NOVEMBER 1959

FLYING SAFETY

UNITED STATES AIR FORCE

"...AFTER THE BALL IS OVER"

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VOLUME FIFTEEN • NUMBER ELEVEN • USAF PERIODICAL 62-1

• EDITOR'S NOTES

IN THIS ISSUE •

In March, 1958, Major General Joseph D. (Smokey) Caldara visited the Japanese Air Self Defense Force. The purpose of his visit was to assist that organization in setting up an aircraft accident prevention program that would cut down on the "bashing" of airplanes and save some lives.

Evidently, the diagnosis and treatment of the problem was right on the money. Major General Katsuo Sato, Inspector General, recently wrote General Caldara that "The recognition of the importance of flying safety was increased remarkably by your visit to the Air Staff Office last March." General Sato proves his point by quoting a 48 per cent reduction in 1958 as compared to 1957 (35 accidents per 100,000 hours in 1957; 17 accidents per 100,000 hours in 1958). The number of pilots killed in accidents also decreased from 14 in 1957 to 6 in 1958. While attrition of aircraft in 1958 was one half of that in 1957, there was a fairly tidy saving in good hard yen to the tune of 900 million—translated, this is $2,560,000 American dollars; a pretty fair average, particularly when you consider that 1958 was their first real professional try at aircraft accident prevention.

The 1958 program was kicked off by an Inspector General Conference which emphasized matching the safety program to the local unit's standardization and systemization of flying safety activities.

Twenty Japanese pilots attended a four weeks Flying Safety Officers course at the University of Southern California, then returned home to use what they had learned, in setting up an aircraft accident prevention program. In the Safety Education Division of the Directorate of Flight and Missile Safety Research, the *Flying Safety Magazine*, the *Aircraft Accident and Maintenance Review* and the *Flying Safety Officers' Special Study Kit* have provided the latest and most current published material to "spread the word." Last but certainly not the least, D/FMSR type Safety Surveys were given the full treatment.

The goal for 1959 is to reduce the present major accident rate to 14, which figures to be a 20 per cent reduction. That's a big hunk they've bitten off. We'll let you know next year if they made it!

Postflight Activities

Adapted from a speech given by Col. Charles E. Jordan, 2750th AB Wg, Wright-Patterson AFB

The safe, efficient operation of aircraft is largely dependent upon the postflight inspections performed by aircrew and maintenance personnel. Postflight activities may be said to cover the entire period from preflight to preflight. The work of the pilot, crew chief, technical specialist, maintenance supervisor — even the commander—is bound up with the postflight inspection system. It is during this period that the unforeseen, the unusual, and the defective are corrected and the aircraft made ready for the following day's operations.

It would be difficult, if not impossible, to compile figures showing the percentage of aircraft accidents attributable solely to faulty postflight inspections. However, the following accounts of accidents taken from the files will illustrate how dangerous this neglect can be. In the first one, an F-84F had the right gear come out of the well during flight. The nose gear and left main gear extended normally for landing, and the right gear held until the airplane was stopped. The records showed a history of unsafe gear indications. Superficial inspections had not revealed the real trouble—the uplocks were out of adjustment. A thorough postflight examination would have prevented this accident.

In another case, the right landing gear of an F-94B collapsed on landing. The primary cause was listed as materiel failure of the landing gear. On the previous flight, there had been a gear system malfunction which the pilot had failed to write up. Was this a contributing factor? Unquestionably, for had the pilot brought the malfunction to the attention of maintenance, the aircraft would not have been flown again until the gear was checked and fixed.

Usually, the flight crew can only write up the deficient system, and then must rely on the maintenance section to correct it. Two F-86Ls on a night practice intercept wound up in each other's laps because of a defective radar set. They made a nylon letdown and, fortunately, walked away with only minor injuries. The primary cause of the accident was pilot error, but an important contributing factor was that a known defective radar set had been neither inspected nor repaired, despite pilot write-ups detailing the trouble.

Such a wide diversity of accidents occur because of improper postflighting that it would be tedious to list them even in part. But flying safety officers have come to recognize certain areas which, through improper postflight, regularly produce their share of accidents. One of these accident producers is improper seat pin inspection and/or replacement. This neglect has fatally injured pilots and mechanics alike. Tire checking is another danger area. Kicking a 160 psi tire really doesn't prove a thing. It must be checked with a pressure gage and the tire examined closely for signs of wear or damage if anything worthwhile is to be discovered. The files bulge with cases of tire failures which caused major accidents.

