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1957

# ***FLYING SAFETY***

UNITED STATES AIR FORCE



**THE SKIES**

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# The Editor's View

*Times do change. Recently we've been hearing more about budgets than breads. While all this may be a healthy catharsis for the days to come, it's a little disturbing to live with. It's something like the weather—you have to live with what you get.*

*There's been many a lad who thought he'd never make it when first assigned to the dust ridden plains of Texas, and others who went to Thule with the same grim feeling. The heat of the Mojave, the rains of Seattle, the thunderstorms of Ohio, and the low ceilings of the Gulf States have all contributed their "restrictions," but we learned to fly through them. The same it is with the budget—a matter of learning how to live with it.*

*Your first solo ride through the smoothest of clouds was probably a hair-raising experience. Your first case of icing or sticky snow, a real spine tingler. But after the first brush, you began to see ways of living with the thing. You wanted to fly, and you did!*

*So how do we stretch a dollar? Knowledge of equipment stretches dollars. Planning stretches dollars.*

*No longer can we allow unsatisfactory conditions to go unnoticed. They shrink dollars. The savings realized by the timely correction of hazards is money in our bank—money that we can use to buy airplanes and flying time. Use of the U.R. is not only vital to the designer-manufacturer—maintainer of our birds, it is the same to us, the operators. Here, also, the Operational Hazard Report becomes more than ever a lifesaver. Through your near misfortune, you can help others as no one else can. By your awareness of conditions, you can organize and supervise your changing situation for the good of all.*

**So far, we have not done well in coping with our changing weather. On the day of this writing alone, four preliminary reports of major aircraft accidents in which weather was involved as a factor were received. Within the past forty-eight hour period, four costly aircraft have been destroyed; one pilot is dead and two others are at the moment listed as "Missing." In the case of two of the pilots involved, there is every indication that they were not qualified for the job they undertook to do.**

*We'll fly—because we want to fly. We can afford more flying if we do it more effectively and safely.*

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# CROSS

LETTERS TO THE EDITOR

# FEED

## More Safety Tips

The June issue of FLYING SAFETY carries an article entitled "Springing the Trap." The following comments regarding additional safety features have been suggested by personnel of this Headquarters:

- A small painted plaque on the right side, advising that rescue instructions are shown on the opposite side of the aircraft.

- Replacement of the word "jettison" (which is military in nature) with one which would have more meaning to a civilian type rescuer, such as "free" or "throw."

The color coding of aviation fuels is another safety item that needs more emphasis. Instead of asking pilots to memorize the colors as suggested in various publications, it might be simpler to paint on the fuel cap the color of the aviation gas as normally used. Since the nozzle is inserted into the tank and the gas rarely seen during refueling, a small portion of the hose or nozzle could be of clear plastic in order to double check on the type of gas.

An EADF accident prevention letter pointed out that only one type (Mil-0-6081-1010) should be used in servicing F-86, F-89, F-94 and T-33 aircraft. The pilot and crew chief could do a better job of checking the correct servicing if the can and oil filler cap or dip stick were of the same color. They wouldn't have to depend on their memory of correct specification.

**Capt. George H. Tully**  
Director of Flying Safety  
Hq, 1st AF, Mitchel AFB.

*Good ideas. Your suggestions have been forwarded to WADC.*

★ ★ ★

## Put it Back

Here's some information dealing with a problem that exists here and probably at other bases, too. I'd like to pass it on to all pilots, as a reminder. It's about charts. I was just reading an old, old copy of FLYING SAFETY (the July, 1956, issue) and came across your article entitled "Same Book, New Look," and decided to write you. I think it is a flight safety item.

A pilot will go out to his aircraft, make his check, climb aboard and take off. When he checks his Pilot's Handbook and finds one or more pages missing, maybe he wonders what has happened. Maybe he knows. Well, usually this is what happens: The pilot who has flown the aircraft previously

may have the missing chart or page in his locker, flying suit, or perhaps has just said, "What the heck—they can replace it."

In the jet aircraft we have six handbooks—two jet and four low altitude, plus the Radio Facility Charts which number thirteen. It is asking a lot of the radio mechanic to check each page in all of these publications.

So, pilots, when you use one of these books, please be sure that you put it back in its proper place, and don't just stick it any place in the book, or in the aircraft, or in one of your pockets. This is for your own benefit as well as for your buddy, who may be the next pilot to fly the aircraft.

**T/Sgt. Robt. J. Chancellor**  
3803d Com Sq, Maxwell AFB.

*Good advice. It aids the radio mechanic . . . and you haven't lived 'til you've been diverted to another base—IFR—and find that the letdown procedure is missing.*

★ ★ ★

## Personal Equipment Quiz

This is about the August issue of FLYING SAFETY, specifically pages 14, 15, 16 and 17. I believe this to be one of the finest issues you've published.

Being responsible for maintenance, storage and issue of 1800 R1A Exposure Suits and B-5 Life Vests, plus 150 twenty-man life rafts, and numerous D-1 Kits, I have a warm, personal interest in your article. Throughout the years I have learned that one must read the fine print which, in your magazine, states: "The contents of this magazine are informational and should not be construed as regulations, tech orders or directives unless so stated."

On pages 15 and 18, you refer to T. O. 14S2-2-1, concerning the B-5 Life Vest. You imply that a B-5 Life Vest is not properly equipped unless signal flares are included. Paragraph 1f, Section VI, states, in part, that Pyrotechnic signals and mirrors are an optional item and may be installed at the discretion of the commanding officer. This is not submitted in an argumentative vein but merely to preclude many people from turning down a vest that does not have these items. This organization uses mirrors but not flares.

Flares are not used because they are a storage fire hazard; they damage the vests and are difficult to handle.

I regret that you did not mention the pil-

ferage of articles from the life vests. In our business of mass transportation of passengers and cargo we find a high rate of loss of CO<sub>2</sub> cylinders, mirrors and flashlights. If these CO<sub>2</sub> cylinders could be converted to a semi-toxic gas, some of our light-fingered people would really have a hangover.

Keep up the fine articles.

**Maj. George J. Thom**  
1705th Air TRANSGRU(HV)  
PACD, MATS, McChord AFB.

★ ★ ★

## Quiz Again

I don't want to be a nit-picker, BUT, in your personal equipment quiz (August 1957), item No. 5, you neglected a discrepancy which appears on the chest pack chute. Granted, the safety seal is broken and the canopy is exposed but did you notice that the left hand elastic band is missing?

**1st Lt. E. E. Risedorph**  
AFROTC Det #670  
Oklahoma State University



## File Thirteen

This is the month of "The Skies"—as if you needed more proof than "Sputnik." And just as we predicted almost a year ago, this is the month in which world attention should be focused on the skies. There's more there than just weather. . . . Belayed by the budget was the Radio Facility Chart. From the 16 October issue on, you'll get one copy every four weeks rather than every two. Big effect on you is that late NOTAMS and like information are no longer available for those inflight changes of plan. Find out all there is to know before you leap and write it down. You might need it. . . . Some say the quick disconnect warning device restricts breathing after bailout. Figures. It works same as always. Thing is, it won't kill you if it's there, but it's possible for you to kill yourself if it isn't. Breathing may be rough, but it's better than no breath at all. Make sure it works before you leap. . . . Keep a sharp eye for changes in facilities. Ole budget gonna get some, and it may be "change without notice."

'Til November,

*Orson R. Scotts*



You're either with them or against them. Here is a story designed to acquaint you better with . . .

# The BIG WESTERLIES

Colonel Charles F. Blair, Jr., USAFR,  
Pan American Airways

**T**here's one particularly pleasant aspect in writing about the jet stream. It's not classified. Nor has anyone claimed to have invented it. A lot of us claim to have ridden it. I've ridden with it—or bucked against it—perhaps a few hundred times.

