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FLYING SAFETY

UNITED STATES AIR FORCE

Special Winter Section

pages 2 to 13

FLYING SAFETY

VOLUME ELEVEN NUMBER TEN

• This month, the book has something for everybody. Pages 2 to 13 are devoted to the Special Winter Section. We've covered cold weather flying from the viewpoint of flying safety, training, equipment and survival, weather tips and a snow removal program. Lots of good poop for all the troops, regardless of what kind of aircraft you are flying.

• As we promised some time ago, we are featuring in the center section of the magazine a special rundown on the new altimeter, complete with pix. This new gage is slated for all USAF aircraft, so best you check this feature closely.

• The story on the back side of the power curve applies to both jet and reciprocal drivers, and the information is a must for all pilots. Also in this issue, Rex is back, we discuss a certain group of Eskimos and a young airman briefs us on survival.

Next month, watch a stand-board at work.

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USAF PERIODICAL 62-1

LETTERS TO THE EDITOR

C'mon, Grow Up

The Assistant Superintendent of Jones Beach State Park, Long Island, New York, in a telephone call to this headquarters, has registered a complaint concerning low flying civilian, Air Force, Navy and Air National Guard aircraft in the Jones Beach area. He said that he was unable to identify any of the aircraft by number, but stated that incidents of low flying aircraft were becoming very frequent and that he considered it dangerous for aircraft to fly so close to the crowded beach areas.

It has not been determined that any actual violations of flying regulations have been committed. However, the noise of aircraft flying over the area at low altitudes has proved quite distressing in the show presented nightly in an open air theater.

To expedite action in this matter Headquarters, First Air Force, 26th Air Division and Floyd Bennett NAS were contacted by telephone and advised of the situation. They agreed to put out operational instructions to all subordinate units directing that the Jones Beach area be specifically avoided.

Lt. Col. C. S. Dresser
Hq, CONAC
Mitchell AFB, N. Y.

Seems some guys never grow up. The various service branches spend a lot of loot each year telling John Q. Taxpayer what we are doing with his tax dollar and on improving relations with the civilian populace in general. Then, along comes some "Look No Hands, Louie" character and destroys it all in a brief minute or two.

And of course, this isn't even touching on the dangerous aspects of this kind of caper. At high speeds, or relatively low speeds for that matter, when you get near the ground you're asking for trouble. Whether these boys are in violation or not, someone is going to get hurt . . . let's hope it isn't an innocent bystander on the ground.

We sometimes wish we had a reg with teeth. Not just for chewing purposes, but rather for completely severing a few heads. That might stop the buzzin' business.

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Denmark Speaks

On behalf of all the pilots in the 729th Fighter Squadron I thank you for your excellent magazine which is studied carefully at our flying safety meetings.

However, we are missing one copy of "Flying Safety", i.e., the one that contains a big article on jet crash barriers. I believe the cover was showing two F-86s taking off with the crash barrier below, and I believe it is from January 1954.

We would appreciate it very much if you could mail us that copy.

2/Lt. Per Alkaersig, RDAF
729th Fighter Sq
Surydstrup AFB
Pr Vojens, Denmark.

FLYING SAFETY thanks the pilots of the 729th Fighter Squadron. The barrier story you mention appeared in the July 1954 issue. A copy is on the way.

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WAADA Troubles

Many words, written and spoken, have been expended in an effort to keep Air Force pilots aware of the hazards involved in inadvertent operation in restricted areas. Some pilots still overlook this aspect of good flight planning, but others appear to be leaning toward the opposite extreme by entering "will avoid all danger areas" in the remarks section of the DD-175.

This popular phrase, commonly abbreviated WAADA, can have the same effect as the little boy who cried "Wolf! Wolf!" Flight plans with routes entirely along civil airways or directly through the middle of exceptionally large danger areas are copied every day in Flight Service Centers bearing the remark "WAADA." It is evident that this remark is being entered automatically, with no real consideration of the proposed route.

The pilots, however, are not the only offenders. When a base operations dispatcher was asked recently why the remark was entered on a flight plan along airways, she replied, "We've been entering it on all flight plans near danger areas, to save you the trouble of calling back." *Without the pilot's knowledge!*

This confusion and potential hazard could be alleviated if pilots would file a definite route around a restricted area. Two direct legs, with a turning point near but outside the area is a much neater, more economical method than flying up to the area and then circum-navigating it by pilotage, so often inaccurate in the remote places where restricted areas are found.

There are many advantages in filing this definite route. It fulfills the requirement of Air Force Reg 60-22 which prohibits deviation from the flight planned route by more than five miles during ADIZ operation. In the event of a search, Air Rescue's work is much reduced if the direction taken around a particular danger area is known. In addition, it reflects the pride felt by a pilot in his status as a professional.

1st Lt. David H. Tittle
Hamilton Flight Service Center
Hamilton AFB, Calif.

All the Lt's. points are well taken. But special emphasis should be placed on 60-22. If you are looking for a quick bounce from a fighter type, try it. We know a guy who did. He's real sorry.

EVERY year along about this time, we get out collective heads together and start compiling DOs and DONT's for cold weather flying. As we've said before and undoubtedly will again, this business of writing about winter problems in the middle of August is strictly for the birds, or maybe polar bears. We must admit that it's a bit difficult to keep our editorial minds fastened on ice and snow when the thermometer is pegged in the very high 90s!

About the time this issue of FLYING SAFETY finds its way into your hands, the overall weather will be almost ideal. Fall is the nicest time of year to fly, and it is hard to face the brutal fact that ole man winter is right around the corner.

Getting ourselves operationally, physically and mentally prepared for cold weather is somewhat of a job. However, we've got to remember that, far to the north, weather cells are already forming that will, in time, furnish large chunks of trouble for us.

Winter flight operations cannot be treated with the summerish attitude of "let's go bore holes in the blue." Your machine can take it any time of the year, but you have to be conditioned. As our faithful readers know, we're not particularly statistically minded. Nevertheless, our people who compile statistical data can prove that all too many winter incidents and accidents could have been prevented by a realization that flying conditions, runway conditions and even personal life takes a 180 degree change when the thermometer dips.

For whatever it's worth, you might kick this idea around: Regardless of the type of aircraft you fly and regardless of the mission, the winter season will necessitate an awakening of the mental and physical preparedness of all aircrew members. Winter flying should be broken down into four distinct parts. Flying safety. Training. Personal equipment. And lastly, weather. Add the four together and you'll come up with one basic answer. Let's lead off our Special Winter Section with a realistic approach to flying safety as governed by cold weather rules.

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PARADOXICALLY, the accident rate during winter months drops. On the face of it, that doesn't seem particularly logical. However, when you consider the fact that fewer flights are made when the snow is blowing, it becomes clear why the rate charts do funny things. But, to jump from rates to reality, the fact remains that we've got to exercise more caution when wintery blasts are about, especially in the field of good flight planning. There's a lot that you should consider before affixing your signature to the Form 175 during those months from October through March.

Perhaps you'll feel that it is a bit

The Special Winter Section is devoted to many of the problems that crop up yearly for USAF people stationed 'round the world.

Frigid FLYING SAFETY

extraneous to keep harping on flight safety, but during the cold months this is one subject that must be stressed in all operational phases of Air Force activities. Strict adherence to the principles advocated and outlined in regs, manuals, directives and even common sense discussions should be a must with every driver in the business.

We've heard the old cry that it's the Base Operations Officer who is charged with the responsibility of furnishing any needed advice and clearing authority. Okay, so that's true, up to a point. We're glad that not too many pilots adopt such an attitude. 'Nuff said.

Cold Weather Plans

By the time this article reaches print, most tactical organizations will have started their respective training programs. Planning for cold weather we call it, and that means concentrating on such essential stuff as short-field landings, emergency procedures and complete operational knowledge of the aircraft systems.

This is just plain know-how about your flying machine. It's surprising to find how fast dust accumulates on carburetor heat controls, anti-icing switches and wind-shield alcohol toggles over a summer.

Most of our readers have been flitting around for lo these many years, and we don't feel it necessary to get into much of the basic treatment on snow, ice, sleet and allied ills. There is, however, one rather touchy subject which is certainly worth a few column inches, namely taxiing and parking.

Slippery surfaces greatly reduce the effectiveness of braking action in steering and stopping. All taxiing should be accomplished with this in mind. In multi-engine craft, judicious use of the throttles is far superior to attempting to use brakes. Any base commander will buy a throttle-turn policy in place of brake turns that often wind up in uncontrollable skids.

Maintenance personnel as well as pilots should remember the three cardinal rules for winter taxiing: First, taxi slowly; second, keep sufficient distance behind other moving aircraft to avoid having snow or water blown back on your machine, and third, do not allow your propeller or jet blast to blow on personnel or aircraft. Anyone who carelessly blasts another plane with a blanket of snow and ice particles is asking for a punch in the eye, and we've got to go along with that.

Skidding, slipping and making like a top on icy runways or taxiways may be interesting for the spectators, but it can get mighty costly. After unceremoniously slamming into a snowbank with an OA-10 years ago, we learned to ignore pride completely and call for a tug when the area is slippery. If we may, we suggest you swallow your pride at crucial moments and do the same.

Bank Perils

Speaking of snowbanks, today in most every organization you'll find at least one driver who will relate, with appropriate gestures, how all that could be seen of the airplane on the runway after landing was the tip of the rudder. It usually goes on from there!

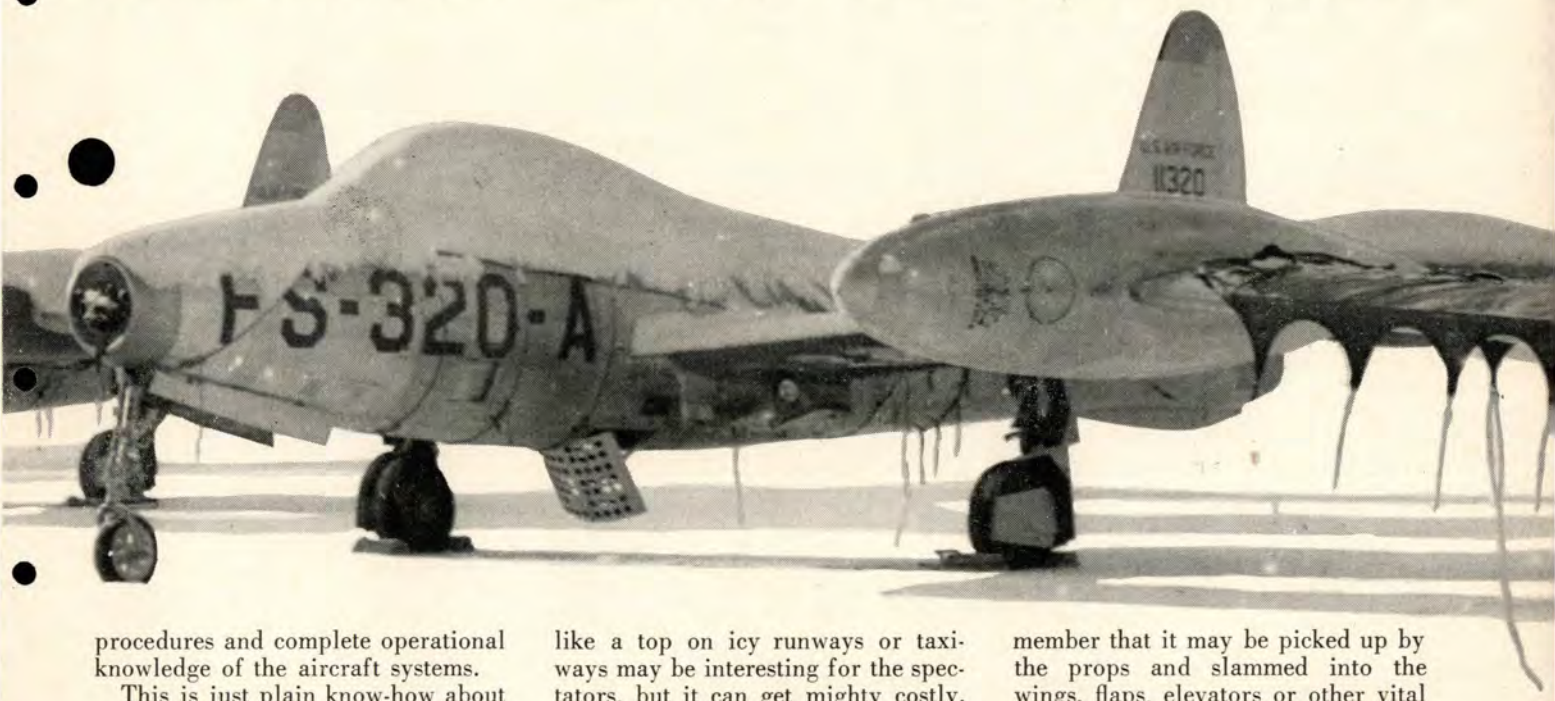
Well, most of us will encounter lesser degrees of piled up snow, but snowbanks call for accuracy and safety, in turns particularly. Make sure that you have sufficient clearance. Be alert when making that preflight runup on slippery surfaces. We've published some rather hairy tales in the past about galloping aircraft that were improperly chocked or improperly managed when the ground was slippery. We'll consider it a personal favor if you'll avoid such pitfalls from here on out.