How many pilots are so skillful that they never make

hard landings? Very few. If each hard landing were written up so that the gear might be inspected by maintenance, there would very probably be fewer landing gear failures. Here again, the pilot is neglecting his postflight duties if he fails to note a hard landing.

Oil consumption is a good indicator of trouble on the horizon. Many a pilot, and more aircraft and engines, might have been saved if more careful records of oil consumption had been kept in the past. The FSO, through the unit commander, can see that flight crews are taught to check this in the aircraft record before flying the bird, and can insure that maintenance personnel keep an accurate record of the oil consumption. Forewarned is forearmed in this case.

The problem, then, is to prevent those aircraft accidents which may be attributed either directly or indirectly to improper postflight activities. The attempt to analyze accident/incident cause factors by an examination of postflight activities is a relatively new concept. We have considered the cause factors of materiel failure or faulty maintenance as being applicable to the flight during which the mishap occurred. But they might be related back to the previous flight; if a thorough postflight write-up had been made, the proper maintenance might have been performed or the impending materiel failure might have been detected. The accident on the subsequent flight would therefore never have happened.

To analyze properly the broad field of postflight activities and their associated problems, five specific areas will be examined. The first will be the attitude, training, and knowledge of the pilot. The importance which he attaches to the postflight inspection depends, in some measure, on the extent to which he is forced to participate by command directives, and on how well he understands that the safety of the next man to fly the aircraft depends on the quality of his inspection and write-up. Unfortunately, the average pilot does not give enough thought to the next flight of the aircraft and thus neglects an important function. He should be certain that the condition of the aircraft as he leaves it is properly documented. To do this, he must inspect the aircraft, placing special emphasis on those areas or components which for any reason gave him cause to be concerned during the flight.

The FSO can make sure that written regulations exist covering the pilot's postflight responsibilities, and also have a checklist published that will help the pilot in this job.

To document the condition of the aircraft effectively, the pilot must have a working knowledge of the aircraft systems so that he can recognize deficiencies and write them up accurately and clearly. General statements such as "flight indicator malfunctioning," or "radio's noisy," or "fuel feeding improperly," do not provide the mechanic with enough information. The problem should be stated as specifically as possible and then enlarged upon verbally with the ground crew in the postflight debriefing session, a subject discussed later in this article.

From time to time, FSOs should check pilot write-ups on the 781 and review them with operations and maintenance personnel for quality of the write-ups and the corrective action taken. A few moments taken with the pilots convincing them of the necessity of proper write-ups will be repaid many times over in good maintenance.

Another important element in this area is the pilot's knowledge of, and attention to, proper engine shut-down procedures. Most pilots learn and practice good engine start procedures, but somehow neglect the art of shut-down. A 15 minute talk on this subject by the maintenance officer at the next flying safety meeting might help eliminate several bad shut-down habits the squadron pilots have picked up. You can be sure maintenance will be appreciative for your efforts in this direction.

A serious and oft recurring problem is the failure of pilots to report incidents and unusual occurrences. The FSO should step into the picture here and make Operational Hazard Report forms readily available to pilots. If suspected deficiencies are recorded on the 781A by the pilot, maintenance personnel will be alerted to focus attention on specific units or areas. This will also provide necessary information to enable them to forecast premature replacement of units or an unscheduled operational check of one of the systems. This of course results in improved maintenance and more reliable aircraft. It has been demonstrated that materiel failure can be reduced by reporting all unusual occurrences, no matter how slight. Reducing materiel failure reduces the exposure rate of the pilot to emergency actions and critical decisions, thus reducing pilot factor accidents.

One thing that keeps a pilot from doing a conscientious job on his postflight is fatigue. If he lands exhausted, he is happy to get out of the airplane and get home for some well-deserved rest. He is not likely, under these conditions, to linger on the flight line and expend the extra time and energy it takes to postflight his aircraft properly. The solution of the problem is fairly

simple—try to keep the flight crews in good physical condition. Do not schedule them beyond a certain number of hours of flying duty so that they may remain fresh and alert. A tired pilot has a higher accident potential. Keep him out of the cockpit.