It's too bad we can't always fly from west to east, hitching a free ride, but this would involve a more or less complete circuit of the globe each time we set out to go somewhere. Such a procedure has its impractical aspects. Therefore we must buck this wind at times. Occasionally in our higher latitudes a jet stream can be found that flows the other way, from east to west, but the "big easterly" is somewhat rare outside the tropics.

In my own particular case there have been periods when I found myself bucking the "big westerlies" a disproportionate percentage of the time. Back in 1950, while suffering from delusions of persecution relative to these high altitude winds which, in a dastardly pattern, too often appeared on my nose, I was finally frustrated into acquiring an F-51 fighter which I rebuilt to fly up to 40,000 feet, with a range of some 4000 nautical miles.

With this airplane a fellow could lie in wait and suddenly pounce on a choice specimen of the North Atlantic jet stream. I simply requested the Pan American Airways meteorologist in New York to pin down one of these things between my regular runs to Europe for the airline.

He finally arose from his crystal ball and called to break up a bridge game one evening in January, 1951. It wasn't long before the F-51 was over mid-Atlantic on its way to London, nonstop. At 35,000 feet in mid-ocean there was indeed a fine specimen. For a short span of longitude

there was a two-hundred knotter on the tail, at least so said the radarman on Weather Ship Charlie, who tracked my weary old fighter at 520 knots. Not bad for a fan-driven airplane.

But I had jumped the gun. During the following four days the North Atlantic winds kept mounting. On the fourth day a Pan Am Constellation out of Gander to Shannon experienced an average 130-knot tailwind over the entire 1735 nautical mile run, recording a 225-knot west-south-westerly breeze over Weather Ship Charlie at a mere 19,000 feet. The navigator of this flight carefully documented his data. This 138-knot average wind, to my knowledge, is the highest sustained long distance wind ever precisely recorded on the North Atlantic.

Major Mott Smith, USAF, flying a B-47 for the Cambridge Research Laboratories, found somewhat higher

winds over the slightly longer trans-continental route during the past winter at altitudes above 35,000 feet. To find and record his wind data, Major Smith used a Doppler-radar coupled with an automatic computer.

Such Doppler equipment, incidentally, is soon going to revolutionize the business of finding jet streams. I have such a device on an F-84F jet fighter in which I do considerable flying on a special Air Force assignment. This equipment is a lightweight application of Doppler called RADAN. It continuously presents ground speed and drift on a standard three inch instrument, giving the pilot an immediate perception of his wind problem. In pursuit of my fighter navigational project I have had occasion to go looking for the big wind with the Doppler. The best I could find this year was a 150-knot westerly, and sure enough, I was

Most reliable of all is Pacific Stream. B-29 operators made this discovery in raids over Japan.



westbound—over Albuquerque. Two days later, while eastbound at the same spot, the wind had dwindled well out of the jet stream category, to a leisurely 40 knots.

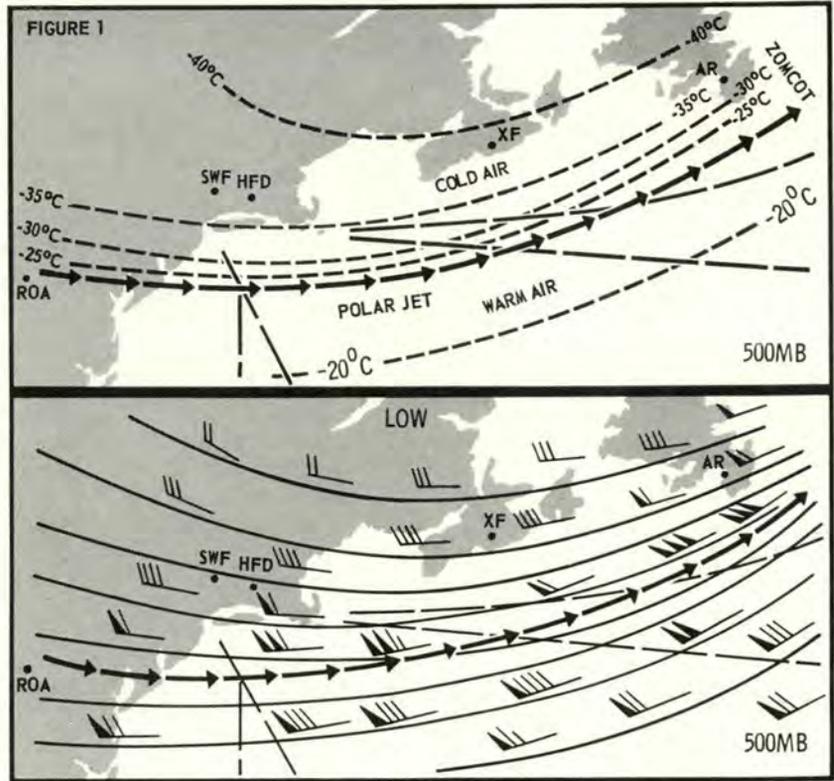
This Doppler is going to help us in the jet transports. We'll ride the jet stream eastbound with precision and we'll do a better job of dodging it westbound.

Riding the jet stream on the airlines is not a new thing. We've been doing it for years on PanAm on the North and mid-Atlantic, as well as on the Pacific, using our forecasts, radio altimetry, and an air temperature gage.

Thanks to meteorologists, we're pinning down certain characteristics of the jet stream, harnessing it, so to speak, for useful work.

The Pacific stream has been found to be the most consistent and reliable. The B-29 operators in World War II first discovered this fact in their raids over Japan, finding themselves on occasion to be literally standing still while flying at high levels westbound. Nowadays our airline Stratocruisers hitch a free winter ride out of Tokyo to Honolulu, eliminating the stop at Wake Island.

These jet streams of the Atlantic, Pacific and elsewhere are associated with a meteorological phenomenon known as the Polar front. Although technically called Polar Jet Streams, these big winds are normally far to the south of the Polar regions, usu-



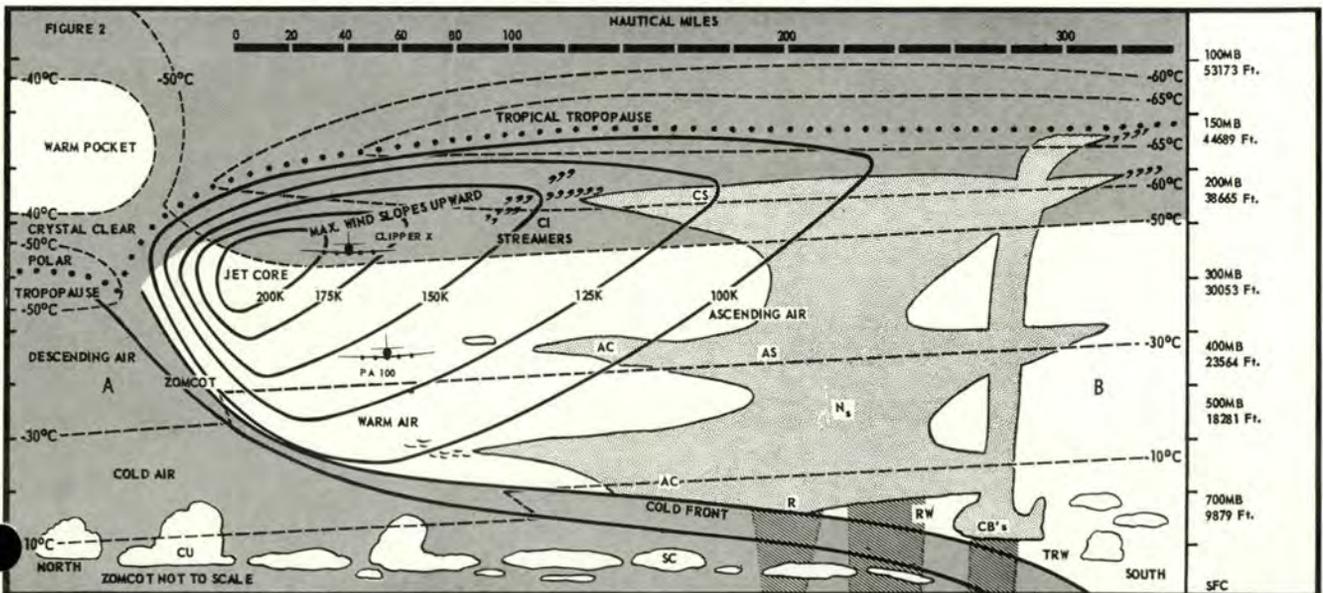
Temperature contrast causes air acceleration. Compare wind velocities vs. temperatures.

ally blowing their strongest in the mid-latitudes.

