the engine time to catch.

Carelessness and misuse of the fuel system resulted in the position of the AT-6 in the sixth picture. The pilot had taken off, climbed, and flown for one hour and five minutes on the reserve tank with the mixture in full rich. When the engine failed the pilot switched to the right tank, applied carburetor heat full-hot, operated the wobble pump, pumped the throttle, and landed wheels up in an open field. Conclusions were that the pilot used all fuel from the reserve tank, failed to switch tanks in time, and with carburetor heat in full-hot position it was impossible to start the engine.

Proper use of the fuel aboard and complete knowledge of the fuel system of the plane being flown are just as important as any of the other phases of flight planning. Don't let the accident investigating board say with tongue in cheek, "The engine failed due to fuel exhaustion, but there was a measured umpteen gallons of fuel remaining in the tanks after the crash!"

Flying Safety BRIEFS . . .

WEATHER DIAL

AN AID TO AIRMEN, called an Icing and Thunderstorm Weather Dial, offers an instant reading of what to do to avoid dangerous flight conditions.

The simplicity and accuracy of checking the weather on a "slide rule" or computor weather dial, instead of having to depend upon memory in recognition of the type of weather faced and the best procedure to follow for flying safely, may help eliminate pilot error and enable a pilot to cope with a hazardous condition.

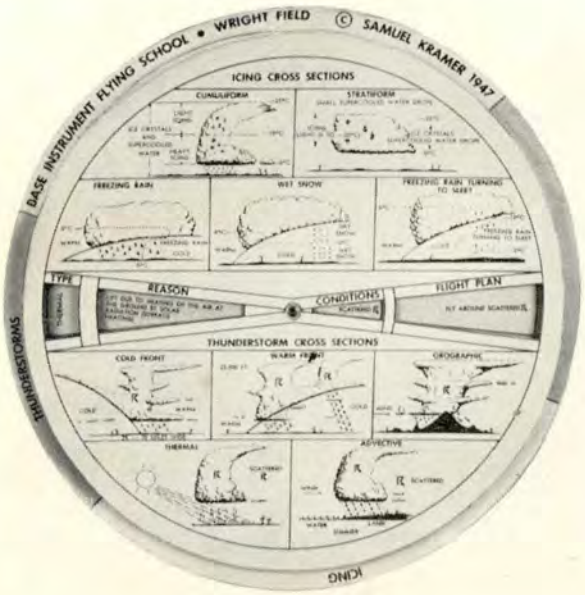
The dial lists all the main types of clouds, their intensity, and indicates the best flight procedure through them.

The top part of the dial has cross-section diagrams of icing hazards, thus enabling the pilot to have a picture of the situation for comparison while flying. By turning the dial properly the bottom disc will show thunderstorm conditions and the immediate flight procedures for passing these hazards with a minimum of danger. All this can be read directly from the computer whenever needed.

In the event of a thunderstorm, the pilot would first use the cross-section sketches of cold front, warm front, orographic, thermal, and advective as the key for identifying the type. With sketches of all types of thunderstorms before the pilot, proper identification of the approaching storm is easy. At this point he turns the dial until the identified type of thunderstorm appears. For example, if a thermal thunderstorm is the type being approached, "thermal" becomes the special word to be dialed for obtaining the answers as to how to cope with this particular hazard.

The same procedure would be followed on icing conditions which are classified into types of cumuliform, stratiform, freezing rain, wet snow, and freezing rain turning to sleet.

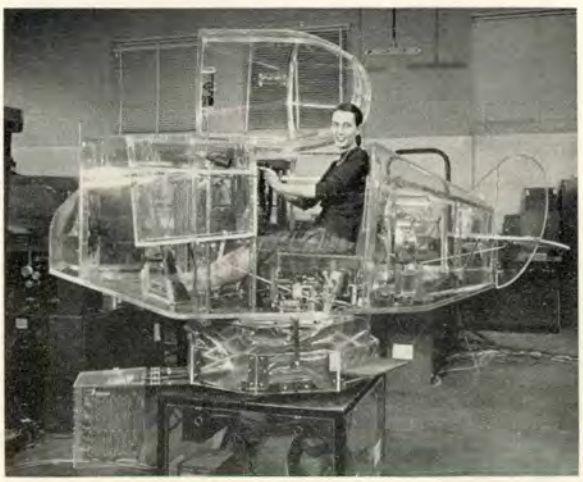
Mr. Samuel Kramer, inventor of the dial, is an instructor in the Weather and Instrument Flying Course at the Base Instrument Flying School, Wright-Patterson Air Force Base, Dayton, Ohio.



PLASTIC LINK

It's true that you won't get any instrument time flying a plastic trainer, although pilots might prefer it, especially when they are in a spin or when tackling a touchy range problem in a Link trainer.

However, one can easily see the working parts through the plasti-glass, and it was created as a practical mock-up for the purpose of training Link maintenance personnel in troubleshooting. On first glance this Link may appear quite complicated, but



to one who has watched it in operation its complexities become simple—you can see right through them. Thus, troubleshooting and preventive maintenance students have observed the operation of the working parts and their location in the plastic Link.

The plastic Link which the girl in the picture is demonstrating is undergoing experiments as a maintenance trainer at Wright-Patterson Air Force Base.

RESCUE SPECIALISTS

A Para-rescue and Survival training unit has been initiated at MacDill Air Force Base by the 5th Rescue Squadron. There they are training medical technicians and paratroopers of the Air Rescue Service how to jump and survive in any area or climate.

At this school, men wearing protective clothing and masks are dropped into densely-wooded areas as they may have to do in actual rescue missions. They use the jumping procedures perfected at the Forest Service "Smoke Jumpers" school at Missoula, Montana, learning how to descend from the tops of trees in which they have landed.

They learn to live off the land. After jumping into woods or swamplands, they set up bivouacs and gain a first-hand knowledge of how to maintain themselves in the wilds.

After four weeks of night and day schooling at MacDill, they are ready to taste the rigors of cold climate survival, simulating Arctic conditions, in the mountains west of Lowry AFB, Colorado. Then follows a course in desert survival at Biggs AFB, Texas.

At the end of this concentrated course, they are sent to rescue detachments throughout the world as Para-rescue and Survival specialists, and are formed into teams ready to fly to the rescue of all airmen in distress.

BOEING XB-47 COMPLETES FIRST TESTS

The 60-ton XB-47 Stratojet bomber has completed the first phase of its flight-test program at the Moses Lake Air Force base in central Washington.