Now let's assume that the pilot lands his craft, and he's fresh and full of ginger. However, he has an administrative job with some piled up work that demands his immediate attention, or he's late for a meeting. He scribbles his OK in the 781A and away he goes, forgetting all about that fuel pressure surge at 35,000 feet or the overtemp condition he meant to record. Or perhaps he's influenced by the ground crew and their anxiety to get the ship serviced as soon as possible. In either case, here we have an accident in the making. The pilot must be taught that his mission is not completed until he has conscientiously recorded and analyzed, to the best of his ability, the condition of the aircraft. This is a must, if the Air Force is to lower the accident rate. The postflight is an important segment of the pilot's responsibilities.

The second area we must examine in order to improve the quality of the postflight activities is that of the effectiveness of the ground crew. Their knowledge of the aircraft determines, in large measure, how efficient and effective they are going to be. Five or ten years ago—even as late as the Korean fracas—we were maintaining a 75-80 per cent combat-ready rate with a predominance of crew chiefs in the airman third class grade. But today, if a man is to know his aircraft well, he must be trained to a greater degree than ever before. The problem is being met by an intensive training program throughout the Air Force.

As in the case of the effects of fatigue on the pilot, so likewise with the ground crew. Long, irregular work schedules have more adverse impact on the efficiency of postflight activities than does any other planned inspection or maintenance operation. A tired crew cannot be effective. Therefore emphasis should be placed on scheduling the postflight crew's working hours so as to keep them as regular and normal as possible.

Closely allied to the overall subject of work scheduling is the effectiveness of our transient maintenance operation. I am sure that many of you, on one occasion or another, have been perturbed with the service or maintenance you received while on transient status. In fact, I have sometimes wondered whether the word "transient" applied to me—or to the crew that was supposed to be servicing my aircraft.

Many commanders have placed strong emphasis on their transient maintenance organization and as a result, we do have some very fine operations. However, some commanders—or their maintenance chiefs—use the transient maintenance section as a repository for undesirables from their other operations. This not only detracts from the over-all efficiency of the unit but, because of its public relations aspects, has the undesirable result that the whole maintenance operation is judged by the poor performance of one small segment.

Last, and most importantly, is the mechanic's attitude toward his job. All the knowledge and training the Air Force can give him goes for nothing if he does not believe in what he is doing, if he does not think that he is making an important contribution. To help the mechanic acquire the proper attitude toward his work, nothing can substitute for the personal touch, the direct contact. One excellent approach is to schedule flight safety meetings of ground crews in which accidents, procedures, and systems are discussed informally, with specific emphasis on the individual job or function and its direct relation to flying safety. Remember, effectiveness is in direct proportion to interest. Team competition, special crew titles, distinctive uniforms, slogans—all these things help produce a better attitude toward the job. The maintenance man as well as the pilot must receive maximum consideration if we are to put Air Force operations on a solid flying safety foundation. For the adequacy with which the maintenance man performs his function can preset the situation to such an extent that an accident becomes inevitable in spite of the maximum corrective efforts of the operator or crew. Without a well-motivated maintenance type to perform the job, the finest facilities, the best procedures, and the most up-to-date equipment in the world would be useless. Maintenance is a full-fledged partner in the flying safety effort. Make the most of what it can contribute.

While it takes human beings to perform the job, their efficiency and effectiveness often depends on the quality of the physical facilities and procedural elements with which they work. These things are important and must be considered in any over-all evaluation of the problem. When considering physical facilities, the value of ade-

The postflight inspection is performed by men, but they must depend on adequate transportation and facilities, and sufficient personnel to do the job properly.

quate shelters accessible to the work area cannot be overestimated. The Air Force has made great progress in developing maintenance, operational, and alert shelter facilities, but further study is needed. It should be going on at every Air Force base in the form of experimentation with mobile shelters, covered vehicles for line shuttles, personnel services such as mobile snack bars, etc. The contribution of such efforts to furthering flying safety may be intangible, but it's there!

Transportation and communication facilities have a direct bearing on the speed, efficiency, and quality with which the postflight job is performed, particularly during inclement weather. The FSO can give himself sleepless nights wondering how many times the decision whether or not to replace a questionable part has been influenced by the lack of readily available transportation or communication. Major commands have made great progress in this field, illustrated best perhaps by SAC's system of roving radio trucks which take a crew chief's request for a part on the spot and radio it in to the appropriate shop. By the time the truck has swung around its circuit, taking and radioing orders for parts, the items requested are ready for pickup. These are then delivered to the maintenance personnel out on the line.