Probably most of you have read and reread this before, but for the new members may we suggest a few little gimmicks worth remembering in this cold weather business.

Use the old noodle when running up the engines. If there is any loose ice immediately around the plane, remember that it may be picked up by the props and slammed into the wings, flaps, elevators or other vital parts of your aircraft. Pick the runup spot carefully.

After being parked over night, always make a visual check for an accumulation of ice, snow or frost in control hinges or brake shoes. Make certain that the wings, fuselage and empennage are completely free of same.

Every year when we get on this subject, we remember an old buddy who plunked a light plane down on



an ice-covered lake one day, during a nasty snow squall. He learned about clean surfaces the hard way.

After getting the puddle-jumper in the lee of some brush along shore, he and his passenger waited for the squall to pass. And as a matter of fact it didn't take long. About half an hour or so.

When our intrepid aeronaut finally decided to continue the flight, he hauled the putt-putt back onto the ice, fired up and leaped off. Unfortunately, he didn't leap very far. One wing, protected by the brush ashore, was clean of snow. The other panel had about a half-inch accumulation on it.

We were selling airplanes in those days. Luckily this lad was still around to buy a new one. Believe us, he needed it. Probably you know what happened. That snow-covered panel failed to produce any lift. With 50 per cent of the wing working, the results were inevitable. A half roll at minus altitude is hard on insurance.

The moral of all this is simple; make certain that all surfaces are free of ice and snow before attempting a takeoff. Even frost can be more than just a nuisance.

Another wrinkle that should be explored thoroughly is that of cycling the gear after takeoff from wet or slushy runways. Admittedly, there are a few aircraft in which such a procedure would not be allowable. However, in most planes cycling the gear a couple times after becoming airborne will preclude the possibility of arriving at the next destination and finding that the landing gear is frozen UP!

We've mentioned this every year also. Probably always will. Remember the NOTAM file. Those notices get even more important during winter months. On many northern bases, runway and field conditions may change hourly. Last year only a handful of pilots got in trouble by failing to check 'em. We'd like to see that number reduced to zero during the 1955-56 winter period.

Added Load

There's an old saw in the advertising business to the effect that "repetition is reputation." Applied to winter flying, this concerns the formation of ice on aircraft and, it has a reputation. Of course we have anti-icing and de-icing equipment and if used properly it will do a good job. But, for the sake of the record it won't hurt to run through a quick review of the three basic types of ice, how they form, the damage they can do and the preventive measures that must be used to combat them.

Clear ice is the most serious type and the hardest to cope with. Clear ice forms when supercooled water strikes the plane faster than it freezes. Because all exposed surfaces are wet with an actual excess of water, the ice forms closely to the planes' contour. Such ice will form in areas beyond effective elimination by the de-icing system and eventually will produce a general roughening of wing and empennage surfaces, creating excessive drag.

Cumulus clouds are naturals for clear ice. If you get in a position where you have to fly through an area with cumulus present, prepare yourself for entry and zip on through as smartly as possible.

Rime ice is the porous, white type that is granular in appearance. It forms principally on the leading edges and other minor protuberances. It is more easily removed than clear ice. Judicious use of the boots or anti-icers normally will take care of it. If you have to land with a load of rime on board, remember to maintain a little excess speed on final.

Above, slippery surfaces greatly reduce brak effectiveness. Below, don't carelessly blast other aircraft with a blanket of snow or ice.

"Practice and more practice... the reason some IPs have you shoot a GCA after a 10-hour flight."

The third offender is sleet. Fortunately you won't encounter it very often and the best advice for fooling with sleet is to get out of the area as soon as possible.

Jet Engine Icing

For you jet jockeys one must for winter flying is Tech Order 1-1-469. Titled "Operation of Aircraft with Jet Engines Under Icing Conditions," this T.O. should kindle a mental fire. As a matter of fact, understanding it might keep the aircraft flame burning, too.

Briefly, the book says to keep a wary eye on the tailpipe temperature gage. Ice can form on the inlet screens and compressor inlet guide vanes and restrict the flow of inlet air. If you see the temperature jumping up rapidly be prepared to change altitude quickly.

The best recommendation for the pilot of axial flow aircraft is to avoid probable icing conditions by careful flight planning. If actual icing is encountered, change altitude as rapidly as possible or reduce engine power as necessary to prevent excessive tailpipe temperatures.

One general rule to remember under all icing conditions is to climb when encountering all types of ice except sleet. With the latter, one should hold altitude or descend.

Having touched on icing briefly, let's examine a few more variables that enter into winter flying.

Depth perception suffers when the ground is covered with snow. Lack of contrast between the runway and the surrounding terrain may cause the runway to disappear from sight entirely on final approach. Such aids as sea marker dye on the strip or branches of evergreens stuck beside the runway have been tried out with varying degrees of success.

It sometimes helps to have the tower operator turn up the intensity of the runway lights, even in broad daylight. Don't ever get caught short without a pair of sun glasses. On cloudy days the glare is almost as bad as when the sun it out.

DEEP FREEZE TRAINING

KNOWLEDGE itself is of small value without practical application. Even before the snow starts to fall, the really sharp units will have intensive aircrew training programs in effect.

Indoctrination in cold weather operation logically could start with supply. You've got to dress for this business. That Base Ops office is nice and warm on wintery days and so is the cockpit as long as the heaters work. But if things happen to go awry, then clothing is number one on your warmth parade. Don't wait for the thermometer to dip before getting with the personal equipment people. Like the Boy Scouts, let's be prepared NOW!

Thinking along the lines of being prepared, how about your personal proficiency in such matters as basic instrument flying, tracking and letdown and low visibility approaches?

For instance, radio antennas have a habit of icing up. And if that ground speed hasn't been computed constantly, then that section of your anatomy between the head and shoulders may be stretched more than somewhat. Of course there is only one answer to all this. Practice.

Some people say that practice makes perfect. Perhaps that isn't quite true, but did you ever wonder why some IPs will have you shoot a low approach after a 10-hour stint behind the controls? It's the only way we can hope to become and remain even close to perfect.

We speak a bit further along in the book this month about weather. However, a few general points are not amiss right here.

Analysis of weather charts and upper air charts should receive your undivided attention. Most pilots seem to be a trifle more interested in the weather picture during the winter months, and why not? Extreme wind conditions and local peculiarities tend to be magnified more in winter than in summer.

Weathermen, believe it or not, relish the questions aimed at conditions along your projected route. This indicates to them that you are seeking more than just a required briefing. They growl about pilots who take winter weather for granted as much as about pilots who remark that all forecasters bust their forecasts. Remember that many of these guys wear wings too, and they didn't get them any easier than you acquired yours. They are serious about this weather business.

In addition to upgrading pilot proficiency, many commanders get their people together for a series of pre-winter briefings. This is a healthy sort of thing and should be encouraged. It beats the so-called flying safety meetings in every way.

We've sat in on some of the "challenge-me-down" type of get-togethers and they make money. Take a group of pilots and throw in the current Radio Facility Charts, the Supplementary Radio Information booklet and the PHACUS charts and you have the ingredients. Then start off with a question about radio facilities at some given base and off the discussion goes. Besides being informative, it's good training.

Another good gimmick is to get in one of the Air Rescue people and have him go over their mission and how it may affect you.

LIVE IN COOL COMFORT

SIDE BY SIDE with air rescue work is survival. The personal equipment officer and any available survival specialists should be rung in on these pre-winter meetings. It has been proved from operational experience that the chances for survival are directionally proportional to the thoroughness of training received.

There's no denying that an emergency bail-out will prove of little value if the pilot loses his emergency kit before he rests on land, sea or snow. We have many reports that indicate just one solitary knife meant the difference between survival and failure. Most jet drivers and the prop boys know their survival gear and attend regular classes in order to keep current with survival methods.

But it's the administrative pilot who should heed some of the advice passed on by their fellow airmen. Every desk jockey should make himself a handy-dandy kit consisting of a knife, mirror, flashlight and three or four books of matches. Maybe that doesn't sound very impressive, but that little kit might just keep one in pretty fair shape if the chips were suddenly down. Even the old Goonies have been known to falter.

Everyone should read AFM 64-5 again. This is better than poop fro the group. It was compiled by gu who really know their business.

Here's another thing you might keep in mind. This deals with moral responsibility, and in this day and age we're getting charged with larger and larger doses of same.

A lot of hours are going to be logged this winter by transient passengers. They have heard the before-flight briefing by crew chiefs, co-pilots and energetic first pilots. Still, every winter troubles crop up and somebody has to pay. Crewmembers must be capable of rendering assistance and leadership to their passengers over and above the perfunctory duty of informing them what a D ring is intended for.

Too little emphasis is leveled in that direction by most pilots. Maybe you've never thought of it this way, but YOU, as aircraft commander, will be the last to leave the great iron bird if trouble develops. If there's any confusion, you can bet it will be too late to make amends. Thorough briefings and insistence on strict air discipline from top to bottom is imperative.

There are a few rules about co weather operations that should be passed on to all personnel concerned: Keep dry, keep clean, take

"... A desk jockey should carry a handy-dandy kit including knife, mirror, flashlight and matches."

Good clothes can make the man, or rather save him, if he happens to go down somewhere in the Artic.

sufficient clothing along, avoid chilling, avoid windblasts, avoid constriction of circulation, wear proper socks, shoes and gloves, dress in light layers rather than single heavy stuff and, when airborne, do not ride hot. (Have the flight engineer turn the heaters low. Maintain cabin heat on the cool side.)

Standard aircraft equipment for survival will depend, of course, where and in what region of the world the plane is operating. However, even in Stateside business one ought to have most of the following equipment on board:

- Two emergency hand axes.
- Two fire extinguishers.
- Two aeronautical first aid kits.
- One pyrotechnical pistol.
- Twelve signal flares.
- One ARC-3 Aldis lamp.
- Oxygen masks. (one per crew member.)
- Parachutes. (Be *certain* you are carrying enough.)
- Safety belts. (No kidding. Check 'em. One per each, you know.)

And there you have it. We've only scratched the surface. If this article has made you think, even just a little, then it has been time well spent in its preparation. Winter flying is just like summer flying. It's the pre-planning that takes more time. Don't skimp on that item. It's available.

COLD FACTS ON WINTER WEATHER

RECOGNITION of certain facts about the source regions of our winter weather and the charted trends and movements of weather cells are two very important phases of wintertime operations that every pilot should consider.

Most fly types know by now that winter weather germinates for the United States either in the polar regions or in the tropics. These cells pick up the characteristics of the surface in which they form. Namely, temperature, moisture and stability. From there to eternity, to coin a phrase, this cell is buffeted around the troposphere. In the U. S. they come roaring down from the Aleutians or North Canada complete with snow and cold temperatures. Or again they sneak in the back door from the Gulf of Mexico with low visibilities and fog.

Denizens of the Pacific Northwest usually are the recipients of an mPw air mass cell first, and IFR flight plans begin to clog control centers as clouds stack over the Rockies.

However, they poop out on the eastern side of this barrier and generally good flying conditions exist in the plains area, with little turbulence and unlimited ceilings.

Down Texas way and extending well up into the midlands and the Gulf Coast states, another cell bangs around most of the winter. Maritime tropical air masses begin their invasion with a lot of poor flying weather because of extensive cloudiness which may be cumuliform, stratiform, or both. Poor visibility coupled with heavy precipitation and widespread advection and prefrontal fogs dampens the spirits of even the best Chamber of Commerce man in Texas.