The airplane is now to be turned over to Air Materiel Command pilots by Boeing for phase two flight tests.

Initial tests on the six-jet bomber included evaluation of landing, takeoff, speed and unsymmetrical power performance at various altitudes, and takeoff with the assistance of all 18 of its Jato (jet-assist) rockets.

The XB-47 will be joined soon by the second XB-47, which recently was rolled from the Boeing assembly line for final installations and stationary functional tests preparatory to its first flight.

BOMBING-UP

By S/SGT. DAVID M. GREY

Instructor, Airplane Armament
Lowry Air Force Base, Colorado

When a bomb explodes in an airplane, or while it is being handled on the ground, the cause is very difficult to establish because the pieces picked up by the investigators are so small. Yet it can be assumed almost positively that the cause was the result of human error or carelessness.

Many disastrous explosions could have been prevented by the observance of simple safety precautions during the loading, fuzing, or the unloading of bombs. In combat, the rush accompanying hasty preparations for missions was sometimes responsible for the use of slip-shod methods. Peacetime, however, offers armorers an opportunity to perfect "bombing-up" techniques without the waste of haste.

Following are a few safety precautions that would, if observed by those responsible for handling bombs and fuzes, minimize the chances of an accidental explosion:

First required is a complete familiarization of all personnel concerning the equipment to be used and the explosive content of the bombs and ammunition to be handled. A fixed loading procedure and close supervision is SOP.

Then, on the job, be positive of the security of attachment of hoisting equipment to the bomb and of the bomb to the shackle and rack. Don't allow the hoist to slip and strike the rack, thus springing it and resulting in accidental release on takeoff or in the air. Always ease away or lower the bomb hoist cables carefully to double-check the security of bomb attachments.

Require that fuzing, AFTER LOADING, is completed by competent personnel.

Inspection is required of the complete load to assure positive engagement of all releasing devices and arming wire installation. For added safety while the plane is on the ground, the bomb-bay door should be closed partially to break the electrical circuit to the racks. This will prevent release if someone accidentally actuates the release handle or toggle switch.

If bombs are to be unloaded from the racks, they should first be defuzed and then lowered away with the bomb hoist.

It may be said that good, honest horse sense, combined with technical knowledge, is paramount in the loading and fuzing of bombs.

Also, if a base is carrying on bombing operations it is necessary that the base flying regulations cover all phases of this type of operation.

A tragedy in which an A-26 accidentally released a 165-gallon, napalm-filled belly tank on a barracks area causing two deaths and $11,000 damage could have been avoided if the pilots had been briefed to stay away from the barracks area, if all safety precautions had been observed in loading, and if all switches had been left in the *OFF* or *SAFE* position until the last turn toward the target had been made. Another in-flight precaution to prevent such accidents is to keep the bomb-bay doors closed and arming switches OFF until the plane is over open terrain or water on the actual bomb run.

Upon completion of a bomb run the bomb-bay doors should be closed and switches returned to *SAFE* or *OFF* position.

In case of a hung bomb, the pilot should immediately make the necessary arrangements to release the bomb in a designated place, or if this is not possible, return and land on the field after alerting all emergency units.

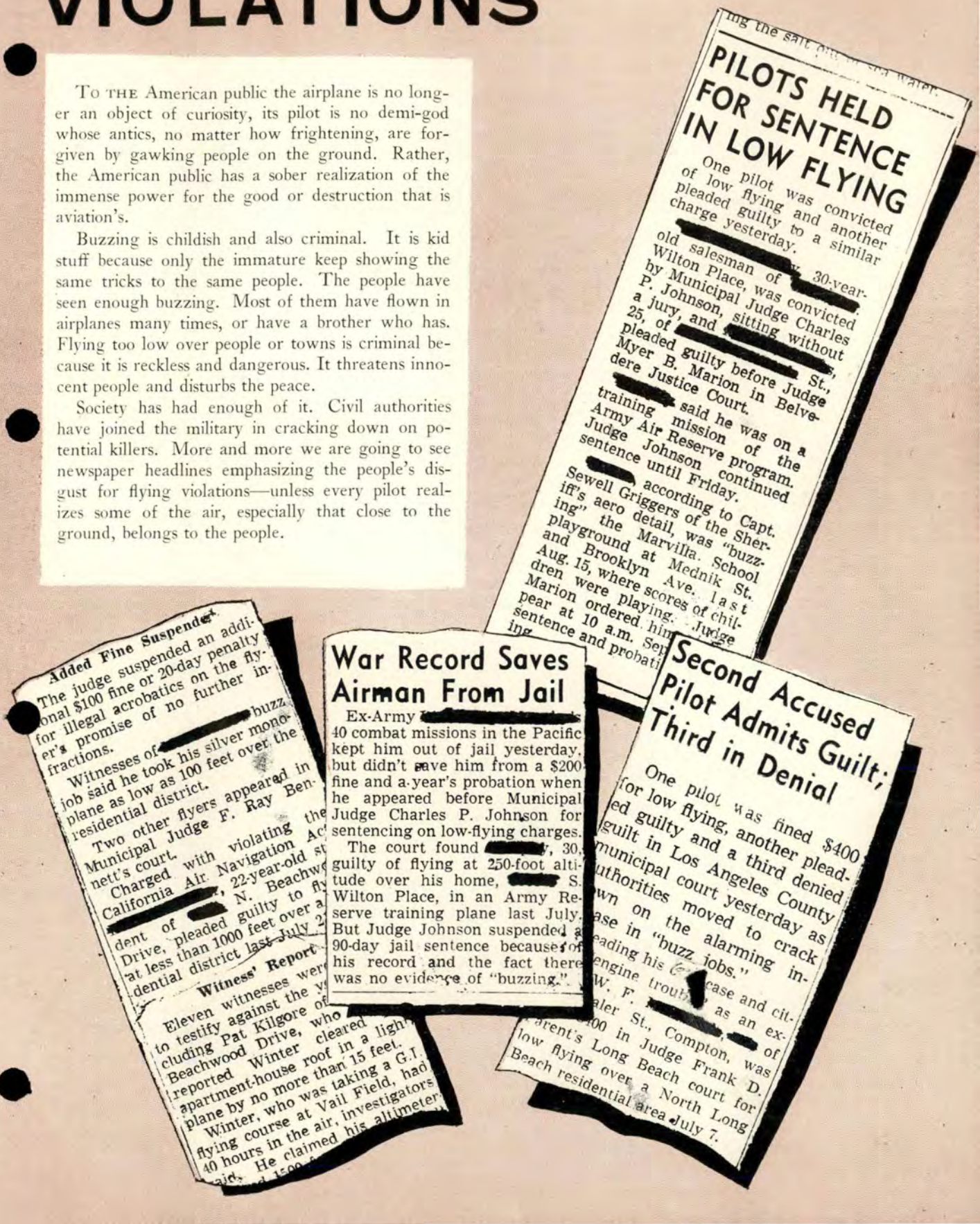
Bombs still present a hazard even though we are at peace.