Such ideas and innovations that could improve the over-all maintenance system should be disseminated on an Air Force-wide basis. What one unit uses to increase the efficiency of its operations should become the property of all. Physical facilities are the chief supporting element of the postflight function. They must be adequate and accessible if they are to serve their full purpose in assisting the maintenance man in his all-important task.

Perhaps even more important than the physical facilities, however, are the technical orders which form the basis for the maintenance effort. Technical data that is accurate, understandable, timely, and available is the heart of the systems and procedures on which the maintenance effort functions. Predominantly, the responsibility for providing technical data to the using commands lies with the Air Materiel Command. They are constantly striving to make tech orders more suitable for on-the-job use. Pocket-sized manuals have been introduced into the T.O. system to provide the man on the flight line or in the launch area with a more useful and available form of essential information. These pocket-sized manuals are not an addition to the regular size T.Os. but are issued in place of them.

Continuing efforts are being made to simplify technical instructions and to improve the readability of technical orders. As an example, command reviews of some of the maintenance publications have been held with highly beneficial results in simplification and readability. Also, Air Force Contractor publication teams are encouraged to visit Air Force installations so that the contractor's engineers and technical writers can get to know the type of average young airman for whom the technical manuals are written. With a firsthand knowledge of his youth, education, interests, and working conditions, the writers can turn out a more readable, easily understood presentation of technical information. This will certainly help improve maintenance quality, and will materially assist in the flying safety program.

Good readable technical information is available; local base distribution systems must be geared to get this into the hands of the users as quickly as possible.

Once the necessary maintenance is accomplished according to tech order directives, the work must be inspected. Formalized inspection systems have been established by all commands, at least to the extent of complying with the procedures outlined in appropriate Dash Six technical orders. The task of the commander and the FSO is to see that these inspection procedures are followed. The postflight inspection is naturally an essential part of the system. SAC places particular emphasis on the postflight—each one is 100 per cent quality control inspected—and has proved that a high quality aircraft results. Their low accident rate bears this point out.

An example of a postflight procedure aimed at achieving the flying safety goal is ADC's J-47 engine trend analysis program. This is set up to detect engine deficiencies in their incipient state, before they can become failures and the cause of aircraft mishaps. The analysis measures three things: engine oil consumption, variable nozzle lip separation, and engine coast-down time. ADC says: "Unquestionably, this program has contributed significantly to the reduction of F-86 accidents due to engine failure."

Many commanders are coming to regard the debriefing session as an indispensable part of the postflight system. One of our major command manuals says: "A current and accurate knowledge of the aircraft status is vital to the effectiveness of the daily maintenance plan and schedule. This effectiveness is measured by the ability to do quality maintenance in the minimum time. The maintenance debriefing of flight crews is an essential step to fulfillment of this objective. . . . Maintenance personnel can obtain firsthand knowledge of the cause and symptoms of a deficiency. . . . Details concerning a deficiency can be completely and accurately recorded on maintenance records, intelligently scheduled into the maintenance plan, and used as a guide to the prompt location and correction of a trouble."

Debriefing may be time consuming, but it assures the timely transmittal of important information, and in so doing, decreases the probability of accidents. Also, with today's complex aircraft, it is somewhat difficult to express certain malfunctions in writing in such a way that they can be clearly understood by maintenance personnel who read the report hours later. If the malfunctions are discussed directly with the people who are going to remedy them, the possibility of misunderstanding is eliminated, trouble shooting time is cut down, and better work planning is possible.

To sum this discussion up, the problem—as we stated earlier—is to prevent those aircraft accidents which may be attributed either directly or indirectly to improper postflight activities. If by definition all the activities and operations pertaining to the airplane from preflight to preflight are put into the postflight category, it is plain that the FSO has a man-sized job cut out for him in supervision, instruction, and inspection. With the wholehearted backing of the commander, the FSO's task is made easier, for every squadron and base unit will cooperate in the endeavor of contributing to flying safety by adhering to recommended work and inspection practices.