The simplest explanation of the Polar Jet Stream is Confluence. This is nothing more than the bringing together of cold and warm air masses which, under certain conditions, results in a sharp frontal boundary

aloft. The greater the frontal discontinuity, the stronger the jet. This frontal zone aloft is sometimes labeled the ZOMCOT (Zone of Maximum Concentration of Temperature). This temperature contrast brings about a strong pressure gradient that causes an acceleration of the air quite simi-

Vertical cross section of Polar Jet Stream. Note greater wind shear toward colder air.



lar to a venturi effect. (Figure 1.) For true jet streams, a ZOMCOT must be parallel to the wind flow.

This venturi-like flow extends aloft, increasing in strength as long as the polar air remains colder than the adjacent air mass. Once the polar tropopause is reached, and at some level above, the horizontal thermal difference ceases. Here the core of the jet is reached. Above the jet core the temperature field reverses, which causes an abrupt decrease in strength of the wind. Therefore, as we climb into the stratosphere above the torrent of the core, we find ourselves in a region of relative calm. See Figure 2. (Please note a 20-to-1 distortion of the chart scale in its horizontal dimension.)

Generally speaking, the jet stream is a year-round phenomenon, being much stronger in winter and farther south than in the summer. Summer jets are relatively weak and, on the North Atlantic, for example, they move northward with the Polar front close to the Great Circle track between New York and London.

**To navigate efficiently** in relation to the jet stream, we must be aware of its general structure, particularly with reference to horizontal and vertical wind shear. Discussing horizontal wind shear and referring to the charts (Figures 1 and 2) we note that the Polar Jet Stream has much greater wind shear toward the cold air to the north, than toward the warm air south of the jet core.

In some cases the shear to the north can be as much as three to four times greater than toward the south, which, incidentally, partly explains the clear air turbulence we find at times near the north boundary of the stream.

The vertical wind shear is greatest above the 25,000-foot level. An increase of 15 knots for each 1000-foot climb is not unusual when climbing below the core in the warm air immediately to the south of the Polar

front. Right here the Doppler can be particularly handy.

In the case of the aforementioned 160-knot headwind over Albuquerque at 36,000 feet last winter, I descended to 30,000 with an eye on the ground-speed meter, and the other eyeball on the fuel-flow meter. At 30,000 feet there was a more reasonable set-up, the headwind having dwindled to 100 knots without too much of an increase in fuel-flow. This amounted to a vertical wind shear of 10 knots per thousand feet.

**With a longer range** aircraft I could have played the horizontal shear as well, probably cutting this 100-knot headwind to less than half by diverting to the north, but other conditions dictated otherwise.

On the North Atlantic we take particular advantage of this horizontal shear. In fact, it's a vital requirement. We simply can't afford to buck the extreme headwinds of a winter jet stream. A large percentage of our airline westbound flights proceed far to the north of the Great Circle track, in many cases into the sub-Arctic regions.

The above-described navigational technique is known as jet stream evasion. We also get involved in jet stream interception. Here again, we can operate in the vertical or horizontal plane. Either can reap large dividends, the climb paying off in particular when operating under the jet core. When flying in the cold air north of the Polar front, the horizontal deviation toward the southeast is our best payoff as we attempt to reach the warm air south of the front.

We probe for this horizontal bonanza with our air temperature gage, assisted by radio altimetry, Loran and celestial fixes, although as a matter of procedure we seldom take more than a 30-degree cut from flight plan track. A 30-degree cut usually figures at the best "yield per mile" of wind bonanza. There is a limit, of course, to the amount of probing around that

we can do but the temperature as well as clear air turbulence, gives illuminating indications as to whether or not the probing to the south worthwhile. Subsiding air, giving lower than normal airspeeds, may be another indication that we are on the north side of the jet.

Once we get into the warm air we find a band of strong winds which is often several hundred miles in width, with the strongest winds near the northern boundary of the warm air.

As we fly higher in the troposphere the band of strong winds normally widens. The jet core itself, high in the troposphere, is a narrow river in the sky, perhaps 25 to 50 miles in width and several thousand feet in depth. It sometimes reaches fantastic velocities, perhaps as high as 400 knots.

I would like to emphasize that finding these extreme wind velocities (in excess of 150 knots) is not a common thing. Furthermore it is a difficult matter to stay in the core of a jet for great distances, although with our coming Doppler and Inertial navigation equipment, we will find it somewhat easier.

My own best interception of a jet stream was in a jet fighter on a flight between Offutt, near Omaha, and Turner, at Albany, Georgia, flying a dog-leg south-south-easterly track to Jackson, Miss., and thence east to Turner. While approaching Jackson there was a moderate northwesterly on the tail, and then suddenly I noticed that my flying machine was blowing sideways and was no longer heading for Jackson.

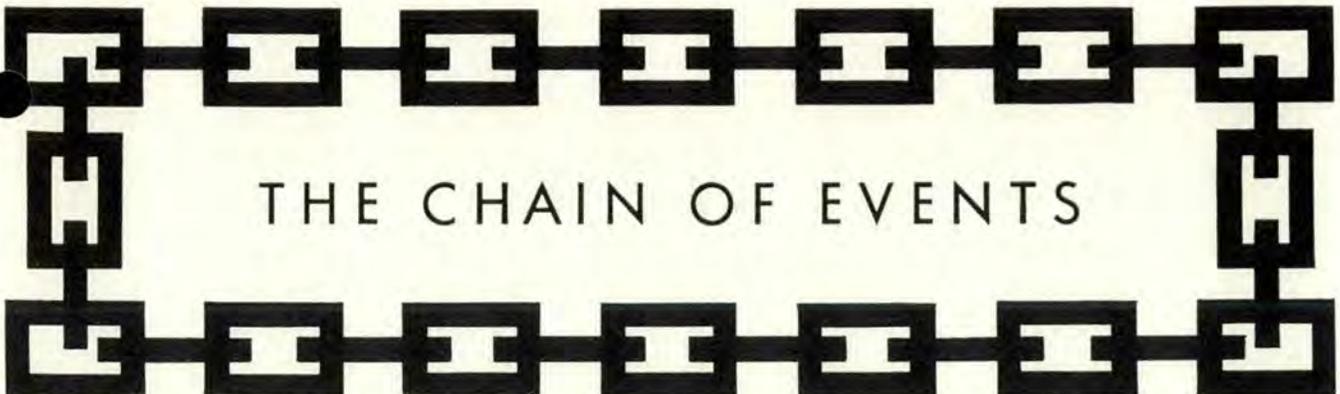
Turning to the east, I clocked a 250-knotter on the tail. It is of interest to note that when penetrating the wind shear area from the north, there was no turbulence; not a ripple in the sky at 37,000 feet. On the ground below, the winds were reported to be dead calm. The night sky was cloudless.