VIOLATIONS

To THE American public the airplane is no longer an object of curiosity, its pilot is no demi-god whose antics, no matter how frightening, are forgiven by gawking people on the ground. Rather, the American public has a sober realization of the immense power for the good or destruction that is aviation's.

Buzzing is childish and also criminal. It is kid stuff because only the immature keep showing the same tricks to the same people. The people have seen enough buzzing. Most of them have flown in airplanes many times, or have a brother who has. Flying too low over people or towns is criminal because it is reckless and dangerous. It threatens innocent people and disturbs the peace.

Society has had enough of it. Civil authorities have joined the military in cracking down on potential killers. More and more we are going to see newspaper headlines emphasizing the people's disgust for flying violations—unless every pilot realizes some of the air, especially that close to the ground, belongs to the people.



PILOTS HELD FOR SENTENCE IN LOW FLYING

One pilot was convicted of low flying and another pleaded guilty to a similar charge yesterday.

[redacted] old salesman of [redacted] 30-year- Wilton Place, was convicted by Municipal Judge Charles P. Johnson, sitting without a jury, and [redacted] 25, of [redacted] St., pleaded guilty before Judge Myer B. Marion in Belvedere Justice Court.

[redacted] said he was on a training mission of the Army Air Reserve program. Judge Johnson continued sentence until Friday.

[redacted] according to Capt. Sewell Griggers of the Sheriff's aero detail, was "buzzing" the Marvilla School playground at Mednik St. and Brooklyn Ave. last Aug. 15, where scores of children were playing. Judge Marion ordered him [redacted] pear at 10 a.m. Sep[redacted] sentence and probati[redacted] ing.

Added Fine Suspended

The judge suspended an additional $100 fine or 20-day penalty for illegal acrobatics on the flyer's promise of no further infractions.

Witnesses of [redacted] buzz- job said he took his silver monoplane as low as 100 feet over the residential district.

Two other flyers appeared in Municipal Judge F. Ray Bennett's court.

Charged with violating the California Air Navigation Ac[redacted], 22-year-old st[redacted] dent of [redacted] N. Beachwo[redacted] Drive, pleaded guilty to fly[redacted] at less than 1000 feet over a[redacted] dential district last July 2[redacted]

Witness' Report

Eleven witnesses were to testify against the y[redacted] cluding Pat Kilgore of Beachwood Drive, who reported Winter cleared apartment-house roof in a high plane by no more than 15 feet.

Winter, who was taking a G.I. flying course at Vail Field, had 40 hours in the air, investigators He claimed his altimeter [redacted]

War Record Saves Airman From Jail

Ex-Army [redacted] 40 combat missions in the Pacific kept him out of jail yesterday, but didn't save him from a $200 fine and a year's probation when he appeared before Municipal Judge Charles P. Johnson for sentencing on low-flying charges.

The court found [redacted], 30, guilty of flying at 250-foot altitude over his home, [redacted] S. Wilton Place, in an Army Reserve training plane last July. But Judge Johnson suspended a 90-day jail sentence because of his record and the fact there was no evidence of "buzzing."

Second Accused Pilot Admits Guilt; Third in Denial

One pilot was fined $400 for low flying, another pleaded guilty and a third denied guilt in Los Angeles County municipal court yesterday as authorities moved to crack down on the alarming increase in "buzz jobs."

[redacted] ase and cited reading his [redacted] as an engine trouble as an ex- W. F. [redacted] of aler St., Compton, was [redacted]00 in Judge Frank D. arent's Long Beach court for low flying over a North Long Beach residential area July 7.

MAINTENANCE

To be an effective weapon, a combat plane must be manned by crews who know the plane from the ground up. They've got to know what it will do for them and, in turn, what it demands from them.

All this is precisely what the Air Training Command is setting out to teach a group of men who will hold a position of important responsibility in America's immediate future. Their responsibility is the care and handling of the planes that are to be this nation's prime bombers and fighters for the next several years.

The groundwork for this training program is being laid in the same factories that are building the bombers and fighters. It consists of a series of the most elaborate mobile training units ever built for the U. S. Air Force.

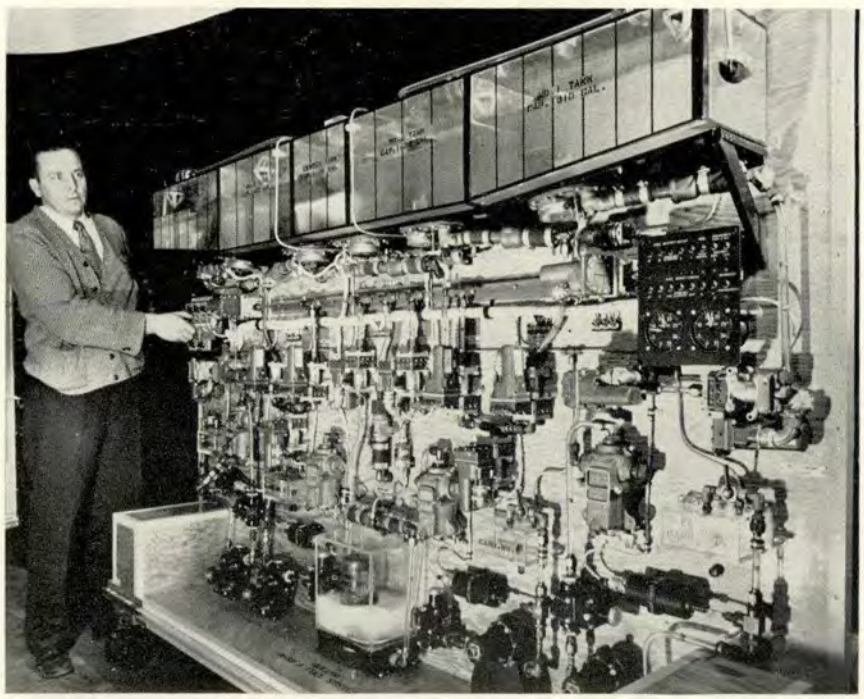
On order at Boeing, for example, are two complete sets of B-50 mobile training units, each with 21 components. When all are delivered to the Air Force they will comprise a veritable college on wings —a college that will be flown from campus to campus. The campuses in this case are the air bases where the Boeing B-50s will be stationed.