Properly conducted postflight activities are the backbone of the aircraft accident prevention program. Are you doing your part to help? ▲

Keep Me Posted

William F. Funk, Design Safety Specialist
CONVAIR, A Division of General Dynamics Corporation

The writer has used the word "incident" in this story but not in the same definitive manner as it is used in AFR 62-14.

"It had to be one of those blasted pumps, sir. We've had trouble before, but never like this."

Captain Jim Kelly, the investigator, leaned over the hospital bed in order to hear the testimony of the injured crew chief who had just spoken in faint tones. "You say you've had trouble with them before? Can you tell me what kind of trouble?"

The bandaged figure on the bed was silent for a minute; then, he said haltingly, "Yes, we've had to change quite a few of them 'cause they've run intermittently or stopped completely. I never did get to see inside one afterward, but we've always heard that they were jammed up with junk from the tanks. Yep, it just had to be one of those pumps back there freezing up, overheating, and—." His voice trailed off weakly.

The investigator, realizing the interview was over, whispered his thanks to the nurse in attendance and quietly closed the door as he left to return to the flight line.

★ ★ ★

"Tom, have we had a lot of fuel pump failures due to contamination freezing the impellers?" The investigator had returned to the base, and was questioning Major Tom Green, the Maintenance Officer.

Figure One

"No, Jim, not a lot of failures. Records show only one pump UR'd for jamming, but since the explosion I've learned of three more failures that occurred during the past few months that weren't reported. One even failed in flight, but the pilot didn't report it. The crew chief found it on postflight. You know, Jim, if these guys would just write these things up, then we could get faulty equipment replaced with improved items. We'd UR them and the manufacturer would get the word that the pump screens are inadequate. I talked to our tech rep after the fire yesterday and he'd just heard about the rash of pump failures. He told me then, that if he'd known about our problems he'd have contacted his Air Safety Engineer at the plant for expedited action." Green frowned as he gazed out the office window toward the burned hulk of what had once been a sleek, fast, metal bird. He went on, "It's the same old breakdown in communications. We can't get ahead of these accidents unless everyone informs each responsible agency of the problem involved and the seriousness of its potential as an accident cause factor."

"You're right," said Kelly, "I read an article not long ago by General Caldara in *Maintenance Review* Magazine (Feb. 1959). The General was really after all of us to report incidents in order to prevent accidents. He didn't mince any words about it either. As it is, I'm afraid Turner suffered some pretty bad burns as a result of this fiasco. Doc says he's going to make it, but he didn't look too good when I talked to him a while ago."

"Thanks a lot for the info, Tom. I've got to get back to the investigation board session and discuss this pump business with them. It could have overheated and caused the explosion but of course we don't know yet."

"OK, Jim," Major Green said, "let us know if we can help any further, and by the way, please keep me posted on the findings, particularly with respect to this pump business."

"Will do," answered Kelly, "be seeing you."

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Let us leave our friend Captain Kelly and his investigation problems and let me discuss the necessity of

INCIDENT CAUSE FACTORS EXPERIENCED DURING A TWO-YEAR FLIGHT TEST PROGRAM

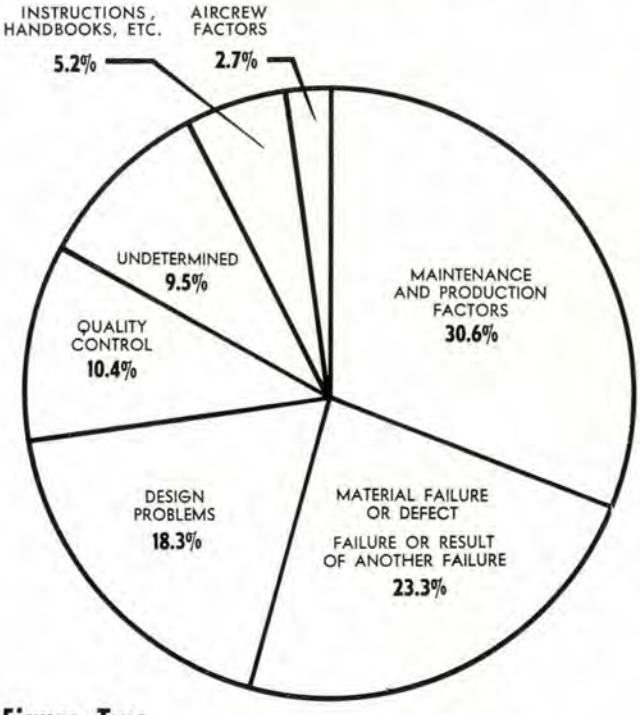


Figure Two

incident reporting. For instance, the fictional explosion in the preceeding story could have been prevented by timely reporting of the rash of pump failures.