Riding such a tailwind can be sporting and profitable, but it can have its unhealthy aspects for the blasé fellow who doesn't keep track of his checkpoints.

Bucking such a wind can be a deadly business in any aircraft, particularly when flying long distances over water. It helps to know when and how to get help, but above all, a pilot must know when and how to evade the jet stream. ▲

Nowadays airline Stratocruisers hitch free rides from Tokyo to Honolulu, eliminating Wake stop.





## THE CHAIN OF EVENTS

**L**ike the machine itself, aircraft accidents are usually complex. They are rarely the result of any single mistake but rather the end product of a series of errors. Such a pile-up of unscheduled events can tax the ability of the pilot to a point where the accident is inevitable, like one which occurred in December, 1956. Although it was complicated by numerous contributing cause factors, the chain of events was triggered by an improperly executed penetration in weather.

It's been said that truth is stranger than fiction and several true stories are currently gathering dust in a Hollywood studio because they are too fantastic to put on celluloid. As we follow these two pilots (one an IP) through the three hours and 12 minutes preceding their fatal accident, this fact becomes more than self-evident.

The T-Bird took off from a southern Air Force base on routine, 60-2 training mission, at approximately 0830 that December morning. The total distance to destination was 1050 nautical miles; winds were not too bad at the proposed altitude, and a pleasant two hours and 25 minutes flight seemed in prospect. These pilots proceeded on course 1000 feet on-top, made routine position reports and experienced no difficulty whatsoever.

They were cleared by Air Route Traffic Control for a penetration at their destination and apparently trouble developed from that point on. Seven minutes after being cleared a GCI site in the vicinity picked up an emergency squawk on its weapon. ARTC reported that it was the T-33, east of destination, with ADF and OMNI out. About this time the pilots requested a steer from their destination tower but were advised the service was not available. Next, followed a period of intense conversation between the aircraft and tower.

The T-Bird reached VFR conditions at 1200 feet and then became lost. While the pilots were trying to establish their position by pilotage, an unsuccessful attempt was made to contact the local GCI site direct. This meant then that all headings and steers had to be relayed to the aircraft by their destination tower.

A DF station in the area tried to give the aircraft steers but the information was "rejected." The reason given was that the aircraft was too far out to use the airfield offering assistance.

The T-33 was given steers by various agencies, all of which were relayed through the tower and at one time the pilots—by now, thoroughly confused—were actually within six miles of a suitable field. They called "flame-out" and looked for an open field to land. They were

given wind direction and velocity and were asked again if they could make it to the air base. Their reply was No.

The T-Bird approached an open field downwind, overshoot, and crashed in a wooded area only nine miles east of its original destination. Both pilots were killed.

A review of events leading up to the accident should start at the beginning of the penetration, since everything up to this point was normal.

Apparently the first error committed was by the pilot since he penetrated outbound on a heading other than that published in the Pilot's Handbook. After rolling out on the inbound headings, the ADF needle indicated that the aircraft was 80 degrees off track. This led the pilot to believe that his ADF was inoperative. The 80-degree off-track indication by the ADF needle was correct because the aircraft was east of where it should have been. Based on his original decision that the ADF was inoperative, the pilot never again considered it an aid to navigation.

For the next 34 minutes (less the time it took to penetrate from 20,000 to 2500 feet), the pilots wandered around under a 1200- to 4700-foot ceiling in a vain attempt to locate the field. At least two GCI stations were available to them. They were given steers from 210 degrees to 295, and at one time were only six miles from a suitable landing field.

**The last known level altitude** of the aircraft was 4700 feet above the ground when it flamed out. This was two minutes after its position had been plotted as being six miles from a suitable airport.

Although the weather was not what is usually expected with a "weather" accident, it played a major role. It necessitated a penetration. It forced the pilots to descend to 1200 feet above the ground to maintain VFR, and from this altitude they couldn't locate the field. Indirectly, weather caused the pilot to mistrust his ADF.

So, it isn't always the "hairy" weather that can throw us a curve. In this case, for instance, the weather was mild, according to our All-Weather Air Force standards. However, two rated pilots (one of 'em an Instructor Pilot) did mill around for 34 minutes from start of penetration, under a 1200-foot ceiling and at times within six miles of a field, until they ran out of fuel and crashed. Furthermore, all of this happened over a heavily populated area where numerous suitable landing fields were available. Also, they had access to at least two GCI sites and one DF station, for assistance. Who said that "truth is stranger than fiction?"

# For Heaven's Sake



**T**he group was quiet. Even an outsider could have sensed the tension that penetrated that somber silence. As the seconds slowly ticked off, each in turn tried to break the suspense by tugging at his collar, squirming in his seat or nervously coughing. Each movement rewarded its author with a glare from the others. It was as though he'd committed a sin.

The silence was finally broken by the tumbling of the locking mechanism. The door opened. Every head turned to view the newcomer and eyes accustomed to noting details searched his countenance for a clue. The search was brief but it easily confirmed the rumors that had filled the air the en-

tire morning. The front office was up in arms and there was going to be "U-no-what" to pay.

The brow of the newcomer was lined and his eyes narrowed in a frown that was a stranger to his otherwise benign face. He strode rapidly and determinedly—yet with elegant grace—to the seat at the head of the table. All eyes remained riveted upon him as he took his place. It was obvious that this was going to be a day that would tax the serenity of even an angel.

The newcomer was no stranger to the group. He was well known to airmen all over the universe. He was St. Christopher. The powers-that-be had, centuries ago, appointed him as pa-

tron saint of travelers.

Initially his position had been a minor one. His staff had consisted of just a few junior angels. Since the turn of the century his rise had been meteoric. It was now rumored that he would soon be given six star rank and placed directly under the Boss. The recent assignment of the Archangels Michael and Gabriel, aides to the front office, as his assistants really pointed up his growing status. One couldn't help remembering with a smile the little angel who once had been in charge of the ox cart travelers section.

St. Christopher's opening remarks brought everyone back to the moment.

"Gentlemen, I called this meeting

Here's a bit of whimsy you can't help but chuckle over.  
Submitted by "Lts. John Luke and Mark Matthew" of  
7th Weather Group, AWS, a down-to-earth discussion.

because we are presently confronted with a problem area which, if not brought under control immediately, may become critical. The front office is really concerned about it and is putting on plenty of pressure to get results. I'll give you a clue, men, if we don't get results, there'll be the Devil to pay. I just attended a meeting up front and I can assure you that the Boss is shook up.

"St. Bernard, Deputy Chief of Staff for Housing, has advised the front office that unless something is done to cut down the inflow of new personnel, we will soon run out of quarters. Somehow the schedule has gotten out of hand. St. Peter has tightened his procedures at the Gate and insists that only authorized personnel can enter. He has no authority to turn away anyone who has the right credentials.

"The Plans Section places the blame on Materiel for letting those Wright Brothers have that airplane. But Materiel has a DF indicating Operations approval of the issue so there is nothing to be gained by pursuing that angle.

"After much discussion it was decided that there were overlapping responsibilities between my Travelers Aide Staff and the Guardian Angels,

(Air Division) and it was front office opinion that we should reorganize by placing the latter under my control. So I am now the angel on the spot and I expect results. I am not too familiar with your problems but I do know the front office thinks you've fallen down on the job. So what about it?"

For a moment there was silence. Then a large, robust angel near the end of the table stood up.

"Sir," he began, "as head of the Four Engine Branch—reciprocating, that is—I'd like to say a few words. First, I guess you know we are under-deranged in our section. We have plenty of recruits and a good OJT program. But most of these newcomers are fellows who goofed on earth, and we have to really check them over carefully before we can turn them loose and assign them to an earthling airman.