Meanwhile up in the Great Lakes regions, a mass of cPk weather makes itself felt. Cold and dry and unstable it concocts a lot of cumulus clouds with accompanying turbulence.

So the trends have been established and will continue to follow their ingenious pathways through the skies. We thought a quick re-hash would set your mental directional gyro on the crux of matter. Next on

the menu are some of the problems you'll encounter this coming season.

No False Fronts Here

Fronts come in assorted sizes and shapes. (However, space will not be devoted to a discussion of Marilyn, Jane or Gina. Maybe later.) The ones we're talking about are cold, warm, stationary and occluded.

We all know what the colors blue, red, alternate blue and red, and purple stand for on weather maps. They indicate something cooking. As can be expected, the weatherman is going to be his artistic self when it comes to dressing up his product. His hodge-podge of solid lines probably could qualify him for a degree from a modern art school. But, he's got the facts, man.

Cold fronts will be whipping up a lather over your base before long. The slopes of cold fronts average from 1:50 to 1:150. Miles that is. In front of one of these "blue northers" you're gonna be gadget gazing, while immediately behind it you'll tangle with some moderate turbulence. The wind component will shift about at right angles, also.

Warm, stationary and occluded fronts have a tendency to clutter up the atmosphere with low ceilings, drizzle, ran showers, and poor visibilities. Those of you with arthritis will feel the moisture. The entire frontal system will be sluggish and will hand out trouble for sometimes a week or more.

Say, friend, how long has it been since you've had fog in the cockpit? We've done a bit of sleuthing around the shop and found out that this cause factor for aircraft accidents is listed as pilot error. Tracing a little bit further, it's amazing to find out that there are many tons of aluminum resting in the salvage yards of airbases all over the world due to this treacherous, insidious element.

Not many moons ago, a lot of C-54's were churning up the air in the corridors of the Berlin Airlift. Europe during the winter isn't conducive to long life for a careless crew. Fog has to be treated with more than kid gloves. I think we all know what causes it. High relative humidity, very light wind and condensation nuclei. Somebody is going to come out with a fog dispenser pretty soon, but don't hold your breath.

Depending upon where you're drawing flying pay this winter, you'll have to deal with either radiation type fog, advection, upslope and maybe some evaporation type. Take it from us, delay that take-off or circumnavigate the area. We say it again, swallow your pride. You'll live longer.

Much of the U.S. winter weather comes roaring down over the Canadian Rockies.

The icing hazard we've mentioned already. Comes the large-size thunderstorm for consideration. Best you check AFM 51-38, Theory of Instrument Flying, for a good rundown on these cantankerous creatures.

We've gone far enough along in this weather section to say something about the weather forecaster. It's our guess that there might be one or two pilots in the Air Force who haven't at one time or another made a disparaging remark about the ability of these much-maligned lads who prognosticate the weather.

Well, we're going to crusade for them on a couple of points. Mind you, now, we reserve the right to kibitz at any time, but we think they've got their problems, too.

You know how to use all of the gages and dials in your flying machine. You know how to use all of your survival gear. But I wonder if you've given any thought on how to use a weather forecaster.

There's a little saying around the weather stations in the Air Force that goes like this, "If you give us five minutes notice for a flight, you'll probably get a nickel's worth of weather." And that is just about what the hurry-to-scurry pilot gets before he leaps into the air.

There are a lot of factors which govern missions and flights. But we venture to say that there would be

far less accidents this winter if you troops would follow somewhat along this pattern when you deal with your weather doctor.

Wonder how many of you have ever used the phone to get the WX? We mean 24 hours in advance of your flight. Or better yet, a preflight visit to the station will help immeasurably to gear your mental outlook for the job coming up instead of rushing in pell-mell and out again. Next time, give the forecaster a hint of what you will need in advance of take-off time.

Next step is the proper use or sequence of facilities the weather station has to offer. Isn't it amazing how a pilot can leaf through some hourly sequence reports and know the weather, whereas it takes a competent forecaster every working hour to do the job right.

Actually, while the forecaster is busy with another crew or pilot, you usually have time to case the joint yourself. Number one on your list ought to be the constant pressure charts. Answer this question before reading the next paragraph. On which side of a closed low pressure area on the constant pressure chart will you get the worst weather in wintertime in the U.S.?

Whether you know it or not, these charts are one of the best tools that a forecaster has at his disposal. It gives the winds, temperature, moisture and location of fronts aloft. It is effected much less by terrain features than the surface chart.

These constant pressure charts will indicate major weather trends. Any fly type, who takes a serious look at the past performances of the weather on these charts, can interpolate as to the probable direction of their movement. Then when the forecaster begins his tour with you, you're tuned in on his frequency.

Next stop on your weather beat is a matter of personal needs. Icing levels, turbulent areas, winds aloft and matters of like ilk. Mind you, these things are old hat, but the important thing is to get into a regular habit of sequence.

Lastly, hit the landscape job that he accomplishes every six hours with his colored pencils on the surface chart. Now, you are at liberty to leaf through the sequence reports.

Learn to Listen

One big fault that most of us have in a weather station is listening. Far be it from us to have you read Mr. Carnegie's book on winning friends, but here's a tip. Tell the forecaster your mission or flight and then let him talk and you listen. Helped along by your own incisive questions at the conclusion of his pitch, there isn't any reason you shouldn't walk out of the weather adobe with a clear, concise picture of what you can expect in flight.

Once in the air, the services of the weatherman still can be helpful. First off, how many of you knew that Air Weather Service no longer gives the altimeter setting on hourly sequence reports? Yes, they give station pressure, but not the setting. So that means that you have to get it from the tower or a range station.

Another little gimmick that might help you. Guess you know that when you ask the tower operator or controller for weather at the point of intended landing he calls the weather station. What you should do is to ask for the forecast weather also. This alert gets him on the horn personally and his facts might help you make a decision prior to leaving that all important altitude.

Another refreshing item. Who watches your weather while you are enroute? You do. Flight Service used to flight follow, but no more. Once you clear the tower frequency, you are on your own. Things can get really hairy what with static, ice and turbulence all cropping up at the same time.

The single engine jet pilots have a peculiar problem. They are always playing footsie with fuel. When that destination starts to close in and they're ginning over the 30,000-foot high cone and the controller throws a new clearance at them that requires new flight planning, well, being up the creek without a paddle is a mild understatement. About the only way to solve this vexer is to pre-plan for that omnipresent eventuality. A clear cut, clear weather alternate and constant radio checks will normally alleviate the situation.

Know Your Backyard

That familiarity breeds contempt is an old military aphorism that has made the rounds. But relating it to weather brings up an interesting

The weather office has got the information, so why not use it? Don't go leaping off to some field where freeezing rain or heavy snow are forecast or your plane might look like these.

point. Generally the southeastern, southwestern and far western sections of the U. S. have good winter flying weather. The severe flying weather zones are their opposites. So get familiar with your own backyard. When you go a-calling, use the old noodle.

Here's what one base did to acclimate their pilots to winter flying. They knew where most of their winter flying would be done so they constructed a bar graph to show the comparisons. Just for your information; the degree of better than 1,000-foot ceiling and 3-mile visibility frequency of weather for Tucson, Arizona is 99 per cent as compared to Chaumont, France, which had 59 per cent. Washington, D. C. rated 76 per cent, while alongside was Landstuhl, Germany with 51 per cent. McChord Air Force Base, which notedly has some pretty foul weather year-around, was 64 per cent but, Hahn, Germany was the worst of a six reported with a 43 per cent. S you can see winter flying presents some problems everywhere.

P. S. The answer to the closed low pressure area question on the constant pressure chart is normally on the eastern side. ●

MAKE SNOW-GO

JUST A YEAR AGO we sat down and wrote a short discourse on snow removal. We titled it "Hazards by the Ton. At that time we felt there was little to say about the subject not already known by the average pilot. Possibly we were in error, for since then we have received the most comprehensive snow removal plan we've ever had the pleasure to review.

As we said a year ago, thousands of tons of hazardous material will be delivered soon to many Air Force bases. It will arrive by air, unpackaged and at unscheduled intervals during the next few months.

The soft white flakes which comprise this material can be a grave menace. Often, within a matter of hours they become dingy gray snowbanks piled along runway edges and overruns where a hapless pilot may drive into them. Or they melt on the runway surface and turn into slick, rutted ice, a perfect setup for runup and taxi accidents.

One base, however, has worked out an outstanding snow removal plan. We believe it's good enough to pass along. It doesn't require any special equipment. It *does* require some careful organization and planning. We urge that you consider the recommendations incorporated within this article, and do it long before the first snowflakes fall.

Personnel at Presque Isle AFB have always been cognizant of the difficulties of wintertime operation and since the reactivation of that base more than five years ago, much time and effort has been devoted to methods and procedures for presenting clean runways during periods of inclement weather. The results have exceeded all expectations, and Presque Isle AFB can take pride in a job well done.

Flying safety occupies an important place in the overall picture of a snow removal plan. Of primary importance is the necessity for providing quick withdrawal of vehicles from the active runway in the event an aircraft desires to land or a active alert mission is scramble

We've all heard the plea from FSOs and AIOs that they didn't have any radios for their ground equipment. What would somebody do about it, please? The people at Presque Isle solved that one easily. They have one radio-equipped pickup truck, tuned to tower frequency, that monitors the removal operations and is able to contact all vehicle drivers in a short period of time. This system, in conjunction with light signals from the tower, provides adequate safety precautions.

Another safety factor revolves around the use of a qualified mobile control officer when recovering base aircraft, regardless of pilot experience level and qualifications. It has been proved that during periods of blowing snow and other restrictions to visibility, a qualified person in close proximity to the runway provides the necessary added control needed for good supervision of flying.

Factors contributing to a succeessful snow removal program are:

- SOPs.
- Adequate Equipment.
- Efficient Maintenance Facilitie
- Experienced Operators.

• Proper Control and Supervision.
• Implementation of New Ideas.

Basically, standard operational procedures should be broken down into four phases: Preparation prior to winter; action to be taken upon receiving a storm warning; operation of the equipment during a snowstorm, and lastly, operation of the equipment for snow and ice removal.

There is no magic wand for any of these phases. They must be carefully preplanned, then put into action as required.

As in any military operation, the first requirement for a sustained attack is equipment. In this case, snow removal equipment. It is mandatory that every piece of rolling stock is in good operating condition. Further, it must be ready for immediate use. This means that not only must gas tanks be filled and radiators checked, but batteries must be available on a moment's notice and crews ready to hop in and dig.

Snowplows, including wing-plows, should be mounted on the frames of dump trucks and prime movers. These are for the heavy workloads. Small, straight blades should be mounted on jeeps and tugs for use around hangar ramps and doors.

All equipment should be stored in covered and heated spaces. Cold-soaked engines won't be of much use if it becomes necessary to get on the job on the double. All too often spare parts are overlooked by personnel charged with planning. Even one tired old spark plug can raise particular hob with an operation when machines are teamed.

Of course, one of the most important functions is that of making a complete survey of available manpower to determine how many men are needed for a continuous operation and to insure that operators are well-schooled in the operation of the equipment. It will be necessary to have on hand a complete file on each operator as to address, phone number and how to contact him immediately, when needed. This is especially true of off-base personnel and civilians. The whole organization must be divided into shifts and teams.

Provisions must be made for an adequate amount of sand and salt to be used for ice control. These two items must be stored in a sheltered area and be immediately available. But remember, when using salt in conjunction with wet snow, caution should be observed around aircraft. After each flight, the planes must be washed down.

"Suggest you implement our snow removal program when ready, Gridley."

The AIO and FSO should get together with the Ops Officer and establish a "plan of the base" as to priority for runways, taxiways, parking aprons, roads and other work areas. The prevailing wind, type of storm and other factors must be considered when working from the base plan.

One factor sometimes overlooked is that of assigning a top priority to the issuance of winter clothing for the airmen. A cold worker is of no value to any plan. He simply cannot produce at top level.

Now is the time to get that snow fencing checked and repaired as necessary. Past experience will dictate its placement, but, here again, don't wait until the snow flies to get the fence up. Also, wooden stakes should be fabricated and painted and be readily available for marking of runways. Don't forget that the plow crews have to have a guide.