"Keep me posted" could well be a watchword for this business of reporting incidents as a means of preventing aircraft accidents. It really is *everyone's* responsibility. It's true that a person who reports an incident to the proper people never knows how many accidents he has prevented, but he can rest assured that he has probably helped save money and lives somewhere along the chain. No one associated with aircraft can assume that *he* isn't responsible for reporting these things. The accidentally bumped switch, the failure to remove ejection seat pins,

the "hardover" signal on the flight controls, the elevator trim hooked up backwards or running away, the reaction to a sudden distracting light reflection on the flight instruments—all these and many more are incidents that have too often been the prelude to an accident. Properly reported these items can be, and in many cases have been, eliminated. No matter how insignificant it appears, *report it;* it could be the straw that breaks the camel's back.

Each command in the Air Force has its own incident reporting procedure; the Navy has its "Anymouse," some airlines have procedures for reporting, as do many of the manufacturers' flight test sections.

In a manufacturer's flight test program, incident analysis is of extreme importance. It's during the early flight tests of a new aircraft that most of the bugs show up. These faults can be eliminated before the customer starts operating the bird. The manufacturers vary as to their methods of incident reporting, but all of them are well aware of the importance of such reports, and are sincere in their efforts to eliminate the problem areas involved.

Let me give you a quick rundown on how we handle incident reports here at Convair—Fort Worth. Figure 1 gives a general idea. From the incident reports we do a little statistical work to provide our management with an idea of where any weaknesses may lie. The chart, figure 2, gives an example of an analysis of the cause factors involved in some incidents which occurred during a two-year test program. Notice that—

Now here's a coincidence. One of our pilots called to report trouble in flight due to a failure. Excuse me, there's the phone again.

How about that, the affected design group called to tell us they know about the problem and the vendor will be in tomorrow! Meantime, inspection is checking other airplanes to be sure this problem will not recur.

That was fast action—wish they were all handled that fast, or that they were all that simple. We'll attend the session with the vendor tomorrow, sure, but the important thing is, our pilot didn't *have* to report, except to maintenance. Design didn't *have* to call the vendor to discuss getting immediate redesign started! But we're out to eliminate any item which could cause an accident, so the wheels are turning to prevent that—x-x-x—item from ever coming unglued again!! Our pilot probably helped prevent a mighty large-sized accident.

We never did get back to the discussion on Convair incident reporting procedure, but the above illustrates it pretty well. (If the design group hadn't called us, we'd have called them).

Regardless of what your incident reporting procedures are—*use them*. Regardless of how trivial the item may appear to you, if something annoyed you in flight, couldn't be reached comfortably, was accidently bumped, or is in a location you just don't like—SPEAK UP. All manufacturers of aircraft are vitally interested in providing you with the best equipment possible. What may appear completely satisfactory in test may not be the best in combat, on a long cross-county, or for an operational requirement that was developed after your airplane was delivered. Let the manufacturer know in detail, through your channels, just what gives with that annoyance, distraction, or problem area.

Your problem on *your* airplane could be a potential accident cause factor—AND—you might be on board at the time! Excuse me. . . .

Rebb Magee had a good wife, a fine job, a proud family. He also had . . .

THE RAGE TO DIE

It all started when Little Rebb was just under two. At least that was the first time his mother became forcibly, completely convinced that her son's fiery temper might be capable of consuming him completely.

On this occasion, Rebb was having breakfast and his mother a telephone chat with her favorite neighbor. If Mama had been listening closely, she might have heard among Little Rebb's prattlings a single request for "mo' aig, pease." But only once, for Rebb's patience with the service was definitely limited. Kicking and screaming immediately ensued as Rebb struggled erect in his highchair to better declare himself. His Mother said, "Hold on a minute, Mabel," and turned to cope with the situation—turned in time to see Rebb flailing his chubby arms wildly and stamping in high rage on the tray of his old highchair.