"Their shortcomings, coupled with the caliber of airmen we are being assigned to, makes me think we're putting in lots of flying hours on a hopeless task. I think someone should investigate the Ingredients Branch of the Mankind Propagation Division under Personnel. I don't think they're issuing the same number or quality of brain cells they used to. It's a

He strode rapidly and determinedly to the head of the table. It was obvious that this was a day that would tax the serenity of an angel.



tough job to watch over a chap who won't use the intelligence the Boss gave him.

"Let me give you a 'for instance.' I won't bother with inflight emergencies or anything serious. My case is one where the goof was made before we even got off the ground. I was assigned to this four-engine jockey last week, his regular angel being on leave. He filled out a 175 and went into weather for a briefing. He had to wait a minute since the forecaster was briefing a jet pilot.

"As he waited he checked the sequences and saw that his destination was clear and 10, negative perspiration! When his turn came for briefing, he turned down his hearing aid and got on cloud seven for an ecstatic few thoughts of home, et cetera.

"**He didn't hear** the forecaster say that while the situation was good, now, they were forecasting fog for his ETA, not only at his destination but all along the coast, back to the mountains.

"Well, to cut a story short, we got off the ground. I checked with the Forecast Branch and was told that they were going to let the forecast verify so I had to go to work on this chap. I finally got him bored enough to read the Radio Facility Chart. Even got him to look at the page covering the area adjacent to that of his destination. I gave him a terrific belt to have him notice that a station en route had Pilot-to-Forecaster Service. But no matter what I did I couldn't get him to call the station, although he did ask the copilot what the letters 'PFSV' meant. I broke three conscience needles on him.

"I won't bother you with the gory details or the chaos that ensued on our arrival at destination or at either of the two alternates we used, or what happened when we finally just made it into a small field in the hills. My point is, what can we do in a case like that? Here we have a chap who thinks he knows all about weather, and completely ignores the weather briefing. If attentiveness to weather briefings was a prerequisite to getting up here, this guy wouldn't make it. In fact, if he does get in, I'm going to insist he get a cloud-pounder's job. If he gets wings, I'll FEB him immediately. I swear. . . ."

The grey-haired angel at the center of the table cut in just in time. "I agree with the four-engine people. We have the same problem in the Gooney Bird Section. Just yesterday, my boy made a trip from Andrews to Patrick. He got a good weather briefing — route okay, destination CAVU. What he didn't hear—as he collected for flight lunches — was 'headwinds at flight altitude 75-95 knots.'

"Well, we made it, but had to stop at Savannah for gas. And, believe me, downstairs hath no fury like a chap trying to land that crate in a 40-knot crosswind. I dang near had to pull a miracle to get him down okay. It was the last miracle he had coming too.

"What burns me up, and the very thought of that makes me shudder, is that I almost got airsick because of the turbulence. You see, we paralleled a cold front all the way. If my boy had listened to the forecaster describing the synoptic situation and used his head, we would have lit out about

70 miles west, flown behind the front with a terrific tailwind and less turbulence, and made it without that miracle-begging landing at Hunter.

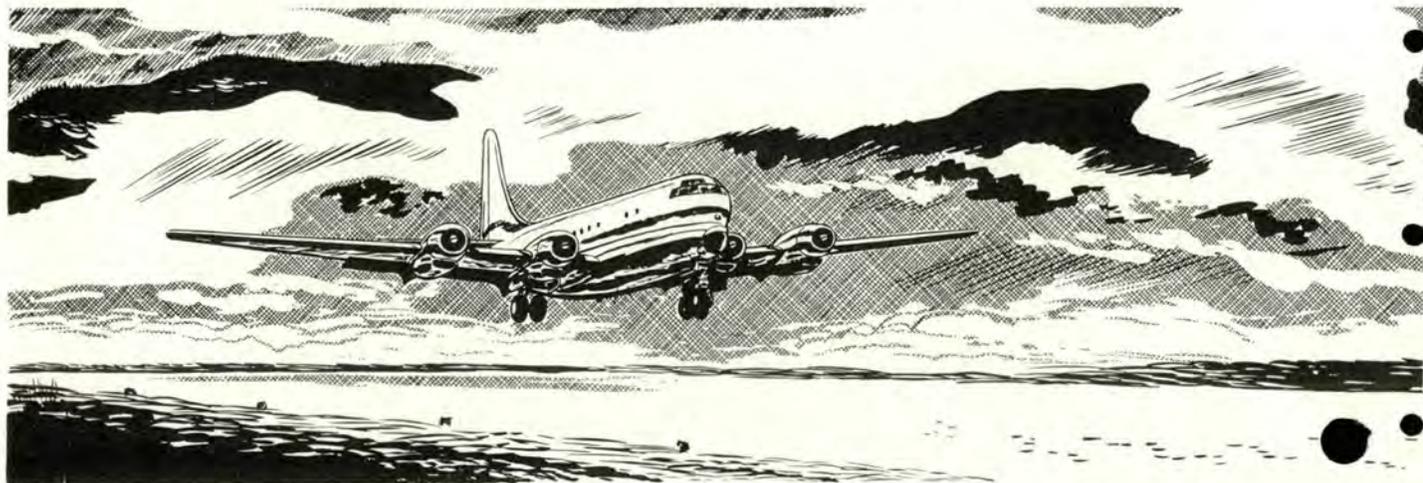
"Chief, too many of these fly boys whom we have to protect, think that weather briefings are necessary evils, and they don't use them to plan their flight. They commit themselves to a certain flight plan, then get the weather, instead of getting the weather and then planning a good flight. This apprentice I'm breaking in now did the same thing, but his quota of miracles had run out.

"I think my four-engine friend has a point, but you're beating your head against the clouds if you think you can get the Ingredients Branch to change the formula on brain cells. They can prove the issue is adequate, and that it's mismanagement that causes the trouble. I think maybe a better solution is to check with the Scientific Services Directorate and get them to step up the forecast verification to 100 per cent. Maybe if the weatherman is always right, the pilots will pay more attention."

"**You're wasting your time** on that, Chief," spoke up a bespectacled, long-haired angel from the end of the table. "As Staff Weather Officer for the Guardian Angels, I've already talked to them about that. They claim the present schedule for meteorological progress will be maintained. While they are willing to let the forecaster be right most of the time, particularly in good weather, they insist that he must still make mistakes. They refuse to let him approach perfection until he has done a lot more research.

"They vehemently insist that with Pilot-to-Forecaster Service, the pilots

"I broke three conscience needles on him, and we finally just made it into this small field in the hills."



can check on the forecast periodically and get confirmation of the original—or a revision of it as necessary—and if they don't do it, it's not the fault of Scientific Services. The Operations people have allowed the forecasters—in fact, told them—to advise the pilots of stations en route with Pilot-to-Forecaster Service. This decision to stick to the present scientific schedule has front office approval so if you want to buck that, you may bring down the wrath of the Boss upon yourself. I got my wings clipped just going as far as the Chief of Staff on it.”

“Okay,” cut in St. Christopher, “I guess we can't upset the whole universe system. But —.”

St. Christopher was interrupted at that point as the door opened and Archangels Michael and Gabriel entered, supporting a be-draggled, blood-smeared, bent-wing angel whose appearance gave every evidence of another accident.

“Holy Smoke — Oops, sorry,” exclaimed and apologized the Gooney Bird angel. “That's Angel Jonathan of the Jet Division.”

“The front office thought you might want to see him right away. The medics gave him an ambrosia pill and a nectar shot, so he should be coming around pretty soon. Actually, he's suffering more from shock than injuries.” As he spoke, Archangel Michael eased Angel Jonathan into a chair. He and Gabriel left the room.