It's all very well to say, "The best way to learn about an automobile is to get under the hood of the auto itself." Why, then, aren't the same methods satisfactory for learning about an airplane?

Well, briefly, a four-engine bomber with a length of 99 feet and a 141-foot wingspread is a horsepower of a different color. Take the fuel system for instance. Tanks and fuel lines are buried in that 141 feet of wing, stretching almost from tip to tip. There's no "hood" you can lift and see the whole system right before your eyes. There's no way you can watch exactly what happens when the flight engineer flicks a switch on his panel.

Now look at the same thing on the training unit which bears the B-50 fuel system. Mounted on a 5 by 7¾-foot plywood panel are all the essential parts of the system: tanks, valves, boost pumps, engine pumps, flow meters, pressure transmitters — the complete flight engineer's fuel panel. They are right out of the B-50 itself and they work just like they do in the bomber. They differ only in position, and in some cases, size.

Fuel lines are shortened greatly, of course, and are made of plexiglas so the flow of fuel from tanks



The B-50 fuel system training unit works same as in bomber

to engines can be observed. The tanks, also of plexiglas, are small facsimiles of the real B-50 tanks, tailored to fit the mobile trainer. Using colored fluids to simulate gasoline, an instructor can put on a highly effective 20-minute demonstration of the B-50 fuel system at work. The embryo flight engineer can learn, by doing, such techniques as how to level his fuel load. Without benefit of the trainer, he might be told any number of times the proper method of isolating a ruptured tank and operating all four engines off the three remaining tanks; and he still might have to *learn* it the hard way in actual flight, by losing part of his fuel supply. By trying it out for himself on the trainer, he will learn quickly the right and wrong procedures and what happens in each case.

Because of their restrictions in size, training units of this sort require some pretty clever engineering. When you consider, for instance, that the hydraulics panel must include one of every type of part that is operated by hydraulics on the airplane itself, you can get a fair idea of the problems involved in getting all this aboard a piece of plywood the size of a country dinner table. Boeing engineers had to make this whole system operate by hydraulic pressure in exactly the same manner as on the plane.

By the time sizable numbers of Boeing B-50s are in the hands of the Air Force, the men who will fly them and the men who will care for them on the ground already will know their airplane.

Preparing for eventual activation of multiple-jet bomber squadrons in America's peacetime air arm, U. S. Air Force ground crewmen are taking a special B-45 four-jet bomber maintenance and service course at North American Aviation's Long Beach, California, plant. In addition to work with the mobile training equipment, the students are able to study actual components of the airplanes as they are being assembled.

These training aids describe graphically internal parts of the B-45, including the fuel, hydraulic and electrical systems. A mock-up of an instrument panel and pilot's seat for pilot procedure studies also are included.

The effectiveness of such training aids was perhaps best summed up informally by an Air Force sergeant who recently looked them over.

"If a man can't learn from them, he just can't learn," said the sergeant.

Mock-up of the B-45 jet bomber cockpit is used in crew training

P-80 SHOOTING STARS JOIN THE NAVY

THE UNITED STATES Navy has selected the P-80 Shooting Star for special assignments to units giving Navy fighter pilots jet transition training. To be known as the TO-1, the Navy Shooting Stars are the same design as the P-80 in current production for Air Force tactical units.

This is not the Shooting Star's first duty with the Navy. In 1946 a P-80 specially equipped with arrester equipment was flown aboard the carrier Franklin D. Roosevelt. Navy officials have stated that there are no plans for using the TO-1 as a Navy combat airplane.

Certain Navy pilots have already received transition training in P-80's at Williams Air Force Base, Arizona. Bulk of the TO-1's will be assigned to West Coast Navy and Marine operational units for use as standard jet transition trainers.

RADAR MAPS

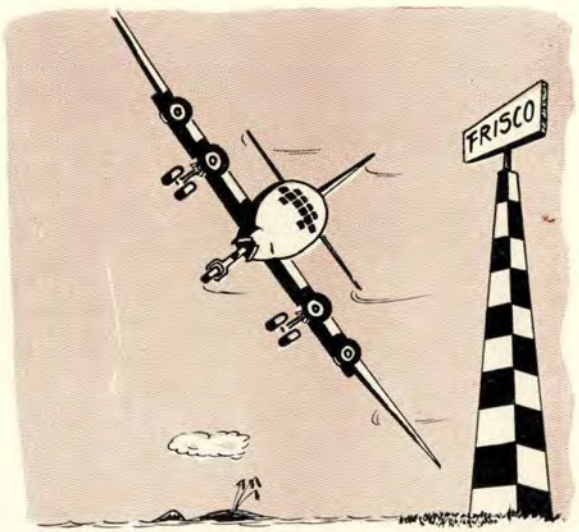
Using Airborne Search Radar AN/AUS-10 and Ground Radar AN/CPN-6 beacons as basic equipment, a ground position indicator has been designed to present radar beacon information on a map which is superimposed on the face of the display. The center of the scope represents the beacon's ground position and the first return of the beacon echo represents the aircraft ground position. A transparent map placed on the scope and automatically oriented with azimuth shows a spot of light over the actual aircraft position.

Direction of flight is indicated directly by the reading of the peripheral dial at the top of the scope. Facile offset course flying and immediate ground position determination with reference to a map are the advantages of this GPI over normal radar.

FAST CRUISE

A USAF C-97 Strato-freighter set an unofficial record for Military Air Transport planes, when it flew 2,491 miles from Hickam Field, Hawaii to Fairfield-Suisun Air Force Base, California in eight hours and 30 minutes. The previous record for the same route, same direction was nine hours, three minutes by a C-54.

A routine flight, the plane carried a normal load of 17,983 pounds of cargo between these two Pacific Division terminals. Pilots of the plane reported that they made no attempt to set a record of any type. They flew at 15,000 feet because weather reports showed that other planes were encountering rain and turbulence from 6,000 to 13,500 feet. At 15,000 feet, the crew reported that they were above all weather in the area and flew in the smooth upper



air from the time they reached their altitude until they began their letdown over San Francisco. Indicated airspeed was kept at 201 miles per hour in accordance with the instructions contained in the cruise control manual for this plane. Average speed from terminal to terminal was 293, and the top speed was 305.