Okay, so much for the preparation phase. Now we have to consider the action to be taken upon receiving a storm warning. The system of warning must be worked out in conjunction with the base weather officer.

All crews and teams must be alerted and if the warning comes after normal duty hours, civilian personnel must be contacted and transportation dispatched to pick them up, if necessary.

Crews will start up all equipment and make any last minute adjustments that are necessary. All equipment that may be on other jobs, such as road graders, should be called in immediately and checked.

You may not make any dear friends in the food service squadron, but contact them for support in feeding the men if it appears that a sustained operation is in the offing. A hot meal at 0300 hours can work miracles with morale as well as with the physical man, and coffee on a 24-hour basis is a must.

Finally, it will be necessary to hold a briefing of the operators on priorities and weather conditions.

Assuming that the forecast storm arrives, we now enter phase three of the removal program.

As the snow begins to fall, immediate action begins; equipment is readied and prepared for dispatching. When the accumulation of snow is of sufficient depth to warrant the use of plows (usually four to six inches), the snow removal officer will move the equipment out.

The machines employed at Presque Isle AFB are typical of those needed at any field in the same general latitude. Let's see what they use during a typical winter storm.

Four large straight blade plows and two graders are dispatched to the active runway. Two 7½-ton rotary blowers are dispatched to the same runway as soon as the plows have built up a windrow for the blowers to work on.

The designated lead plow starts in the center of the runway, followed by three more large straight blade

plows in echelon, pushing the snow to the right.

After moving down one side of the runway, the formation reverses its direction and moves back up the other side, thus completing one trip. As many trips as necessary are made to build up a windrow about 20 feet inside the runway lights.

At this time, the lead plow leaves the formation and makes one trip just inside of the lights on both sides of the runway. As soon as the lead plow starts its trip, two rotary blowers start to blow the windrows over the lights, clearing them away on both sides of the runway.

In case of a particularly heavy snowfall, the rotary blowers may be used to disperse the windrows on the runway before the straight blades have reached the lights.

The cleaning behind the runway lights is accomplished after it has stopped snowing in the same manner as prescribed for cleaning the runway. A 150 to 200-foot area is cleaned behind the lights and the windrows behind them are removed after the storm is over.

The two graders are utilized during the storm in the center section of the active runway to keep that area as bare as possible. Because of their cutting ability, they can remove the small amount of snow that the larger blades miss.

After the storm has ceased, the graders are used to remove windrows at the intersections and other priority taxiways. One large straight blade plow is dispatched to the alert hangar taxiway and remains in continuous operation in that area. One rotary blower is used in the same area when the plow has made a sufficient windrow to be blown away.

When rotary blowers are working on the shoulders of the runway, the cutting units are not lowered to rest on the ground because of the possibility of hitting a frozen rut or deformation in the ground.

Four straight blade plows and four rotary blowers are dispatched to the priority taxiway. The length of most taxiways makes it necessary to use the four blowers in order to expedite snow removal. One large straight blade is designated as lead plow. The leader starts in the center of the taxiway with the other three large plows following in echelon.

As in the case of the runway, the plows move the snow to the right, travel the entire length of the taxiway, and then reverse direction. Normally, a few trips will open up the area for safe aircraft operation.

Taxiways that have marker lights on them are cleaned in the same manner as the runway. The rotary blowers are used to blow the windrows over the lights, dispersing the snow as far back as possible.

One straight plow and two rotary blowers are used to remove snow around the hangars when the storm abates. Tugs and jeeps mounted with plows are operated by the sections assigned such equipment and coordinate with the large plow crew in removal work around the hangar area.

While these operations are taking place, other crews are dispatched to keep key roads open. Two small (1½-ton) trucks mounted with sweeper blades and one large plow are sent onto the priority streets.

As soon as the operational runways, taxiways and roads have been cleared, all available equipment is used to clear the overruns for 1000 feet on each end of the runways.

Snowbanks on the taxiways and around the operational areas of the aircraft are held to a minimum of two feet. This is accomplished by use of both plows and rotary blowers. Snowbanks on the runways are eliminated completely if possible.

The accumulation of ice is one of the most serious situations that accompanies winter operations. The use of a road grader equipped with ice blades has been one method of solving the problem. These ice blades are composed of sharp teeth and are attached to the blade of the grader. To utilize these blades efficiently, a 12-ton road grader is required to provide an adequate force to scarify the ice. Where extreme ice conditions exist, crawler type tractors (TD-4s, TD-6s and TD-9s) have been used with some success. The action of the cleats tends to break up heavy ice. The suitability of such vehicles is somewhat questionable, however, because of their detrimental effects on bituminous surfaces and, too, there is a great deal of wear and tear on the vehicles themselves.

A word of warning. Calcium chloride works pretty well in removing ice from roads and highways. A few people have tried it on runways. True, the reaction was all that was expected. The ice melted. But, so did the wings and fuselages of a few hapless aircraft. The corrosive action of calcium chloride on dural is somewhat startling, to say the least.

There is, however, a relatively new product on the market known as Sno-Gon. Preliminary tests indicate that this material is compatible with iron, steel and aluminum. FLYING SAFETY would appreciate hearing from any using organizations after this coming winter has passed. If the results are half as good as indicated by the preliminary tests, we may well have a solution to the problem.

". . . rolling stock must be in good condition."

The spreading of sand on runways and taxiways is one method to insure fairly effective braking action. The sand must be clean, free of lumps and in such condition that it can be spread easily.

Lumps of frozen sand on runways have proved to be a built-in hazard that must not be allowed to exist. It is very probable that major damage to jet engines has been sustained from such malpractice. Experience shows that heated sand is more effective than cold in that it adheres to ice more readily and is not so easily dissipated by propeller and jet blasts.

Weather conditions affect the tim

when sand is applied. In the case where freezing rain is forecast, it is sometimes feasible to spread a thin layer of sand before the rain begins. However, if snow follows the freezing rain and accumulates to a depth of over one inch, the sand that was spread will not be effective.

As in any operational plan requiring more than a modicum of skill, the experience level of equipment operators plays a tremendous part in a good snow removal program. The statement that "a piece of equipment is only as good as the operator," is profoundly expressed in snow removal operations. There must be close coordination between the military and civilian personnel and the ability of both to get on the ball at the start of a storm is instrumental in beating the weather. The work of good operators is indicated by the amount of maintenance necessary. A good driver will seldom have his machine deadlined.

We spoke earlier of new ideas. Nothing is static. Even such a prosaic subject as snow removal has possibilities of improvement. Let us, then, examine some of the new ideas tried out last winter at Presque Isle.

A disc harrow loaded down to give more bearing force and pulled by a truck was used to scarify the ice on the runways and taxiways. This harrow was successful to some degree but better results could be desired.

Through the installation of radios in key vehicles, the efficiency of the plan was increased greatly. Wasted time and unnecessary dispatching of snowplows was stopped through the use of these facilities.

The use of brooms (towed type) to remove light snow proved successful when the depth of snow did not exceed one-half inch. This type of broom was also used to brush off the ice slush and water during a period of melting. This prevented a further accumulation of ice.

An emergency crew of approximately 20 airmen was set up on a standby basis to shovel out the runway and taxiway lights at times when they were buried from a heavy snowfall. These men would clear an area of four feet in diameter around the lights to allow a snowplow to work without damaging these fixtures.

Using a jet aircraft to remove thin coatings of ice from runways has proved most successful. This is accomplished by inflating the nosewheel landing gear strut, thus directing the exhaust blast onto the runway. *A sweeper must be used in this operation to dispose of the water caused by the melting action.* The aircraft must be in motion constantly or the blasting may sever portions of the runway surface.

With this method of ice removal it is possible to clean a 50-foot strip at one time with an F-89C type aircraft. Naturally, an airplane with a single engine will not clear an area as wide, but should be quite effective nevertheless. This method guarantees a completely bare, dry runway.

Naturally, any base faced with a snow removal problem will plan for the worst and hope. But we strongly urge that snow removal officers keep on the alert for new plans, new methods and new gimmicks. There's usually an easier way of doing any job and quite often, a more efficient way.

Experience has shown that you may expect a certain amount of structural and mechanical difficulties with their equipment. It would be well to be on the lookout for the following:

- Electric motors in windshield wipers burn out frequently.
- Mufflers on the rear engines of rotary type blowers cause excessive heating because of back pressure. The solution appears to be in complete removal of the mufflers. However, there is the ever-present danger of carbon monoxide.
- Push frames on 3½ and 5-ton straight blade plows will sometimes buckle. Fish plates or other stiffeners may be the order of the day.
- Cold-soaked engines may be very hard, if not impossible, to start. Getting the rolling stock under cover and preferably in a heated area is a must for efficient operation.

The basic reason for this article is two-fold. First, to point up how a good snow removal plan should operate and second, to give a few of you airplane drivers a small insight into the problems facing any base commander who has a pea patch up in the northern latitudes.

Remember that winter flight planning must encompass a bit of research as to destination runway conditions. The driver who goes tooling around in jet-type machines may well take off in 90-degree temperatures and land in the minus 20 areas.

We'd like to leave you with this thought that so aptly describes cold weather operations. Possibly you'll remember we've said this before:

"Dashing through the snow in a one-horse open sleigh may be a real picnic; driving through it in an airplane is something else again. The snow-removal crews will do everything possible to reduce the hazards of ice and snow on the ground. After that, it's up to the pilot to remember the common sense rules. ●

Snow removal equipment, used in echelon, disperses windrows piled up by big straight-edge plows.

Experimentation by WADC has led to a new altimeter presentation that makes for quick and easy reading.

FIG. 1

FIG. 2

Above, the 10,000-foot pointer provides a conspicuous indication that is always visible. It will tell a pilot, at a fast glance, his approximate altitude.

•

Left, the Drum-Pointer altimeter provides indications of thousands of feet on the drum visible through the vertical window in the right side of the dial.

•

Right, this experimental presentation is a combined altimeter and vertical speed indicator, designed to minimize reading errors and reduce cross check time.

the POINTER in the CASE

As told to Flying Safety by Albert Rosenbaum, Instrument Branch, Flight Control Laboratory, WADC

THE CASE OF the hide and seek 10,000-foot indicator on the instrument that is known to one and all as the altimeter, has been solved. It is satisfying to know that something has been done to improve the readability of the instrument that proved to be the culprit in more than one aircraft accident.

The altimeter problem first reared its ugly head with the advent of high-speed, high-flying aircraft; the ones that crank off feet rapidly by the tens of thousands. At certain altitudes, the 10,000-foot indicator was completely hidden behind one or both of the two larger needles. Often this led to misinterpretation of altitude readings by 10,000 feet. Misreading the altitude by this figure can bring forth dire results. (See FLYING SAFETY, Dec. 1954.)

Fully realizing the situation, WADC set out to develop a better presentation of altitudes. Ten different proposals were tested under actual and simulated instrument conditions, night and day. All of the proposed altimeter displays were designed for ease of incorporation into standard instruments for immediate refitting of present equipment. Results of the tests were conclusive and as a result it was recommended that the altimeter display illustrated in Figure 1 be adopted.

FIG. 3

The large pointer still indicates hundreds of feet and makes one revolution for each 1000 feet of altitude, and an intermediate pointer indicates thousands of feet and makes one revolution for each 10,000 feet. These pointers are just as always. In addition, a small pointer indicating tens of thousands of feet is painted on a black disk with an extension line terminating in a triangular section. This provides a conspicuous indication that is always visible and which can be used to get an approximate altitude at a quick glance.

The other new feature is the 60-degree section marked with alternate diagonal fluorescent and black markings. The striped warning area is visible only between zero and 17,000 feet. When the striped indication comes up on your altimeter, you will know that you are at or below 17,000 feet.

The program is already set up to modify all existing altimeters to incorporate the new display, with jets assigned top priority.

The altimeter just discussed is, in actuality, only an interim measure. Not satisfied with merely doing a bang-up job of establishing this fix, WADC is going ahead with plans to design new instruments that will be as up to date as the aircraft in which they are installed.

One of these is the Drum-Pointer type altimeter. This altimeter is comparable in size and weight to the present one. It provides indications of thousands of feet on a drum visible through a vertical slot in the dial. (See Figure 2.) Indication of hundreds of feet is obtained from a single pointer on the main dial. Also, improved presentation of the barometric pressure scale is accomplished by use of a four digit type counter instead of the window type.