Angel Jonathan slowly opened his eyes. They gradually roamed around the room as he became conscious of where he was. Finally his eyes rested on St. Christopher. “Chief, I've had it. I need a transfer. How about let-

ting me go back to the Bicycle Division.”

“Take it easy, now, Johnny,” replied St. Christopher, “from your appearance and condition, I would say we have some new basic angels down at the Gate.”

“Yes, unfortunately we have. But that isn't the reason I got this way. I guess I'll get court-martialed for this, but maybe a couple of Centuries stoking the furnace downstairs is worth it.”

“What are you talking about?”

“Well, let me start on the beginning. I just got assigned to this junior birdman down at Scott. He was my first jet assignment, you know. Well, he had a full-time desk job so his proficiency as a pilot wasn't the best. He decided to go down to Warner-Robins and got himself a T-Bird for the trip. On the 175, he entered his flight altitude as 4000 feet! I immediately got shook up about that. Then, we went into the weather station and he was told he was going right through one of those Severe Weather Warning Areas.

“**He took the news** without a flinch. I thought the fluttering of my wings when the forecaster said, ‘tornadoes forecasted and already reported’ would wake him up, but no. Well, to make a long story short, we took off and when we ran into the thunderstorms, he headed down trying to get underneath. Well, he finally did. But it was a couple feet of ground instead of clouds.

“I couldn't see my way clear to waste a miracle on that chap. But I got real mad about this and I went back to our departure point. What I couldn't understand is why this guy got cleared for a flight altitude of 4000 feet and through a tornado area where the weather was already occurring. It seems to me that the clearance authorities in this case had fallen down on the job. I can't see how they can perform their functions, unless they are aware of the areas of marginal weather.

“I've seen too many of these base ops people and AOs do a whole day's work and never go into the weather station for a briefing. Then they check a Form 175 and I don't know what they do—I guess just check to see that all the boxes have something in 'em. They sure as ‘downstairs’ can't evaluate the weather effects on the flight.

“The Form 175 is designed to let

the forecaster give the pilot and the clearing authority a reminder of the weather. In itself it isn't enough. It must be supported by a knowledge of the general situation. Then it can serve a purpose.”

“You've got a good point there,” cut in St. Christopher. “I'll get after the ops people on that. It's pretty clear that the Supervisor's Guardian Angels aren't up on their toes.”

“That's what I told this Angel who was assigned to the clearance officer at Scott. Then when I found out he had been sleeping on the job, I lost my head and let him have it. They say he'll recover, but I guess I'm going to have to face an angel assault charge.”

“I'm on your side,” spoke up the bespectacled, long-haired angel. “I can't see why the forecasters have to fill out the Section D of the 175 unless ops people are going to use it.”

At that moment a red-capped angel entered the room and whispered something behind his wing to St. Christopher, then withdrew.

“Well, gentlemen, a crisis has just arisen in the Ground Safety Section which I'm going to have to get on right away. Meanwhile I want all of the Guardian Angels in all aircraft sections to review their procedures. Use your checklists. And literally and figuratively, for Heaven's sake, use the Tech Order and stick to it.

“**On these matters** concerning weather, sharpen your needles and if your assignees don't plan their flights according to the weather briefing, or if they let their attention wander during briefings, let them have it right where it hurts the most! And, for the Boss' sake get them to check in on Pilot-to-Forecaster Service for a new forecast before they commit themselves to proceeding into questionable weather. It will save them and help your ulcers.

“And remember, it isn't the latest observation they want—that's history. Keep that needle working until they ask for the latest forecast. Meanwhile, I'll get together with the Operations Guardian Angels and see if we can't get them working harder on the supervisors. Now, let's get to work. I want results! Or you'll all be out pushing clouds around!

“Oh, one last word. Keep your eyes open when you're flying around up here. Traffic's getting pretty thick these days. A mid-air collision up here and we'll all lose our wings.” ▲





# "Just a minute,

Major William L. Dodge,

**There is not an instrument available that can give a more representative picture of weather upstairs than you can. Where other eyes cannot see, you have to take over.**

**I**t was a typical early Tuesday night in a very typical Officers' Club bar. First Lieutenant George Appleby was idly stirring his drink with his finger. He looked around the room. Yep, it was real typical. He could spot the "regulars" right away. They're all the same. And, he could tell the lonely TDY types. The eager look.

He was on TDY himself. Just killing time. Weather socked in all around. Real bad. He looked at his watch, polished off his drink and turned on the bar stool. He bumped into another first lieutenant. They looked at each other and Appleby started to apologize. He was interrupted by a big grin and an outstretched hand.

"George Appleby, you old knucklehead. Haven't seen you since flying school."

"Ed! Ed Thompson! Man, I'd forgotten you were stationed here. Am I glad to see you! I was looking forward to an evening full of nothing to do."

Thompson's grin widened. He climbed on an adjoining stool. "What'll you have, George?"

Appleby ordered another of the same, Thompson called for an imported beer and the dice.

While they were "horsing," Thompson said, "George, I'm sure glad I decided to stop in for a quick one. Say, I'm fixin' to call up a dolly. Want me to see if she's got a friend?"

George smiled. "Yeah, why don't you do that little thing. But, like the fella used to say, 'Let's eat first.'"

"Good show," Ed said, as he winked. "Let's order another and have the waitress bring them in to us. He turned to the bartender, "Two more of the same and have Gloria bring them in to the dining room!"

The two men climbed off the bar stools and walked to the other room. Everyone seemed to have had the same idea at the same time and all the tables were filled. They

waited for about five minutes and then got a table for four, just as the waitress brought in the drinks.

"Excellent timing, Gloria," Ed said. "It looks like we'll be doing a bit of waiting so why don't you bring us a couple more, in about ten minutes?"

"Very well, Sir!" Gloria jiggled out of the room. Both men watched her leave. Ed looked at George, "George, I'm with you." Both men laughed as they looked over the menu.

Their thoughts were interrupted as the hostess came up to their table. "Gentlemen, would you mind if another officer joined you? We are a bit crowded this evening."

Ed looked at George, then looked at the hostess. "Certainly not, Miss, we'd be delighted."

The hostess motioned to a gentleman standing by the cash register. He came over. Both lieutenants stood up and introduced themselves to an apologetic El-Cee.

"I'm Colonel Dale, gentlemen, I hope I'm not intruding too much."

"Not at all, Sir, it's a pleasure to have you join us," Ed replied, looking at George. The Colonel scrutinized the menu carefully. Ed turned to George again.

"You never did tell me what you were doing here, George."

"Ed, there's a lot of places I'd rather be. Wasn't supposed to be here at all. I owe it all to a busted forecast. The clown who briefed us on the weather fouled us up, but good."

"Us?"

"**Yeah, I was flying a bird colonel** to Washington. Got a T-Bird. The Forecaster told us we'd run into a weak front, west of Washington, just about ETA time. Ed, we ran into a line of thunderstorms that shook us every way but loose. I finally came in here when the fuel ran low. Colonel got shook and decided to stay here for a couple of days. Said he's got business."

Ed sympathized, "Some of those jokers ought to be in a carnival tent. I've seen Gypsies who can guess better than most of those guys!"

George interrupted, "Can you figger it, a weak front, he says, and I hit some tops that went above 40 thousand!"

Ed, not wanting to be outdone, came on strong. "There's a weather guesser on one of my runs who's going to be looking for a new head one of these days. Not that he

# Lieutenant...

Hq 9th Weather Group, AWS

doesn't need one! He's on an island out in the Atlantic. You'd think they'd take pretty good care of us MATS types. They're in MATS, too!"