FIRE TOWERS TO BE MARKED

About 3,200 fire towers and lookout stations of the U. S. Forest Service are to be marked under the supervision of the Civil Aeronautics Administration as a safety aid to the visual flier.

The buildings to be airmarked are located in 167 National Forests and most of them are in potentially dangerous terrain. Marking of 179 towers and lookout stations in mountainous areas of Pennsylvania is virtually completed. Oregon and Montana are next on the airmarking program.

The markers were especially designed to conform to the size of the roofs on which they will be placed, and are considerably smaller than the standard airmarkers. However, they can be seen clearly by a pilot flying 1,000 feet above them. They will carry a letter or letters three feet high designating the state, and numerals of the same size indicating location.

The pilot, by reference to his aeronautical chart, will be able to place himself exactly. Fire towers and lookout stations are indicated on the charts by a small black triangle within a circle, and close to the symbol is the abbreviation for the state and the number fixing the geographical location of the marker.

NEW INSTRUMENT LANDING CHARTS

The first four in a new series of Instrument Landing System Approach Charts have been published by Coast and Geodetic Survey. The charts cover Washington, New York (La Guardia), Indianapolis, and Chicago. More than 50 additional charts, covering the ILS installations now operated by the Civil Aeronautics Administration will be available soon. Eventually, about 130 of the charts will be published, as the CAA puts additional ILS installations into operation.

The new charts have been made simple and clear by eliminating all data which is not involved in using ILS. They will be revised as often as necessary, and are in loose-leaf form for easy handling in the air. In addition to the general chart, perspective drawings on the back help to clarify ILS procedure. The charts are in black and white to make them easier to read under colored cockpit lights.

AIR SPACE RESERVATIONS

Violations of rules prohibiting flights over Air Space Reservations and danger areas are increasing. Several reports that Air Force planes have flown over such reservations as atomic energy research centers have been received by USAF Headquarters.

Base operations should make certain that all Air Space Reservations and danger areas are indicated plainly on flight planning charts where they can be seen by all pilots. Colored plexiglass, cut to the same shape as the reservation, and placed on the wall chart, is an effective means of marking such areas. If such material is not available, colored crayon can be used.

GIVE THEM A CALL

By S/SGT. CHARLES M. PETERS
Eastern Pacific Wing, ATC

When the C-47 took off from Lowry Air Force Base, the senior pilot at the controls did not realize that he would be dependent upon the initiative and skill of a VHF/DF operator to save the plane and crew near the end of the flight.

The C-47 encountered icing near the west coast and the "town-finder," better known as the radio compass, was affected by the icing and gave inaccurate readings. The pilot knew that he was near Sacramento, California, but he was not sure of his exact position.

At this point, the pilot called the tower at Hamilton AFB on VHF and informed the operator that he was in an "N" quadrant but did not know which one. He also informed the tower that he was very low on fuel.

Through the alertness and initiative of the air traffic controllers on duty in the Fairfield-Suisun AFB tower, the Fairfield-Suisun, VHF/DF (very high frequency direction finder) was informed of the C-47's predicament.

The pilot of the C-47 was contacted and instructed to call the DF station on an emergency frequency for a plane-to-field heading. In the meantime, the tower operator at Fairfield-Suisun obtained permission from Hamilton AFB Flight Service Center for a change of destination and clearance from the Oakland Air Traffic Control for an emergency landing at Fairfield-Suisun.

Several minutes later, the C-47 pilot called the tower and said that he was 15 miles northeast of Fairfield flying VFR and wanted to land at Fairfield.

The C-47 landed with about 35 to 50 gallons of fuel, thus ending the emergency.

The pilot stated that the position bearing he had received from Corporal Steven A. Rozinsky (pictured), the VHF/DF operator on duty at the time, was so accurate that when he broke through the undercast he was headed directly for the field.

This is a fine example of the payoff of training and practice and should alert all pilots to the possibilities afforded by VHF/DF stations.

Several accidents have occurred recently because the pilot was lost and eventually ran out of fuel or ran into a "solid cloud." Some of these could have been averted if the pilot had just punched "D" channel of his VHF and called the nearest DF homer.

Usually when the radio compass is inoperative or inaccurate, VHF is still relatively free of static and the pilot can use it both for getting a DF steer and for normal communication.

There are approximately 25 VHF/DF stations scattered across the country and they are available for routine navigational homing for fighter aircraft on a special frequency of 139.32 MC and on Chan- "D" of all VHF-equipped aircraft for emergency

homing. They can be set up on any of the normal VHF frequencies within about five minutes' notice. And too, they will soon have Channel "G" set up at all times for practice steers.

It is a good idea to know the locations of these Homer stations (see Radio Facility Chart) and give them a workout on a channel other than emergency just to keep them in practice for the time when they are needed.

ROGER

By LT. EUGENE ALBERTS
First AACS Wing

THE C-47 LIFTED from runway 30 and leveled off to pick up airspeed. At the same time a streaking P-80 became airborne on runway 35. Up in the control tower the AACS traffic controller clenched the microphone through which he had been unable to halt the P-80, now on a collision course with the C-47. Hoping against odds that somehow a crash would be averted, the towerman prepared to alert the fire equipment.

Just as the P-80 became airborne, the pilot saw the C-47 in his path, for the watchers in the tower saw the right wing of the fighter dip as the plane banked into a steep climbing turn.

The jet pilot was indigant as he circled the base for a landing. He had acknowledged the transmission with "Roger." Something had happened, but what, and how?

The AACS tower officer, himself a pilot, reviewed the circumstances leading up to the simultaneous takeoffs.

Wind was 30 mph from the NW with heavy gusts. The short runway 30, into the wind, was being used for some airplanes, but the jets were using the long runway 35.

The tower instructed the P-80 to hold position and cleared the C-47 for takeoff. The P-80 pilot had received only the first and last portions of the transmission, so he thought the "cleared for takeoff" was directed to him. His radio was not functioning properly, but he was ready for take-off, expecting clearance, and assumed he had received it. After starting the takeoff roll, the tower's warnings to hold position was not heard over the faulty radio.