The following warning feature also is incorporated: The diagonally striped markings are included in the thousand feet scale, visible between zero and 10,000 feet.

Tests indicate that use of the Drum-Pointer type altimeter display will materially reduce the incidence of erroneous interpretation by pilots.

Still another experimental presentation (see Figure 3), features a combined altimeter and vertical speed indicator designed to minimize altimeter reading error and to reduce time required to make cross check readings with respect to altitude and rate of climb or descent. The respective instrument mechanisms will still be entirely independent, but will operate from the same static source. The altimeter will provide the indications of thousands of feet on a drum, visible through a vertical slot in the dial. The indication of hundreds of feet will be obtained from a single pointer on the main dial. The spacing of the 1000 feet graduations will be about one-fourth inch, which will result in an easy-to-read scale. The small vertical speed dial also will provide adequate readability.

It will probably be some time before you will see the likes of Figures 2 and 3 around the Air Force. Tests are still being carried on and testing, evaluating and approving an entirely new presentation such as this takes time. But isn't it nice to know that you have people, like those at WADC, who are really interested in doing a job for you . . . the pilot? ●

A small fuel leak can suddenly loom big when you slow to landing pattern speed.

HAZARDS CAN BE HIDDEN

OF COURSE, when the engine instruments start falling off, so does a pilot's sense of security. This is how I felt when I first noticed the fuel pressure gage in the old "Fifty Four" flicker and then drop a few psi. I called my copilot's attention to the loss in fuel pressure and we both affirmed in knowing glances that we were about to lose No. 4. But no, how wrong can you be? My mental gymnastics of shut-down procedure slowed down and then completely disappeared as old No. 4 kept ticking away without so much as a wheeze between revolutions. The gage maintained its low reading with no apparent effect on power so we blamed the indicated loss in pressure on a tired gage. "Remind me to write it up," was my classic remark.

"Land, ho!" boomed our navigator, and there it was, that beautiful strip right under us and we were home once more. Call the tower. Alert the crew. Mentally set up your pattern and then enter it. Power back . . . karoomph . . . dull and sorta muffled but it was there. My side looked okay but . . . "No. 4's on fire!" shouted the copilot, "Real bad, all over. Hit the fire-bottle and get this thing on the ground." I did just that—got her on the ground where what remained of old No. 4 hung on its mounts covered with foamite and char.

Checked and Rechecked

I worked right along with the investigators as far as time permitted. What causes a perfectly good engine to give up the ghost in a blaze of glory (blaze, anyway), after six hours of flawless operation? The board was confronted with this question and I tagged right along with them. I had to know. Some people buy life insurance. I want to know my airplane. Same thing.

Those investigators handled the old beat up engine with kid gloves. You'd have thought it was the latest engine development instead of an almost unrecognizable piece of junk. What was left of it was disassembled part by part and further, each part was checked, piece by piece.

Well, this isn't a yarn on the attributes of investigators but their doggedness paid off. My airborne barbecue pit was fed its liquid briquets from a leak in the engine driven fuel pump by-pass valve. How long had it been leaking? If I had checked the time at the precise moment that the fuel pressure dropped, I could tell you to the minute.

Finding the cause of the fire handed me a mental reprieve. I wanted to be sure that I hadn't goofed someplace along the line and inadvertently caused it myself. Well, I felt pretty good and rather looked forward to meeting the investigating board.

Flight Handbooks on these aircraft aren't yet revised to include the procedures to be used in the event of fuel pressure drop with the engine operating normally.

Aircraft	*Data now being included or modified	**Data to be included in next revision or next reissue
C-117A & B	X	
YC-122B & C		X
C-124A	X	
B-36J		X
All B-50 series		X
All B-29 series		X
B TB-25J, K & L		X
B-26B & C		X
SA-16A	X	
T-7, T-7C & T-11		X
C-45B & F		X
C-47, C-47A		X
C-47B & D	X	
C-54D, E, G & M	X	
C-74		X
C-82A		X
YC-97		X
C-97A & C	X	
C-97B & D		X
KC-97	X	

* Will be accomplished within 60 days.
** Will be accomplished within 12 months.

was sure that a pat on the back was forthcoming for the way I got her on the ground in one piece. If I left you with the impression that I was surprised when the fire broke out, I don't know what to tell you about the board meeting except, double it. . . .

Facts — Plain Facts

No, there was no malice or hints at my stupidity, just facts . . . plain facts. Although I had no part in the origin of the fire, had I known what I do now, I could have prevented it. So you see, all education does not come from the classroom. I got mine from some friends, so let me pass it on to you on the same basis.

It all stems from this indicated drop in fuel pressure with continued engine performance. When the expected fails to happen (loss of power or erratic engine operation), you and I immediately assume that it's the fuel gage that has failed. So, we tool along and forget the whole thing. Meantime, the gage being in a real healthy condition is trying its best to tell us that although the engine is getting enough fuel to support it in the manner to which it is accustomed, it's not getting it all. The extra three or four psi? Well, it has just found a way out and may be oozing about anywhere in your engine.

Under your normal cruise condition the slipstream is cooling all of the engine parts, dispersing the fuel and things are going along okay. At pattern time it's a different story. When you pull off that power for the gear down slow down, the cooling breeze slows down, too. This completely unbalances its dispersing effect. The three or four-psi dribble finds just the right condition and up in flames it goes. That's exactly what happened to No. 4.

A Believer Now

How could I have prevented the fire? Well, this is what the experts told me, and I'm a believer. If you are still on the ground and the fuel pressure drops below the normal operating limits, but the engine continues to operate normally, stop the aircraft, set the fire extinguisher selector to the affected engine and shut down immediately. DO NOT TAKE OFF. Investigate the cause and have it corrected. During flight if the fuel pressure drops below operating limits but the engine continues to operate normally, the cause may be one or more of the following; primer leakage, oil dilution solenoid leakage, engine driven fuel pump by-pass valve leakage, clogged pressure line, instrument failure or line leakage. In that from where you sit it would be almost impossible to determine the cause, the best thing for you to do is:

- *Cut engine immediately.* Do this if the power is not necessary to sustain flight to reach an airfield.
- *Continue operating engine normally.* This may be done if it can be unquestionably determined that the indicated fuel pressure drop is caused by instrument failure or a clogged pressure line.
- *Keep the affected engine at or above cruising speed while maintaining watch for fire.* This can be done if it cannot be determined whether or not an actual leak exists and the engine is required to sustain flight or maintain the required altitude for arrival at a safe destination.

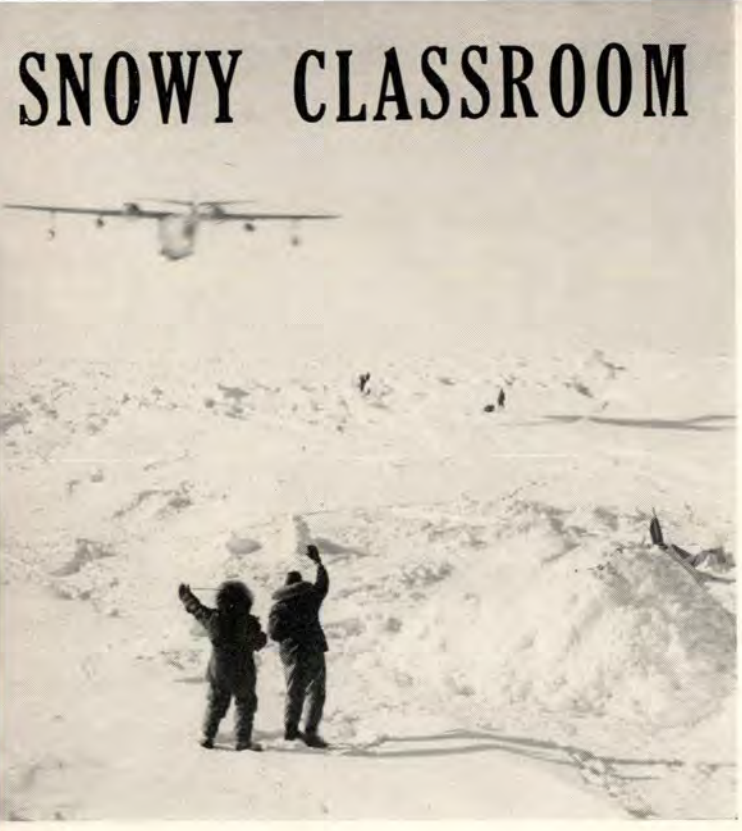
Well, there are your three choices. There's more though. If you do elect to keep the monster in operation, do it like the man says in choice number three. Then, and this is the important part, this is how I could have saved old No. 4. Prior to power reduction for entry into the landing pattern, cut the affected engine completely *by means of the mixture control. Not by retarding the throttle.*

Don't Reduce Airspeed

Unless the added power is absolutely essential to effect a safe landing, do not reduce airspeed until the engine is shut down in the above method. The reduction in speed may be just enough to withdraw the slipstream dispersing effects, and there you are.

Too many pilots have gained a false sense of security as a result of several hours of flight under these circumstances without any indication of fire, then reduced power for a landing and it became too late for corrective action. I know, because I was one of them. ●

SNOWY CLASSROOM



WHEN THEY told me I was going to the last Ice Cap Survival School class of the season at Thule, I wasn't too keen about the idea.

"I've heard about that place," I thought, "and I'll probably freeze to death." But orders were orders, and as an airborne radio operator at BW-1, I didn't have any choice but to go.

Well, shortly thereafter I returned to BW-1. My face was still a little windchapped, but outside of that I survived the school with no sweat.

When we arrived at our farthest northern base, we headed for two days of classroom lectures and movies in the Thule gym. They told us everything we'd need to know on survival. Lectures on Arctic clothing, how to use our equipment, how to substitute for it if we lost it—everything was outlined in full detail.

We all listened carefully, better than we usually do at Air Force lectures, for we knew that in a matter of hours we'd be out on that Cap on our own. There'd be instructors there in case of emergencies, but for the most part it would be up to us to survive.

About 48 hours after we had landed at Thule, we boarded Weasel snow trucks and headed out to the camp site. It was "warm," we were told — temperatures were a little above zero during the day.

The snow truck stopped about 16 miles from the base. The site was covered with snow; not the soft, wet kind they have at Narsarssuak, but a very dry, hard snow. I've never seen any place as still and peaceful.

Instructors told us to go to work building our huts, and to hurry. Seems we couldn't have anything to eat until they were finished. To build one, five of us sawed out blocks of snow and started digging — six feet down. Our only equipment was a trenching tool and a handsaw. After the initial digging, we made a tunnel through the snow and then began carving out our "hut."

Our five-man shelter had four walls of snow. It was big enough for a man to stand up in so we could exercise our muscles and not freeze. I've seen pictures of the Catacombs in Ancient Rome and that's just what it looked like to me. There were shelves in the walls, but instead of coffins like the Catacombs, we had sleeping bags stacked up.

Believe me, I was thirsty. The dry air accounted for this and we weren't surprised, as we had been warned about it. To relieve the thirst we rolled little balls of snow and let them melt in our mouths. *(Ed. note. A bad practice. Doesn't do any good and can cause severe chapping and burning. To get any good from snow, you must melt it.)*

Our first meal was given to us late that evening. That was the best meal I ever ate, even if it was C-rations. I remember we had baked beans—I'd never liked them much before, but they tasted wonderful. To make coffee we melted snow in a C-ration can and heated it over the very small stove from our survival kit. After two hours, it was half-way warm and we drank it — the best coffee I've ever had, too.

During that first night, we had to keep busy talking to keep our minds off the isolation. We heard plenty of noises—foxes—we could tell by the rhythm of their walk. Some guys thought they were polar bears.

There was one man who was sure it was a polar bear. Now, no polar bears ever roam the Cap, but imagination plays tricks on a man's mind. This boy was so shook up that I had to take him three miles over the snow to the instructors' camp. It wasn't unusual, the instructors said. Even some of the best pilots suffer from hallucinations at times up there.

At night we had to take all our clothing and equipment inside to prevent freezing. Anything left outside would be frozen by morning. I know because I left my gloves out the first night and in the morning they were worthless. From then on I used socks for gloves. Besides taking everything inside, we also had to put it inside our sleeping bags for warmth. It was a funny feeling to turn over at night and have a C-ration can sticking in your ribs.