George laughed, "I always thought they were in a world by themselves."

"Brother, I had a load of passengers on my last run who feel that airplanes are a child of a disordered brain. I can't blame 'em either. We were all over the sky, missed the ETA by 20 minutes. Even the steward got sick. And this weather joker told us we'd have some scattered buildups!"

"It was just like your flight, George, they call for light turbulence and icing. We end up with moderate to heavy. Had to pick our way through with radar. We were going to turn in an Operational Hazard Report (OHR) on the whole deal but the aircraft commander was in a hurry to get home so we didn't mess with it."

The conversation continued, each man trying to outdo the other, as he recounted hairy tales of weathermen. Parentage was discussed and various torture treatments were bandied about.

The waitress broke up the session by bringing their orders. The break didn't last very long. Just as George started off on another talk, punctuating his remarks with his fork, the LC broke in.

"**Just a minute, Lieutenant.** I've been sitting here for 20 minutes, listening to this utter nonsense. To hear you men talk, you'd think the weatherman's mother and father were first cousins!"

George looked at Ed. This look said, "Mebbe we were talking when we should have been listening."

Ed flashed back the same look as he attacked his steak vigorously.

The Colonel was far from through.

"Gentlemen," he said, "I'm not pretending that weathermen are perfect. Far from it. But, I'm curious as to how much help you pilots give the weather people."

"For instance, when you hit a ceiling at 600 instead of the forecast one-thousand, do you tell the tower so he can tell the weather boys? And you, Lieutenant, when you were trying to get into Andrews today, did you call the forecaster on Channel 13 and tell him of the buildups? Did you ask for weather conditions in other areas?"

George looked at his plate. "No, Sir."

"I thought not. And you, Lieutenant Thompson, did the AIREP you sent out contain information on the icing and turbulence you encountered? I'll bet it didn't."

The colonel paused and had a drink of water.

"I'll bet neither of you gave the forecaster a briefing on the weather that you encountered—either in the air or when you landed."

Both Lieutenants continued eating as the Colonel pointed out a few other things. When they had finished, the Colonel called over a waitress, ordered a round of



drinks "for my friends here." He lit up a cigar, got comfortable. Ed and George looked at their watches. It was apparent that their dates, if any, would be late ones.

"Gentlemen, the Air Weather Service maintains a continuous program aimed at getting you flying types to make pilot reports. Admittedly, weather forecasting isn't an exact science and AWS needs everyone's help to make it as exact as possible."

"It makes no difference where you are flying—over the ocean or in the local area. Your observation of the weather is a vital cog in the weather forecasting machinery."

"The high-dome boys are working hard to reach the ultimate in exactness. But—they've got a long way to go. We've come a long way during the past few years but there still are too many 'Xs' to make the equation come out with a 'pat' answer."

"Thompson, you do most of your flying over the Atlantic so let's look at that area for a while. Suppose you MATS boys and the airline pilots didn't send out AIREPS. What would the weathermen have to work with?"

Ed started to speak. "I never thought—"

"Yes, Thompson, I'm sure of that! But you've got to remember that a weather forecaster in that area has but eight stationary weather ships to rely on. Of course, he's got Bermuda and Lajes and some commercial surface vessels—but that's all."

"**He has to forecast cloud tops, turbulence, icing, winds, et cetera** from the data obtained by rawinsonde runs made by the people I've just mentioned. Give a young weatherman a map with holes in it as big as the eastern half of the United States and his imagination can run wild."

"Of course, the old 'heads' can give you a good forecast using the crystal ball they've acquired through experience. But the inexperienced types can and do earn themselves some OHR clusters."

Ed broke in, "How about the weather recon outfits? We're always hearing about them."

"Glad you asked, Thompson, I was just getting to them. There are two outfits, as you know. The 59th Weather Recon Squadron is at Bermuda and the 53rd is at Burtonwood, England. The men in those units go out and fly 14 hours over areas you people don't cover."

"**The information they send** in is as accurate and as valuable to the forecaster as the information received from the local and ship stations. The forecaster counts on you to fill in those big holes where Recon doesn't operate."

"Every wind forecast, every cross-section, and those new horizontal weather depiction charts are all made up from a careful review and analysis of all information the forecaster receives. Then, too, a lot of this information is sent in to Washington for the 'Big Picture.'"

All three men laughed and George sneaked a look at his watch. He then sneaked a look at Ed and the two men started to rise.

"Sit still, gentlemen, I'll order another round." The two young officers sat down, reluctantly.

The Colonel called the waitress over, ordered, lit another cigar and began again.

"Let's get back to the States for a while. There's pretty good coverage of upper air and surface station here in the ZI. The weather people can give you a good forecast for your winds. As yet, though, they don't have equipment which will give them the picture that you can give them."

"The CPS-9 weather radar sets—I'm sure you've seen them—can locate heavy cumulus or convective clouds. They can even give a fair picture of the tops. But—and this is an important but—they can't give a picture of the degree of turbulence within the clouds. They can't tell how much or what kind of icing is in the clouds. And they can't clearly define the amount of clouds or their bases and tops."

"A rawinsonde run—when plotted up on an adiabatic diagram—can give the forecaster information on what should be present up there. But, unless they start putting people in weather balloons, you fly-boys are the only ones who can positively confirm the conditions."

"The observer on the ground can only report what he can see. The worse the weather naturally the less he can see and the smaller his representative area will be. The Representative Observation Program, designed by the Air Weather Service, puts the observer in the area you're most interested in. And that's the approach end of the instrument runway."

"**With winter just around the corner**, there'll be plenty of days when that observer will only be reporting the weather in that small area. Where the limits of his eyesight ends, your eyes have to take over."

"Gentlemen, there isn't an instrument now available that can give a more representative picture of the weather aloft than you can. The forecaster needs pilot reports. If what you encounter is according to his forecast, he wants to know. Conversely, if he 'busts one,' he also wants to know."

"Don't wait to give that pilot report. Give it to someone as soon as you can—to Air Traffic Control, Approach

Control or to the Control Tower. And, don't forget Channel 13! Give it directly to the weather forecaster on the Pilot-to-Forecaster Service. That's Channel 13."

"The next time you're in base ops, ask the weatherman for a copy of the new Form 36. Air Weather Service has just published it. On one side you'll see the location of Channel 13 sets and CPS-9 weather radar sets. Both of these are listed for the ZI. The other side has a checklist to use for inflight pilot reports. You should turn in this form with your Form 175 when you land."

The Colonel cleared his throat, "Guess I've been hogging the conversation, haven't I?"

Before either George or Ed could say, "Roger," the Colonel put out his hand, "Nice meeting you gentlemen. Hope you'll be more kind to weathermen in the future." He was smiling as he left the room.

George looked at Ed. "Whew," he said, "haven't had a lecture like that since ground school." He looked at his watch. "Hey, Ed, get on that telephone. The Colonel is only going to be here for two days. This is my night to howl."

"Ed was scratching his head. Suddenly his face broke into a grin. "Been trying to figger out who that troop is. Just came to me. He's the Weather Detachment Commander here. No wonder he made such a pitch!"

"Yeah, okay, good show, roger, I'll remember what he said. But, you, you clown, get on that phone and do some pitching of your own."

It was a typical late Tuesday night in a very typical Officers' Club bar. First Lieutenant George Appleby was idly stirring his drink with his finger. He looked around the room. Yep, it was real typical. He could spot the "regulars" right away. They're all the same. And he could tell the lonely TDY types. The eager look.