Embodying the integrated or "systems concept" in communications, the AACS provides standard procedures and phraseology in air-communications throughout the Air Force. *Standard Phraseology* is one key to safety. AACS personnel are trained to give instructions and information without breaks or pauses during transmission. When the flow of conversation is interruptetd, don't assume you have received the entire message. Ask for a repeat—that is what the P-80 pilot should have done.

"Roger" means the complete message has been received and when a pilot says "Roger," the transmitting agency has reason to believe the pilot understands the instructions.

THAT DIZZY FEELING

BY MAJOR E. R. COBB
Headquarters, Fourth Air Force
Hamilton Air Force Base, California

OLD MAN VERTIGO has little respect for age, experience, or past ability. However, he is a good friend of alcoholism, fatigue, fear and anoxia and works in close cooperation with them.

Vertigo (swimming of the head) is capable of arousing the instinct of self-preservation which is a powerful mental force to conquer at any time. It is especially hard to overcome when flying a plane in rough instrument weather. By far the best procedure to conquer this psychological impulse is to develop strong self-discipline by practicing blind flying in Link trainers and under the hood in airplanes. This practice leads to a strong belief in the accuracy of the flight instruments and tends to build up confidence in their reliability.

The pilot-victim of vertigo egotistically believes his own senses are superior to the flight instruments in his aircraft. When a pilot flying blind lets this sensation take over and disbelieves his instruments, he usually spins in and kills himself, all his passengers, and wrecks his plane.

The problem then is how to overcome this imaginary reaction which overrules the much more reliable flight instrument indications.

The main reason for a pilot thinking his senses are more accurate than his instruments is lack of proper training. Lack of proper training is simply that the pilot has not disciplined himself to believe that the flight instruments are more accurate than his own sensations. Fatigue may cause a pilot to forget his training and allow the seat of his pants to take over.

The sensation of vertigo can be induced easily in instrument weather with turbulence if the pilot allows his eyes to close for a few moments. Upon opening them again, he will experience a feeling that he is in a steep turn either to the left or right. This sensation may be so strong it momentarily will dominate all senses of training and instrument discipline. The pilot manipulates the airplane controls automatically to counter this sensation (this is his first error). In putting the aircraft into a turn forcibly, his senses tell him it is now level. However, he is now in a turn which in a few seconds will build into a tight diving spiral.

Vertigo may also be induced while flying in instrument weather in this manner: Turn your head quickly from side to side or look at the floor or ceiling of your airplane. When you look at your flight instruments after this exercise, you will probably believe they are not indicating correctly. Your senses tell you you're turning, diving, or climbing and your reaction is to control the plane to satisfy your sensory impression.

This condition is caused by the movement of fluid in the semicircular canals of the ear. Man's many years on the ground has built up a strong sense of coordination between mind and muscle as well as a strong confidenec in these coordinations resulting from the internal ear sensations. However, in aerial flight, without reference to the ground, these sensations are not reliable because the internal ear may give false sensations.

If the pilot will check his flight instruments closer (especially his gyro compass and artificial horizon) when he feels the turning sensation and then manipulate the controls according to the instrument's reading, he will fly correctly and live longer.

Under actual instrument conditions proper training can triumph over mental sensations. The pilot must call on all his mental strength, on all his practice and discipline, to be calm and believe the instruments. At times rather than fight the controls, it is better to relax and let the aircraft assume proper flight attitude by itself. Another helpful hint, is to lower or raise the seat so that the flight instruments are approximately at eye level. Looking at instruments from an uncomfortable angle encourages vertigo.

After the vertigo sensation has passed and the pilot has won his fight by believing in the instrument readings, the rest of the instrument flight will be as easy as a visual flight. He has met an enemy in the skies and conquered it. Old Man Vertigo has lost another battle. Proper procedure, practice, and strong self-discipline have won over sensory impressions and another pilot and plane has completed a flight safely.

ONCE IS ENOUGH!

(EDITOR'S NOTE: These are experiences of pilots who knew better but had to undergo a bit of a shake-up to have the safety lesson sink in. The authors of the following stories remain anonymous at their own requests. If you have had a "Once Is Enough" experience, share it with other airmen by sending it direct to the editor, FLYING SAFETY, Field Office of The Air Inspector, Langley Air Force Base, Hampton, Virginia. We will withhold your name on request.)

Rough Riders

I'M NOT A rated officer, but here's how I almost got my permanent wings.

The jeep in which I was riding rolled up to the side of a C-47 at a base in New Guinea. The time, 0400 on the dot. Takeoff was scheduled for 0430. As we climbed out of the jeep a lanky First John yelled, "O.K., climb aboard." So into the airplane I crowded with 20 other passengers. The door slammed and in a matter of minutes we were airborne. About an hour later as it became light enough to see, I noted that there were about 10 Aussie soldiers, seven pilots (homeward bound combat weary P-shooter jockeys), and three other paddle feet besides myself.

The air began to get rather rough but not bad enough, we thought, to bother with safety belts. We were flying at about 1,000 feet. The weather ahead was stacked from the deck up to St. Peter's gate. There were, however, two saddle backs at about 10,000 feet so up we went. As we headed for the nearest one it closed in, so the pilot headed for the other. Just as we entered Cloud Valley the roof fell in all around us. Believe me, the next few seconds are hard to describe but that iron bird did everything but lay eggs. We bounced all over the cabin. Our gear and supplies scattered all over the place with some going through the top of the fuselage. Maybe it did lay eggs!

The next thing I remember I was in a floating position halfway between the roof and floor and then trying to crawl on my hands and knees on the roof. When the pilot recovered, we were below 500 feet. About then, an updraft caught us and up we went again. This up and down business continued for about an hour. I led the Aussies in a cookie-tossing contest. Once in the clear, the pilot headed for the nearest strip and 30 minutes later set the plane down much to my satisfaction.

When we were all on good ole terra firma (the more firma, the less terra), the pilot said, "Sorry I shook you fellows up, but it was pretty rough up there." We all agreed and thanked him for our lives. Even the P-shooter boys salaamed the C-47 pilot.

The plane was towed to the boneyard, with twisted wings, back and tail. A few of us went to the hospital for major repairs. I resolved that from that moment on, I would use the safety belt and fly only with pilots who tie down loose equipment at all times regardless of the weather. — PASSENGER PIGEON.

I Struck Out

We were playing baseball on the ramp when a sergeant from engineering ran over to me and said, "Captain, that AT-6 is ready for a test hop."