After the first night, when we tried to go outside, the entrance was frozen solid. The instructors warned us about this, too, but for a minute we were panic stricken. After a few seconds we remembered to crawl back in through the tunnel, get our saws and break the snow. The outdoors looked awfully good again.

During the days, we shot off flares and learned how to avoid being injured when we did. We also made snow signals like the letter "X" which indicates an airplane is downed and unable to proceed. We stained our sign with marker dye and it was so realistic that a C-54, a C-47 and a jet all mistook it for the real McCoy. We were pretty proud of our "X," but we finally had to get rid of it because it was upsetting too many pilots.

Back at Narsarssuak now, I really appreciate this base. It's like Paradise after living out there for a few days. Sure, I didn't want to go to the school and I don't know as I'd want to go again. But I know this much — if the SA-16 I fly in goes down on the Cap someday, my chances of survival are pretty good. And if I hadn't gone to Thule for that survival course, I wouldn't be flying this area with near as much peace of mind. ●

WELL DONE

Maj. Walter P. Meyler

526th Fighter-Interceptor Sq., 86th FIW.

MAJOR WALTER P. MEYLER took off on a local instrument flight in an F-86D, entering an overcast at 9,000 feet. After breaking into the clear at 22,000 feet, the aircraft started to vibrate severely and the aft fire warning light came on. Major Meyler immediately retarded the throttle to IDLE, checked the engine instruments and switched to the alternate fuel system. Although the throttle was advanced, the RPM continued to drop.

Meanwhile, the aircraft had descended into the overcast and the pilot went on the gages. At this time complete electrical failure occurred, causing all flight instruments but the needle-ball, airspeed, altimeter and vertical speed indicator to go out.

Major Meyler noticed in his rear view mirror that most of the fire was bright yellow, indicating a goodly portion was composed of exhaust gases. After weighing all the factors involved, he decided to remain with the aircraft. Rolling out on an approximate heading for the base, he started a high speed descent, using the alternate control system.

He broke out of the overcast at 9,000 feet, about 10 miles from his base. A cockpit recheck was made, the throttle stopcocked and the engine master switch turned off. The fire was now producing some black smoke, but only in a small area. A flameout pattern was set up and mobile control notified the crash crew.

Although the controls were stiffening, Major Meyler made a successful landing and the fire was extinguished quickly. His fine technique and coolness during this emergency saved his aircraft. Well Done.

A vital part of the Alaskan GOC is composed of Eskimo tandem-team observers and even the school children are able to help their parents in aircraft identification.

It's mighty comforting, when flying in Alaska, to know that the friendly eyes of the GOC are following your flight.

SENTINELS in MUKLUKS

Dr. I. E. Chart
Historian, Alaskan Air Command

"Lift up thine eyes!" It might have been the prayer of a 11-man Navy crew as their Neptune limped toward Gambell, located on the tip of St. Lawrence Island. No ordinary circumstance this. Only minutes before, the Kodiak-based P2V on routine patrol in Bering Strait waters, was jumped by a Russian MIG. One sneak pass was enough to clobber the dark-colored bird; a hail of cannon shells tore gaping holes in the fuselage, the left wing blazed in the haze of a still-cold Arctic summer and four men nursed nasty wounds. Maybe the crew was praying; maybe they weren't. But all of them had been in Alaska long enough to know that the watchful eyes of native Ground Observers gave them a better than even chance of surviving.

Aircraft Commander, Lt. R. H. Fischer, USN, just did manage to make it down. His left engine had quit and even with a feathered prop, his prospects seemed dull in the face of a rapidly unwinding altimeter and the burning inferno outside. But he made the soft tundra of an island, four miles short of Gambell.

Yet, in an otherwise desolate region where a cabin is a castle and a bush, a veritable forest, these distressed airmen were not alone. Keen eyes of native Gambellites, who wear the Scout garb of the Alaska National Guard and double up as Ground Observers, spotted the damaged aircraft even before it cushioned in. Taking time only to flash a message back to Ladd AFB in Fairbanks so that the air rescue boys would have time to tool up an SA-16, they hopped into skin boats, wheeled around the island coast and were at the crash scene in less than one hour.

They wrapped it up. No need to embellish the rescue story further, except to say it happened in June.

Alaskan pilots, Air Force, Navy and bush jockeys find this kind of thing mighty comforting. They don't discount the ever-increasing growth of electronic devices to speed them on their way. They know that their own instruments and a solid measure of ground Navaids are pretty good insurance in what occasionally can be termed rough flying conditions in the northland. And there's always ground radar to turn to under emergency conditions. But knowing about those extra pairs of eyes can be very soul-satisfying to a pilot.

Was this an unusual instance? Not particularly, in Alaska. Only a few months before, a native observer — a trapper of sorts, nesting in a remote corner of the Seward Peninsula, spotted the crash of a T-33. Acting on innate ingenuity and calling on his training, he immediately cranked up his radio and reported the disaster to his supervisor, who in turn informed Alaskan Air Command officials through GOC channels. Because of the timeliness and accuracy of the flash, an air rescue unit was able to reach the scene with minimum delay and evacuate the

Inhabitants of sparsely populated villages and lonely cabins are accustomed to function as observers while going about their daily duties. Information on all aircraft sightings is then given to local radio operators.

survivor to Ladd AFB. We have no doubt that this same Londonesque character mushed into the wilderness (It happened in the dead of winter!) and took a hand in proceedings.

Incidents such as these opened up an entirely new role for the 1100 GOC enrollees. By Alaskan Air Command directive, they were officially enrolled in air rescue activities whenever any of the following conditions prevailed; when an aircraft crash or explosion was visually sighted, when an aircraft apparently in distress also was visually sighted or after radio broadcasts had announced an aircraft missing.

Just who are these people who lend a willing hand to the Air Force? How are they organized? What are they up against? Prior to the entry of the Alaskan Civil Defense into the GOC program in August 1953, organized observation posts were nonexistent. Entire native communities, sparsely populated and widely scattered throughout the Territory, were accustomed to perform "the observer role," while inhabitants went about their daily activities. Aircraft sightings were passed to the local radio operator — CAA, Alaska Communications System, Alaska Native Service or frequently a sole resident blessed with outside communications — for transmission to the military air defense system.

At best it was a loose, cumbersome method involving intolerable but understandable delays, one which produced little, if any, beneficial results. But in 1953 AAC and the territorial Civil Defense Organization exerted a concerted drive to pool resources, divide responsibility and build up observation posts in native townships.

To the Air Force fell the tremendous job of establishing a network of posts and training volunteers. And the 10th Air Division at Elmendorf and the 11th at Ladd had only a handful of experts to come up with results. They did it though, even if it meant —50-degree weather, Arctic-style travel by L-20 and dogsled and carrying an Eskimo language handbook in their parkas.

Within two years the GOC was able to boast a strong organization, stretching from the Canadian border to the Bering Sea and from the Arctic Ocean to the Island of Kodiak — which is second to none.

Observers came from all walks of life. Teachers in such tiny communities as Little Diomede Island (a stone's throw from Siberian territory) and Bethel on the picturesque Kuskokwim River, trappers, miners, even roadhouse owners answered the call, no questions asked. We hasten to explain for the benefit of the untutored, roadhouses in Alaska are necessities of life, places where the weary traveler may stop before resuming his long journey.

But the parade of volunteers did not end there. Into the fold marched whole organizations, military and federal, all anxious to lend support. Some day you may receive an Alaskan assignment. If you happen to travel via MSTS vessel, you may not realize it but there are personnel aboard with watchful eyes. They are the Navy's contribution to the system. The Coast Guard operating in Alaskan waters was quick to jump in the swim. Even the hard-working tugs plying between Seattle and Seward offered to "close the back door" in the defense system.

On land it was the same story. Just about every civil agency doing business in Alaska — the Alaska Native Service, the CAA, the Alaska Railroad, the Alaska Communications System, Fish and Wildlife — not only contributed the time of their personnel but extended the full use of their radio facilities, as well.

In a country one-fifth the size of the United States, where native villages occasionally wax nomadic and move from one locale to another, where communications are not merely sparse but subject to severe atmospheric disturbances, we can entertain only an inkling of the problems involved. But it is obvious that the "watchful eyes of the Arctic" are a distinct boon to the northern defense barrier.

It's a chilling and lonely thought to visualize yourself down in a frozen waste, helpless and unseen, where minutes mark the difference between life and death. But now, Alaskan pilots have the comforting assurance that their flights are under constant surveillance, in more ways than one. If anyone does have the misfortune to belly in or pull a ripcord, his chances of getting out unscathed are now much improved, thanks to the members of the Far North GOC. ●

REX SAYS

A BUNCH OF the boys were kicking it around over a few tall ones the other day and, as usual, the talk got around to flying. The subject of hairy deals came up and we decided that one of our Tigers had a sweat job that would be hard to top. So we had him write it up and send it in to old Rex. His description of the incident involving a T-bird follows.

"The flight was normal until I rolled out of my turn on initial. At that point I felt a vibration similar to jet wash, but this figured as there was a flight of four about one mile ahead. But gradually the vibrations increased until I commented to my student that it felt pretty bad for jet wash, and he agreed. As I started to roll into my pitch there were two strange clanks and then a loud bang. I checked the RPM and saw that it was 20 per cent and falling, and that the aft overheat light was on. I retarded the throttle to IDLE, pulled in the speed brake I had just put out a moment before and then, as the RPM was down to 10 per cent, stop-cocked it.

"I turned about 45 degrees to the left and told the tower I had a flameout and would land downwind. They started clearing the pattern.

"When the explosion occurred, there had been a violent pitch-up. I told the student that I thought I had lost the elevators; but then I managed to regain control again.

"The takeoff and land switch was ON and the light was green, and as the fuselage tank was full, I decided to try an airstart. I turned on the airstart switch and put the fuel sequence starting switch in AUTO, but nothing happened. I turned the aileron boost OFF, put the gear down and told the student to actuate the emergency gear system right away.

"I was now on downwind, turning base, and I told the tower that I was landing opposite to the rest of the traffic. There were four ships on the runway and I heard someone tell them to clear to their right, so I lined up on the right side in my direction. I kicked out the speed brake and about this time the student told me that the gear was not down. I checked and saw that the left gear was down, the nose gear indicated UNSAFE and the right gear was still up.

"As I looked up again, I saw that none of the flight of four had cleared the runway. I held the T-Bird off a little and passed over the first and second planes. Both had slowed down, but had made no attempt to clear off. About this time some joker called me and told me to go around as I had no gear. I think I used considerable restraint when I merely told him that I still had no engine.

"The other two aircraft were still coming head-on for me, so I stuck the nose down, bounced on the left gear, getting a three-safe indication, and hopped over the No. 3 plane. He was smoking his brakes, but still heading straight down the runway. The No. 4 plane turned off the runway just as I went by him. After touching down, I pulled in the speed brake, anticipating hitting the landing barrier, but I managed to turn off at the end."

REX SAYS: *That's the first time I ever heard of a Tiger playing leap frog, but it sure was for keeps. This lad did a fine job despite little or no assistance from everyone else concerned. The four drivers coming up the runway in the opposite direction must have been reading books; it is a brass bound cinch they weren't looking outside the cockpit much. As for Mobile Control and the tower, it doesn't sound as if they were straining any vocal cords trying to get the runway cleared for the emergency.*

★ ★ ★

I WOULD LIKE to tell you of an experience I had which may be of some interest to your readers and of importance to all those concerned with safety of flight.

I am a retired, rated Air Force officer. Occasionally, I have taken advantage of the privilege of hitching an air hop, on a space available basis, for which I am most grateful to all of the individuals who make this possible.

At any rate, not too long ago I got a ride to Florida in a C-45. During the trip the pilots changed seats several times so that they could

"... held the T-Bird off and passed over the first two ... bounced and hopped over the No. 3 aircraft."

each get a share of the flying time.

Now this is where my story really begins. I suppose it is part of my psychological makeup, but I sweat out every landing with the pilot. So naturally, I sneaked a look into the cockpit during the landing to see how it was going. We were coming in on a good approach and everything looked rosy, except one thing.

I noticed the red handle on the parking brake was firmly set in the ON position! At first, I tried to rationalize it, saying to myself, "I've been away from flying for a long time and perhaps the brake works opposite from what it used to." I didn't want to display my possible ignorance nor, in my role of a passenger, did I want to infringe upon the rights of the pilots. So I tried to keep my mouth shut. But when we were about one-eighth of a mile from touchdown, at approximately 100 feet, my curiosity finally got the better of me.