George looked in the bar mirror. Liked what he saw. Clean cut American boy type. On TDY. Real eager look. Lonely? No, sir, he had a friend, and the friend had a friend with a friend. What's better than that? ▲



# Iced



# T-Bird

tips  
for  
tigers

**T**here's something definitely paradoxical about this fly safe business. Oftentimes we have to experience an accident or a series of them in order to fly more safely. Of course, that's just another way of saying, "experience being the best teacher."

Once a trend is established, the smart folks in the business usually get their heads together and think. They talk to other people, read the manuals, conduct tests, manipulate the slipsticks, get out the computers and mebbe even burn some midnight oil.

Just such a deal happened recently up at Headquarters Northeast Air Command, and if a colder and icier area exists anywhere, the NEAC-ers are going to need a lot of convincing. This one concerned icing on T-Birds and F-94s. Here's the pitch.

A series of accidents and near-accidents were occurring and there seemed to be no explanation. The pilots knew they had ice on the airplanes, so they had been using normal landing procedures, but flying the final approach at approximately 15 to 20 knots above normal speed. Yet, lo and behold, the airplanes were stalling at an average of 25 to 30 knots above the computed landing speeds for configuration and weight. Naturally, there were some "shook" airplane drivers around, so they decided to figure the problem out scientifically. A series of tests were set up to investigate:

- Stalls with ice accumulated at cruising speed.
- Stalls with ice accumulated at pattern airspeed in landing configuration.
- Stalls with ice formed immediately ahead of the static source vent.

The tests showed that ice formed at pattern airspeed was deposited on the underside of the wing as well as on the leading edge. This produced greater drag. However, the stall char-

acteristics did not differ appreciably from those with ice formed at cruising speed.

It was concluded that the amount of ice on the wings, and not the type of ice, is the major stall factor.

Evaluation of all stalls with varying amounts of ice produced the following average increases in indicated stalling speeds:

- Trace to  $\frac{1}{4}$  inch—Negligible
- One-half inch—Four knots
- One to  $1\frac{1}{2}$  inch—Eight to 10
- Two inches—12 knots

The maximum amount of ice noted on the airplanes was three inches. No stalls were conducted with that ice load. However, in each instance the landing was uneventful since recommended landing procedures were used.

Stalls conducted with ice immediately ahead of the static ports produced indicated stalling airspeeds 17 to 22 knots above normal. The indication that this condition existed was an abnormally high indicated airspeed for the power being used. Another important fact learned in the tests was that if rime ice accumulates on the leading edge of the wings, it is safe to assume that ice has formed ahead of the static ports.

The most critical effect of ice accretion occurred during maneuvering flight at low airspeeds. Any rapid attempt to arrest a normal rate of descent (1500 fpm) caused an accelerated stall from which several hundred feet were required to recover. Moderate ice accretion (one to two inches) presented no serious obstacles when recommended procedures were followed. The following recommendations came out of the tests:

- Avoid icing levels as much as possible.
- If rime ice is present, a power pattern rather than an airspeed pattern should be flown. This type of ice frequently forms ahead of the static source vents causing a low pressure area over the vent

holes. Therefore, expect the indicated airspeed to be abnormally high for the power used. A rate of descent of 750 fpm with full flaps, landing gear extended, and speed brakes out should require a minimum of 78-80 per cent rpm to maintain 150 knots regardless of indicated airspeed.

- If there is any structural ice present while preparing to land, place the base leg at a sufficient distance from the runway to maintain a rate of descent not exceeding 750 fpm.
- Arrestment of the rate of descent must be gradual with slight reduction of power, and elevator action kept to a minimum. A properly planned approach at 150 knots should place the aircraft over the overrun or runway at an altitude of approximately 10 feet and an airspeed of 140 knots.

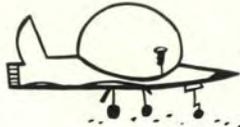
At 200-300 feet from the runway threshold, power should be reduced gradually and the aircraft allowed to settle to the runway as a landing attitude is smoothly established. It is essential that full flaps be used in order to keep the angle of attack at a minimum.

- Pilots should accomplish several of these approaches under no-ice conditions in order to make adjustment for difference in individual pattern and approach technique.

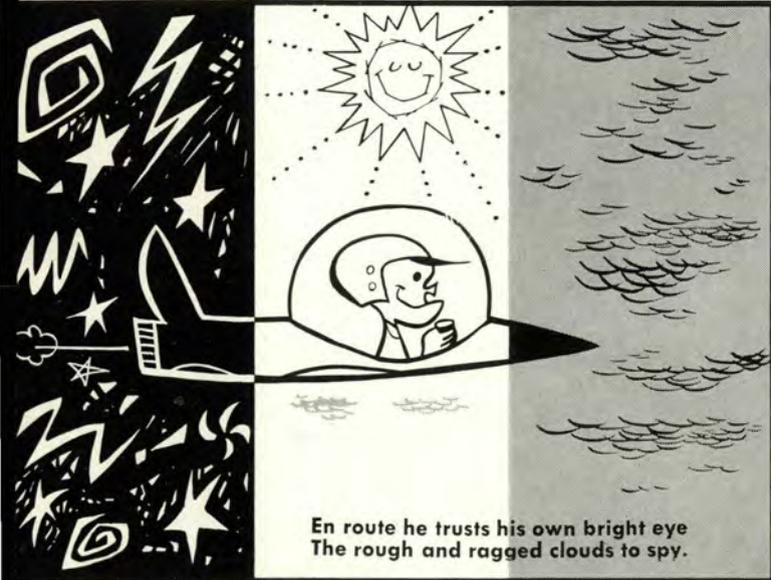
**Missed approaches** or go-arounds can be made in a normal manner. The pilot must maintain adequate airspeed for the ice load and avoid high angles of bank. Obviously, if de-icing equipment is installed and operational, it should be used.

The best solution to the ice-wagon type landing is to make a GCA, using power and a controlled rate of descent to get the airplane on the ground. And don't let an erroneous airspeed reading catch you short—of the runway, that is. ▲

# MAL FUNCTION

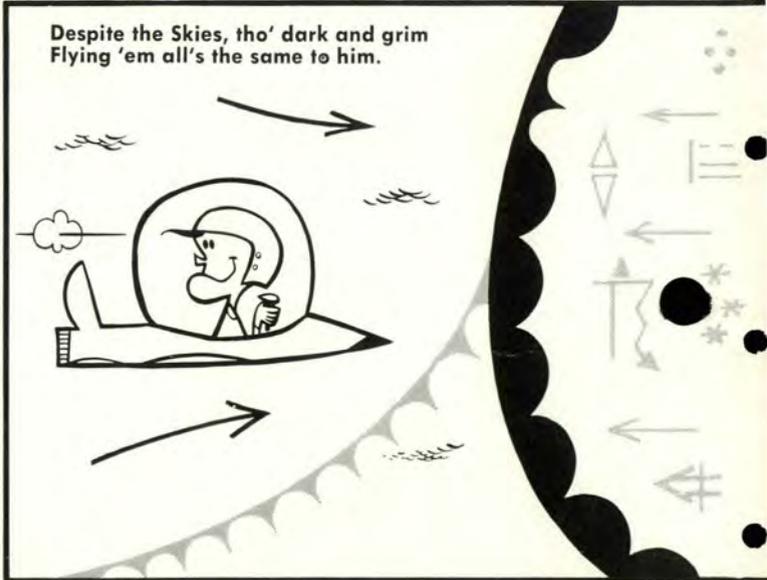


Weatherwise, young Mal takes off  
At forecasters he's prone to scoff.



En route he trusts his own bright eye  
The rough and ragged clouds to spy.

Despite the Skies, tho' dark and grim  
Flying 'em all's the same to him.



Forgetful of the helps that be  
Wrapped up in numbers one and three.



Too bad he knew not that these blokes  
Could've helped him miss the lightning strokes.