My side was leading in the first two innings and I figured if I hurried, I could test-hop the trainer and be back on the ground to catch for the last inning. So I ran to the plane, found the chute already in the seat, buckled the safety belt and cranked up. As I taxied out to the end of the runway for takeoff I wiggled the controls and they felt okay. I looked at the ailerons and they moved when I shoved the stick from side to side.

Cleared for takeoff, I opened the throttle. The plane gathered speed and as lift began taking effect the left wing came up. I pushed the stick to the left to hold it down, but the wing lifted all the more. Then I really put in a correction. Over she went, cartwheeling on the right wing.

I crawled out of a totally-wrecked airplane and could have gone back to the same inning, but for the fact that my presence was required to answer a few questions at the scene of the crash.

The aileron control cables had somehow been replaced in reverse during the overhaul by maintenance. I thought I had checked the control movements, but it was a case of looking but not seeing.— CASEY.

LETTERS TO THE EDITOR

Dear Sir:

We feel complimented that a picture of one of our Flying Safety bulletin boards was used with the "Huckster, USAF" article (February). In each Cadet flight room here at Randolph, the Flying Safety bulletin board is as much at home as the diagrams of "T" settings. Thank you for a fine article, but let's give credit where credit is due.

Reference is made to "3 Strikes" in Flying Safety (April) in which you cite the use of Forms 14 by Flying Evaluation Boards. This seems to be in conflict with Par. 46, AF Regulation 62-14A, "Purpose and Nature of Investigation."

After each accident, we at Randolph reiterate to the participants their rights and privileges and the purpose of the investigation, "that it is not for the purpose of obtaining evidence for - - - reclassification." However, when a flying evaluation board uses these same Form 14's for this purpose, these same people feel as though we have obtained information under false assurances.

Hence, it is suggested that in view of the above, that an article of explanation be incorporated in Flying Safety clarifying this apparently conflicting issue.

Major, USAF
Randolph AFB, Texas

Note that par 46, AF Reg. 62-14A, dated 26 February 1947, does not preclude the employment of AF Forms 14 and 14A in Flying Evaluation Board proceedings. It is pointed out also that a Flying Eavluation Board is not a Reclassification Board.—Ed.

★

Dear Sir:

Read your Wing Tip "Warm 'Er Up." As a B-24 pilot in the ETO, the same difficulty of the armor glass frosting up after a rapid descent from high altitude was encountered.

Several preventive methods were tried. The most successful was the application of "anti-dim" (gas mask type) to the inside of the windshield before each flight. After a couple of flights scrubbing frost with one hand and driving the Lib with the other, eye glued to the vanishing hole, it became part of the checklist.

Perhaps a can of "anti-dim" or a similar preparation could be installed in all high-altitude aircraft.

Bert F. Alexander
M/Sgt., Randolph AFB

Windshields in many new planes are wired for electrical heating.—Ed.

★

Dear Sir:

Am interested to know how the following can be accomplished in a B-29 as per the next-to-last paragraph in your article "Bellying in the B-29" (March, 1948).

"One pilot had the plane down to 60 mph before the wingtip struck the runway. He did this by cranking in full left aileron trim in order to keep the right wing up and aided this by adding power to No. 3 and No. 4 engines. When the right wingtip contacted the runway, he applied full left brake and also left emergency brake. The plane stopped 90° to the right and just at the edge of the right side of the runway. He had started his landing at the extreme left edge of the runway."

I believe you will find it to be an impossibility to apply *both* "full left brake and also left emergency brake." You will utilize hydraulic pressure of either the main system or the emergency system, not both simultaneously. In fact an attempt to use both simultaneously might possibly result in no braking at all due to the centering of the shuttle valve at the top of the debooster valve in the braking system.

Phillip O. Doornbos
Captain, USAF

Should have read "he applied full left brake and then *left emergency brake."*—Ed.

SAFETY QUIZ

Using the following sequence, answer questions 1 through 9.

AW 8 151830 E

STATION A W9[illegible]13/4L 183/70/68↓12-/012/[illegible]E70

STATION B P15[illegible]1S-192/38/35↖14/006

STATION C E60[illegible]2R+196/66/65↘3/996

1. The temperature at Station "C" is
   a. 66° C.
   b. 65° C.
   c. 65° F.
   d. 66° F.

2. The ceiling at Station "B" is
   a. 1500 ft. broken.
   b. pilot reported.
   c. 1500 ft. overcast.
   d. 150 ft. broken.

3. The possibility of fog is greatest at
   a. Station "A."
   b. Station "B."
   c. Station "C."

4. The lower layer of clouds at Station "C" is
   a. 600 ft. overcast.
   b. 6000 ft. overcast.
   c. 600 ft. broken.
   d. 6000 ft. broken.

5. The visibility at Station "B" is
   a. 10 miles in light sleet.
   b. 1 mile in light sleet.
   c. 10 miles in light snow.
   d. 1 mile in light snow.

6. If you were landing at Station "B," your heading would be
   a. NE.
   b. SE.
   c. NW.
   d. SW.

7. The date and time of the sequence are
   a. 1518 hours, 30th day.
   b. 1830 hours, 15th day.
   c. 1000 hours, 18th day.
   d. unknown.

8. The sky condition at Station "A" is
   a. high overcast, lower overcast.
   b. high overcast, lower broken.
   c. broken, lower overcast.
   d. broken, higher overcast.

9. The ceiling at Station "B" is a
   a. pilot reported ceiling.
   b. precipitation ceiling.
   c. balloon ceiling.
   d. measured ceiling.

★

ANSWERS

1—D, 2—A, 3—C, 4—D, 5—D, 6—B, 7—B, 8—D, 9—B.

WHY?

THE PILOT of this P-51 had made several unsuccessful attempts to contact the tower and then made an approach to land still watching the tower for a green light. He failed to see the AT-6 below and in front of him which was also on the approach and had been cleared by the tower to land.

Just before touchdown, the P-51 overtook the AT-6 and they locked together, then skidded for 600 feet down the runway before they came to rest 50 feet apart.