In a somewhat hangdog manner I asked the pilot, "Pardon me, sir, but is the brake handle in the correct position?"

He glanced down, and I never saw any one move a control handle as fast as that boy released the brake. It's a good thing, too. The C-45 landing characteristics are such that a landing with the brake on would certainly have washed out the plane, and most likely would have retired me even more permanently than I am.

I thought I would point out this incident as being typical of the little things that can trip a pilot up and cause big accidents. I have noticed also, that on a long trip when pilots change seats frequently they tend to get "cockpititis" and will touch and retouch all the control handles, ostensibly as a check. In this case, one of the pilots must have inadvertently pulled the brake ON and it was overlooked in the pre-landing check.

REX SAYS: *Looks as if you paid up your dues on that save. Those boys must have been super-nervous when it came to touching control handles, though; the brake handle just isn't that accessible on a C-45. Could it be that they just plain weren't as current as they should have been?*

★ ★ ★

AFTER ONE HOUR of shooting practice intercepts while flying an F-86D under GCI control, I requested a "rackback" to the home field. The weather was 2500 feet, broken to overcast, tops 7500 feet with visibility of five miles.

Having been working with GCI during the period, I assumed that I was still being carried on their scope. I was cleared to descend, and went on the gages after getting a steer to a GCA pick-up point. I broke out at 2700 feet with a large 3500-foot hill staring me in the face!

A rapid pull-up averted a collision, and I then went to my radio compass and scope for directional aid. Climbing back on top, I homed in and executed an ADF letdown without further incident.

Subsequent investigation turned up what had happened. GCI had changed controllers at the time I started my descent and another aircraft was being mistaken for mine.

Actually, I was as much to blame as GCI. Had I metered the birddog and scope, I would have seen that I was not on track and not over the water as I assumed. GCI is a good aid, but this incident taught me that a pilot should use all available navaids when IFR (or VFR for that matter) to avoid becoming part of the landscape.

REX SAYS: *A thoughtful soul clipped the above narrative out of the FEAF FLYER and sent it in. The pilot's comment about being at fault is especially refreshing, and also plenty true. Any pilot who doesn't use everything he has available just isn't thinking. GCI should have requested a definite identification since they were in the process of changing controllers as the descent started, but it still pays to make doubly sure of where you are when you have the means right in the cockpit*

"... then I broke out at about 2700 feet with a large 3500-ft. hill staring me in the face."

★ ★ ★

ALONG ABOUT noon on a Saturday early in May, another Captain and I took off on a student training flight. Although we took off separately, we planned to cover the same route.

Prior to our takeoff, while we were planning this flight, we checked the NOTAMS for the base where we planned to RON and found the same NOTAM which we had seen earlier in the week, indicating that it could provide limited parking, limited refueling facilities, limited quarters for airmen and officers and several other qualifications not pertinent to our flight. From previous experience,

Rex Says

these NOTAMS showed no change over last year's conditions. For this reason, we did not hesitate to go there.

We arrived about 1800 hours and were briskly informed that we would be refueled and would have to depart immediately. The Operations Officer advised us that this would be mandatory because of no parking facilities. Also, he let us know that we should have been cognizant of the NOTAM sent out by the base the previous Thursday, indicating that the airport would be closed to transient aircraft for the weekend. I advised the Operations Officer that it would be impossible for me to fly out that night until I had mechanical repairs performed on my aircraft. Further, that if this could not be done I would have to remain until the next day and fly out in the daylight. Then I itemized my aircraft deficiencies to him, which included:

- No slave gyro
- No UHF radio
- No intercom in rear cockpit
- Attitude gyro inoperative
- Rear cockpit magnetic compass bowl one-third full.

None of these discrepancies existed in my aircraft at the time of takeoff for this flight. The Operations Officer advised me he would get the men working on my plane immediately because my plane "just had to get out right away."

During the course of the next three hours, the Ops officer obtained a communications man who was allegedly performing corrective action on my UHF radio. However, he did not sign off the necessary corrective action in the aircraft form. No personnel were available who could perform work on the slave gyro compass. The intercommunications system was still found to be inoperative. I hesitated to consider my UHF radio fully corrected without aerial check, in view of a night flight.

Up to this point, the Operations Officer had continually insisted upon one paramount thing—and that was that I had to get out. When I queried him about the advisability of flying out at night with no slave compass, he made light of this requirement and repeated I would have to fly out or he would have to file a violation on me. I told him finally that I would not fly out in view of the condition of my aircraft and then left the operations building. In the meantime, he had sent the other Captain, whose plane was all right, to another base for the night.

The next morning I sent two messages via Flight Service Wire, requesting this Captain to come back so that I might fly his wing back to home base. After receiving no reply from either wire, I called long distance and persuaded him to do this. After considerable refueling delay caused by inoperative equipment, we were airborne at approximately 1300 hours. Shortly after becoming airborne I verified what I had suspected. My UHF radio equipment was inoperative. I could barely transmit to and receive the Captain on whose wing I was flying. After more delay at our refueling stop, we returned to our home base 20 minutes after the final time for landing at 1800 hours.

I submit this lengthy discussion at the request of the Acting Pilot Training Squadron Operations Officer. I feel that the points of interest to flying safety, other than the mistakes made by myself, are too important to go unnoticed. It was very obvious to me and my student that this Operations Officer wanted only one thing of me, and that was "to get out of the base." I am convinced that he would have signed my Form 175 knowing that my aircraft was absolutely not airworthy for night operation. He insisted upon this avenue of thought right to the end and only upon my refusal to fly did I RON at his station.

REX SAYS: *Well, now, isn't that a fine deal? I didn't publish the names of the base involved but I'll wager that somebody's ears are burning. The possible serious consequences are so obvious that there is little need for wasting much printing space on them.*

Operations personnel operate in a supervisory capacity to all pilots and this Ops Officer certainly seems unqualified as a supervisor. The Captain used his head in not bei[ng] conned into taking off at night wi[th] his aircraft in that condition.

If a similar situation ever happens to you, I suggest getting the Base Commander in on it. I don't think any commander would appreciate being represented by discourteous, incapable operations people.

★ ★ ★

SOME OF THE boys at our fighter base learned recently that appearances really can be deceiving. They also found out that it isn't such a good idea to make any assumptions about weather; either you know present conditions or you don't.

This incident occurred when a flight of four was practicing formation in the local area. They were flying immediately below an overcast, which was at 14,000 feet. The sun was reflecting weakly through the clouds, giving the impression that overcast was very thin.

A turn was called for by the flight leader, and Numbers 3 and 4 crossed over and above the lead plane. Concentrating on the leader, both aircra[ft] slid up into the overcast. Both pilo[ts] rolled out level and informed the flight leader what had happened. No one was very concerned as they all assumed that the overcast was very thin and that they could pop out on the top in a few seconds and rejoin.

As they kept climbing it became obvious that the tops were somewhat higher than they had figured. They finally broke out at 36,000 feet, slightly lost.

The leader finally climbed through the overcast, picked up his two strays and requested a standard jet penetration from ATC. Shortly thereafter, they broke out in the clear, over the station, slightly short on go-juice.

REX SAYS: *Here we go again. If pilots would abide by their good book, 60-16, incidents like this just wouldn't happen. And don't forget, it's these incidents that start off that chain reaction that ends up as an aircraft accident. Sixty-sixteen says you must maintain 500 feet vertical and 2000 feet horizontal clearance from all clouds. In this case, disregard of this provision could easily have resulted in a couple of flameouts [or] possible ejections.*

Keep Current

NEWS AND VIEWS

A Bellanca, equipped with a retractable hydro-lift gear, lands on the water. By maintaining 15 mph, a pilot can taxi the plane onto beach.

The F-101, new USAF long-range, supersonic penetration fighter, has gained increased range by the addition of three external fuel tanks.

Versatility—The first airplane to be equipped with a retractable hydro-lift has completed preliminary tests. This type of landing gear permits a landplane to operate from any surface, including water, snow, mud, ice and hard runways.

The tests were conducted with a Bellanca Cruisemaster. On takeoff a pilot can start from a beach to pick up speed then turn into the water for takeoff. On landing the procedure is just reversed.

The hydro-lift landing gear can be tailored to any size airplane, thus has important military possibilities. Long-range bombers, for example, could be based individually along a shore line, using an indestructible body of water for a runway. Jet fighters would no longer be tied to hard-surface runways or carriers, but could operate from water as well.

The principle is the same as used by water skiers. The skis of the airplane allow it to ride the top of the water at 15 mph, or more. Wheels protrude beneath the skis for landing on hard surfaces.

★ ★ ★

The Voodoo—Designed to meet Air Force requirements for a long-range fighter, the supersonic 101A is destined for service with SAC.

The aircraft has a wing span of 39.7 feet and is 67.4 feet long. Both wings are swept back 35 degrees and provisions have been made for in-flight refueling.

Powered by two Pratt and Whitney, J-57, turbojet engines which develop a total of approximately 20,000 pounds of thrust, the 101 also uses afterburners for greater thrust. The aircraft employs a tricycle landing gear and retractable speed brakes housed in the aft fuselage section.

Evaluation tests conducted by Air Force pilots indicate that the new aircraft is extremely fast, maneuverable and versatile.

A photo-reconnaissance version of the airplane also has been ordered into production.

★ ★ ★

Man-made Ice—Icing conditions are being produced almost daily at WADC, whenever engineers need it. Using a KC-97 tanker, they release a spray of water through a specially-designed nozzle directly into the path of a test aircraft. The stream of water droplets form ice on the test plane simulating actual icing conditions.

Now icing tests can be conducted on new aircraft without having to wait for the weather man to cooperate. Summer or winter, the KC-97 merely climbs to an altitude where the temperature is $+13°F$, and the tests can get underway.

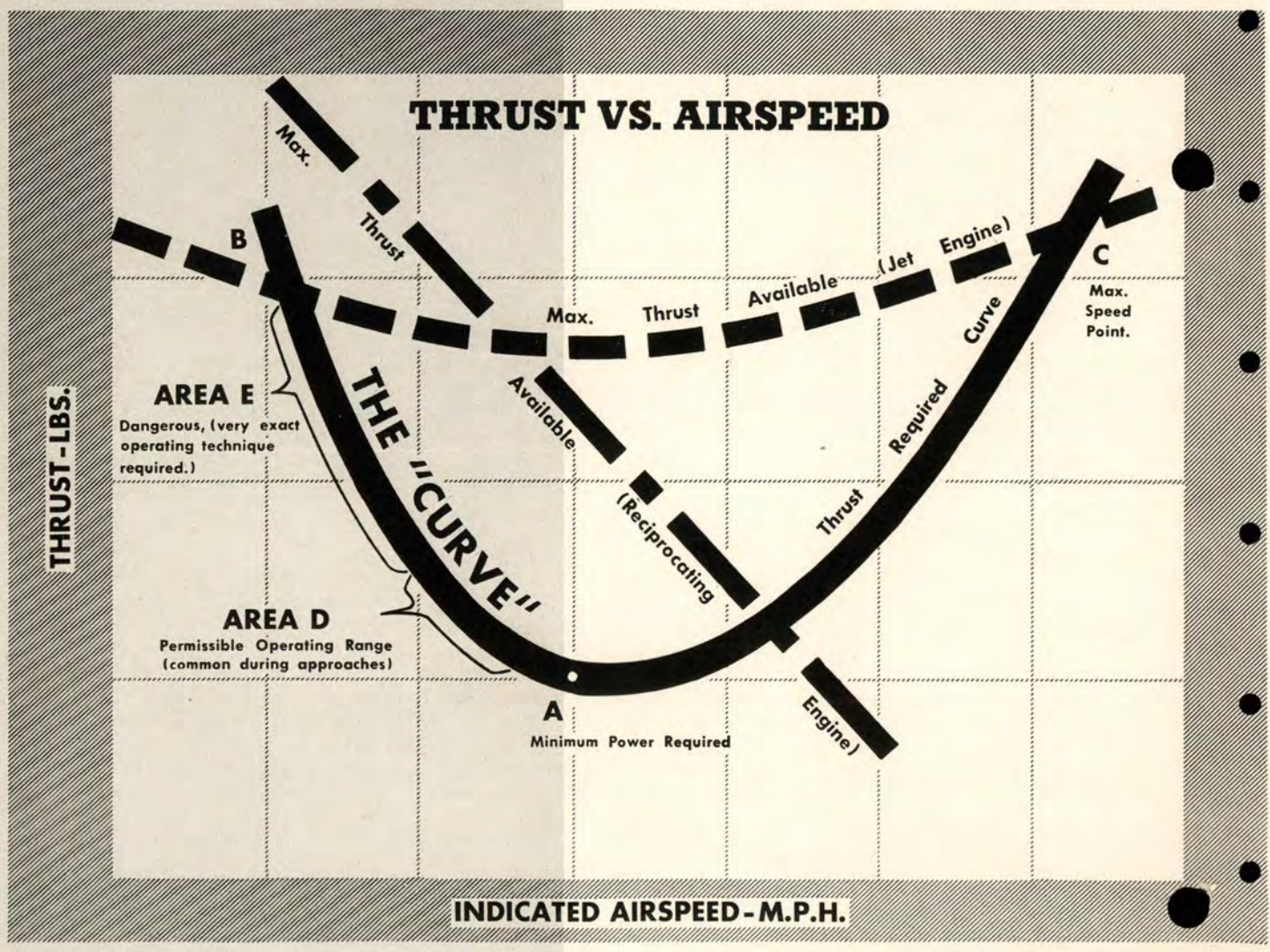
the wrong side of The Curve

Your aircraft may do strange and wondrous things if you maneuver it to where it is on The Back Side of the Power Curve.

Robert B. Gorrill, Engineering Project Pilot
Boeing Airplane Co.

MOST OF US who pilot aircraft have run up against that interesting, but sometimes deadly phrase . . . The Back Side of the Power Curve . . . at some time or other. Some of us have even invaded its territory and found that our aircraft were suddenly exhibiting strange and unexpected characteristics. Then, thanks to having sufficient terrain clearance, we got the

Fig. 1



big bird to flying again by lowering the nose and losing our spare altitude until we had sufficient airspeed to get back on the safe, high or forward side of the curve. Those with no altitude to spare were out of luck . . . they hit the ground with varying results, sometimes drastic in extreme.

It goes almost without saying that when you fall below the minimum safe airspeed with no altitude to trade for an increase in airspeed and not enough power available for recovery, you are going to land, ready or not.

Often, accidents of this kind are placed in the "stall" category. However, it is the phase of flight just preceding the actual stall with which we are concerned in this discussion.

Our accident records have plenty of accounts of pilots who inadvertently allowed their airplane to slow to a point where power required to prevent further slowing or loss of altitude was excessive. And usually the pilot or pilots involved can't understand exactly what happened.

A jet jockey who has just busted his plane up by hitting hard, way short of the overrun usually comments, "It doesn't figure. I never felt anything resembling a stall warning. I thought I had plenty of airspeed, but when it looked like I might be a little short, I pulled the nose up a hair and then added power. But the thing kept settling and the controls got sloppy."

He's right, too. Described what happened perfectly. The only trouble is, he doesn't know *why* he hit short and hard. Doesn't know that he had maneuvered his plane until it was on the back side of the power curve. In this condition a very large increase of power applied may be required to prevent settling of the aircraft, perhaps more power than is available.

If he had realized what was happening soon enough, he might have eased the nose down, added some power and made it okay. If he waited till the last moment, then his only chance would have been to add 100% power, and hope there was enough power available to effect recovery. However, in the second instance, he was probably out of luck. *Depending on power alone* to stop rate of sink can be a very dangerous practice. If the aircraft is fairly light and the situation has not progressed too far up the back side of the curve, and the engine can be accelerated rapidly enough, a pilot may get away with a power on go-around. (Needless to say, this can be a very hazardous procedure.)

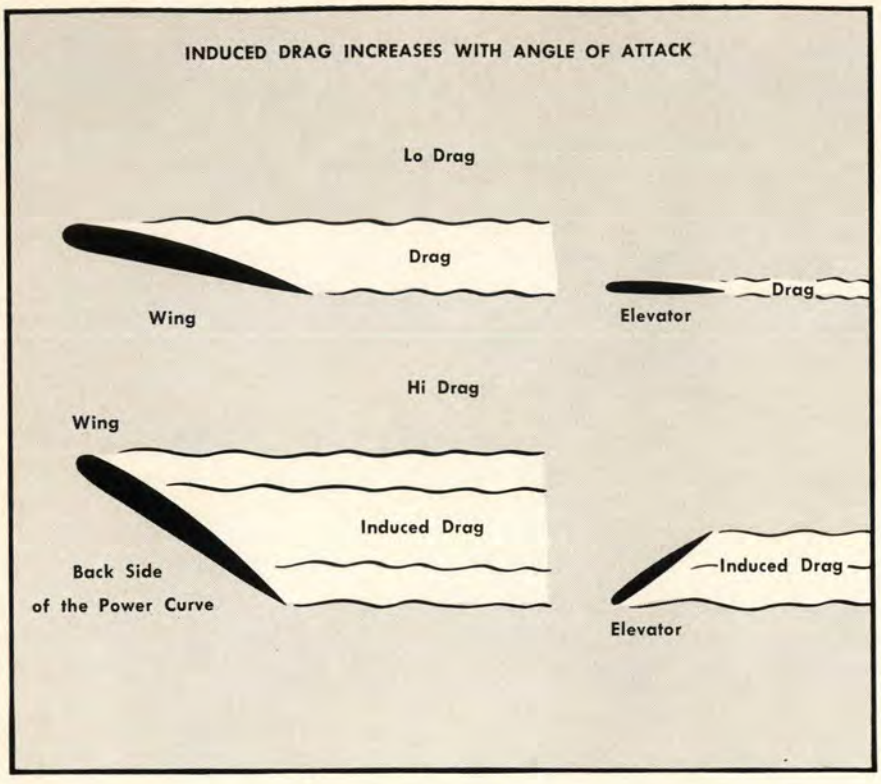
But before we get any deeper in this discussion of the forward and back sides of the power curve, let's take a look at Figure I on page 26. This curve is a graphic depiction of the thrust required to maintain steady flight at a certain airspeed, with the aircraft in a given configuration plus a depiction of maximum thrust available. For purposes of this article, the curve is a general one and applies in a general fashion equally to jet or prop drive aircraft. (A propeller furnishes thrust, as does a jet engine; thus the terms power and thrust are used interchangeably in this article.)

Point "A" on the curve locates the airspeed at which the smallest amount of power is required to maintain a steady state of flight. Point "C" locates the maximum speed point of the aircraft, as thrust required and thrust available are equal there. Point "B" marks a back-side-of-the-power-curve condition at which thrust required exceeds maximum thrust available; hence a steady state of flight is not possible at this point. A steady state of flight, in this case, may be level (constant altitude) flight, or it may be flight at a constant rate of climb or descent, at a constant airspeed.

If point "B" has been achieved in flight, the only method of moving away from it and back down the curve toward point "A" is to trade some altitude for an increase in airspeed. It is obvious that this will be impossible, if point "B" is arrived at while at a very low altitude such as during final approach.

Area "D" locates a "back side" condition at which a steady state of flight can be maintained by increasing thrust materially over that required at point "A." But upon reaching area "E" the techniques required for a pilot to operate in area "E"

"The Curve" is given its shape principally by the aerodynamic drag characteristics of a particular aircraft under consideration. The aircraft's configuration, the operating altitude and its gross weight will vary the location and shape of the curve to an extent.



are very exacting. This is a dangerous operating area for most flyboys.

"The "curve" is given its shape principally by the aerodynamic drag characteristics of the particular aircraft under consideration. The configuration of the aircraft, (that is, with flaps down-gear down or with flaps up-gear up or with all or less than all engines operating and so forth) the operating altitude and the aircraft's gross weight will all vary the location of the curve and alter its shape to some extent. Power is required to overcome the effects of induced drag which increases as a steady state of flight is maintained and airspeed is decreased simultaneously. Hence, the phenomenon occurs in which flight at a lower airspeed will require more power than otherwise similar flight at some higher airspeed.

The power to be applied may be provided by a jet engine or by a propeller equipped power plant, it makes no difference in this discussion of fundamentals. If you have sufficient push from any power source, you can operate in or move out of the back side of the power curve condition as long as drag does not exceed thrust available.

When operating at or near point "A," (this is the maximum airborne duration point) it is quite easy to inadvertently slide off onto the back side of the power curve. Anything that upsets the balance of the plane such as a climb, addition of drag, a loss of power or some other factor which results in a loss of airspeed, can cause the aircraft to slide toward the back side of the curve.

Propellers mounted ahead of or immediately behind a wing induce an airflow of greater velocity over the wing than the velocity of the aircraft. This difference in velocities varies as power is applied. Since lift varies with the velocity of airflow over the wing, propeller driven airplanes can operate more safely at lower airspeeds with high power applied than they can with little or no power applied. But remember, this is a special characteristic of propeller driven aircraft and does not apply to jets.

Now, how does a pilot recognize when he is approaching that danger zone where he is creeping up on the back or low side of the power curve? His airspeed will fall off at an increasingly rapid rate, and the rate of sink will go up sharply unless a lot of power is applied to prevent it. Another warning is that he will note an inability to hold altitude without a further loss of airspeed.

Finally, in some aircraft design if allowed to progress to the extreme degree, a typical stall warning may be felt; in other designs no stall warning will be in evidence.

Flight operation on the back side of the power curve is in the low speed region where stalling of the aircraft may be encountered. Whether stalling will occur, with its accompanying loss of aircraft stability and controllability prior to reaching point "B", will vary markedly from one aircraft design to another. Typically, airplane stability and controllability deteriorate at the relatively low airspeeds associated with back side of the curve operation.

Stalling of the aircraft, which results from an excessively high angle of attack having been achieved for a given weight and airspeed, is not strictly relative to or inescapably associated with this power required versus power available discussion. However, both stalling and excessive power requirements may be experienced when operating in this low speed region.

In many current swept or delt wing designs, particularly, it is possible to slow the aircraft into this region of very high drag, where more power is required, as many of these planes do not stall recognizably until an extremely high angle of attack is reached. And long before a stall is encountered, drag will have begun to increase at a rapid rate with each additional amount of aircraft slowing. These characteristics will be influenced by the rate of speed reduction or approach to the stall.

If a pilot slows his aircraft in level or steadily descending flight to a point where drag is increased markedly, and power is not added to compensate, sinking of the aircraft will result. By drag, we mean induced drag, stemming from the plane's wing having been forced to a higher angle of attack in an effort to sustain a steady state of flight while decreasing indicated airspeed.

And this is exactly what our hypothetical jet fighter jockey did when he had no room left, on final approach. There was no room left to drop the plane's nose and gain airspeed, there wasn't enough power left to stop the sinking, there w nothing left to do, but hit. ●

BATTERED BEDRAGGLED and BEAT

FLYING SAFETY is not in the "let's embarrass this guy" business. That's why we have masked off the face of the rather bedraggled pilot whose face appears on this page. Who he is, doesn't matter. What happened to him, does. This is his story. Better check it carefully, there might be a lesson in it for you.

The hairy tale started when our hero was tooling along in an F-86 at 17,000 feet, IAS 350 knots, performing in-trail acrobatics. Faced with a sudden emergency he elected to eject, and did so successfully. However, he has since admitted that he made several mistakes before he ever boarded the aircraft. You be the judge.

He was wearing an old, threadbare WWII flying suit which had several bad tears in it. Force of the slipstream ripped the suit to pieces, as shown in the picture. Fortunately, he ejected in an area where he didn't need the suit as protection from the elements or the terrain.

But this wasn't the only mistake our boy made. He didn't bother to get a chin strap for his helmet. You know what happened. Even though he had his visor properly positioned before jettisoning, he lost everything as soon as he went out.

You may have noted that this lad is in his stocking feet. That's the way he hit the ground. Sans shoes. Seems he had on low-cut oxfords up to and including the time he pulled on the D-ring. After that he had his socks. And he hit in terrain where it was impossible to walk barefooted, or rather sockfooted. Had to tear up his chute and wrap his feet with many layers before he could hobble to a road. He claims his feet will never be the same.

The whole point of this grim little yarn is that it could have been a lot worse under different circumstances. Failure to obtain and use proper personal equipment can get real deadly under many conditions, in any old part of the world. ●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