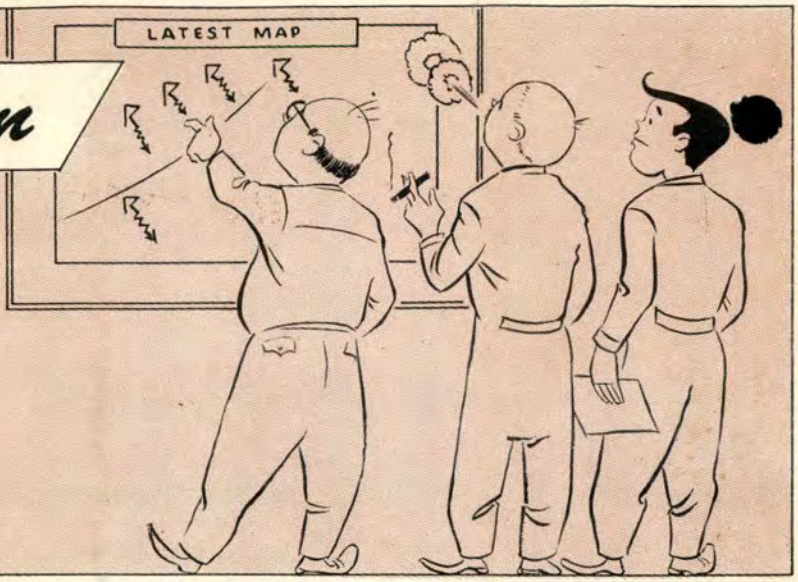
The pilot in the rear seat of the AT-6 was killed, but the non-rated officer in the front survived.

Control tower operators on duty were not aware of the accident immediately as they were watching traffic on a parallel runway across the field.

There was no emergency which required the P-51 to attempt a landing without permission.

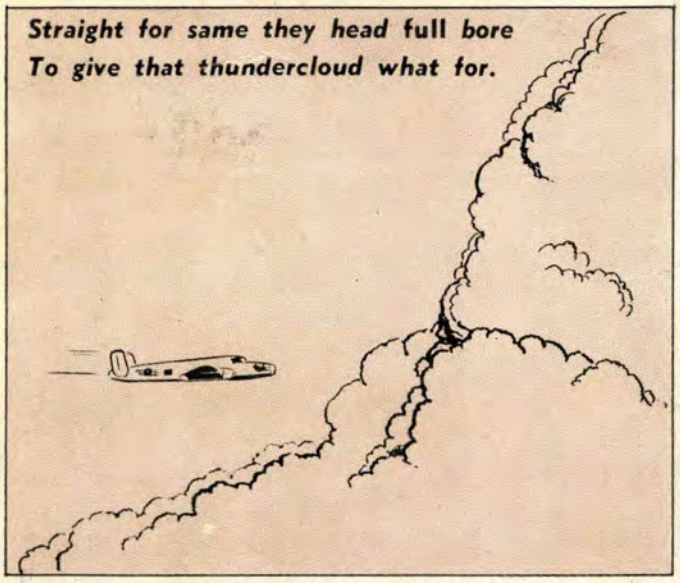
WHY?

Mal Function

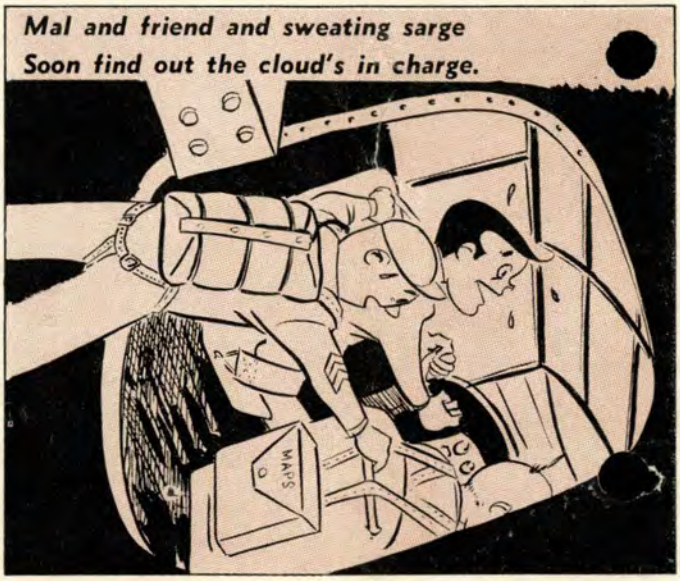


Thunderstorms aloft today,
Mal and friend think baby's play.

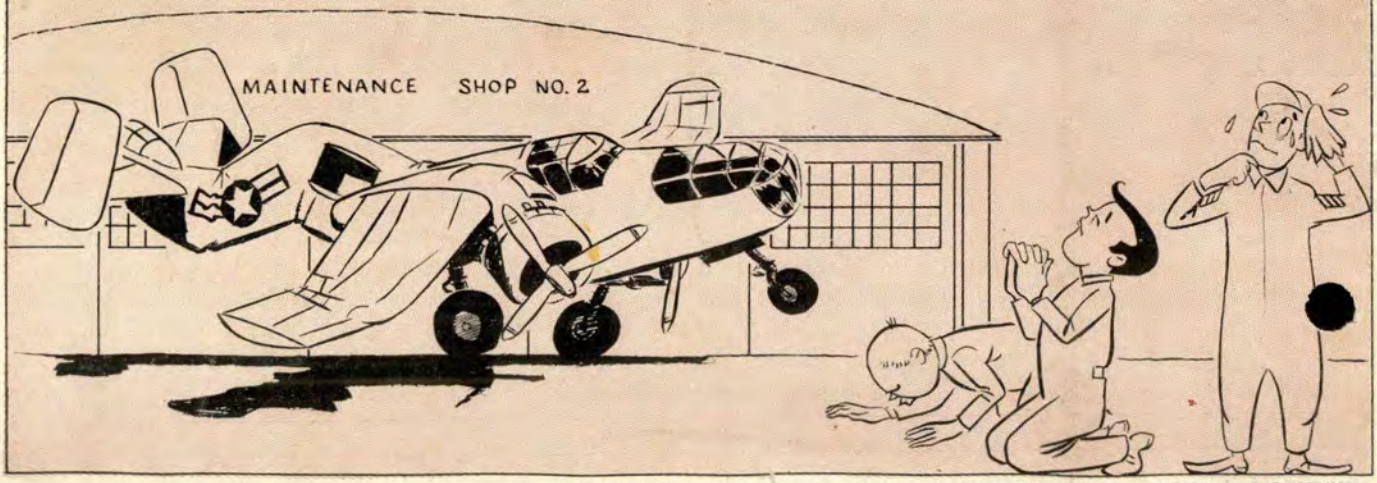
Straight for same they head full bore
To give that thundercloud what for.



Mal and friend and sweating sarge
Soon find out the cloud's in charge.



Bent and crumpled 25—
3 miracles leave all alive.



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