Then it happened. He lost his balance, toppled forward, made a half left turn as one little foot caught on the tray's edge, and landed flat—nose, chin, chest, tummy, knees and toes—with very little forward momentum.

For Rebb there was darkness . . . then a whirling, swirling awakening to some pain, much noise, confusion and a whiteness which finally settled down and became his mother's blouse. She comforted him.

That evening his father viewed the patched-up victim, the sagging highchair, and some red stains on the linoleum floor. "Looks like little Rebb got too mad to worry about a fall, lost his balance and spun in from the highchair."

Rebb Magee grew to be a very presentable youth. At 10 he was tall, fair, well liked. He made good grades and showed athletic promise. He still had a temper.

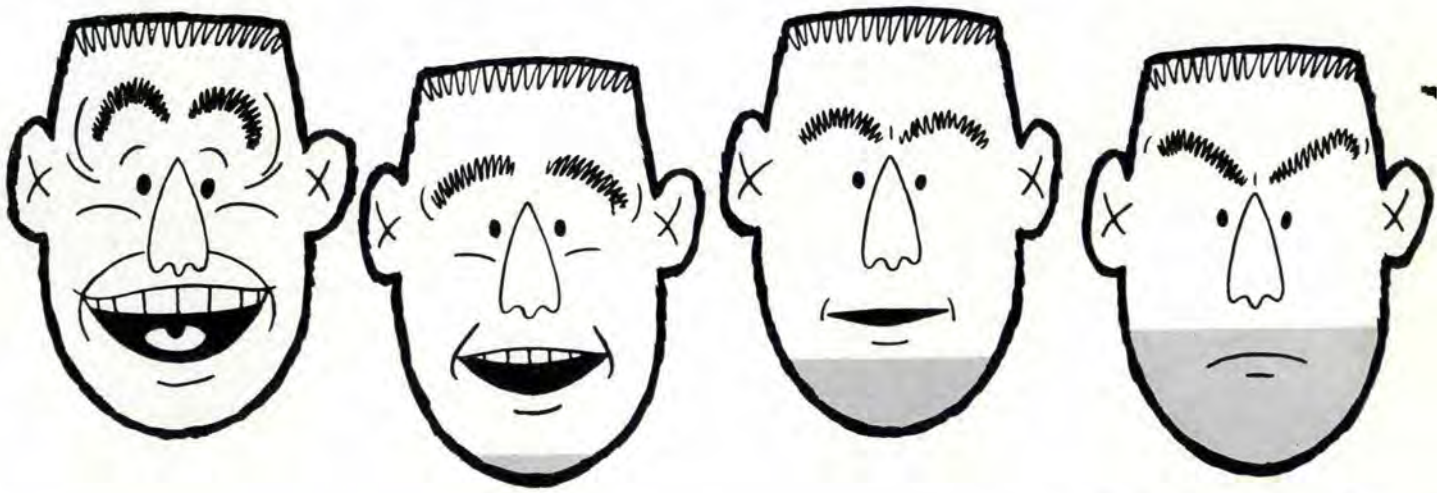
But at 10, this was not Rebb's major problem in life. Lucy was. Lucy lived next door. A lanky, toothsome nine-year-old who talked incessantly and who trailed Rebb relentlessly, efficiently, joining him always when least welcome.

On one particular evening, Rebb was enjoying some daydream solitude in the "High House," his tree shack 18 feet up in the mulberry tree at the back of the lot. He had been contemplating with extreme satisfaction this packing-box work of art and was embroidering a rosy fantasy of himself as a brilliant young architect who had just modestly presented his parents with a fabulous split-level house when . . .

"Rebb! I know you're up there, Rebb, and I'm coming up." Lucy's voice intruded on his daydream. "The funniest thing happened in school today and I just have to tell you and you'll be surprised what . . ."

Rebb's ire rose as fast as his airy castles fell. He flashed out of his shack and, leaning over the portico rail, without hanging on to the safety rope, he gave vent: "Lucy, you dumb brat! How many times have I told you never to come up here? Now go away! Git . . ."

There was a cracking sound, a flailing of limbs and a swishing of branches as Rebb spiralled down, then a sickening, breath-taking thud as he landed flat, face down—with very little forward momentum. He was struggling back to consciousness and gasping hard to regain his breath when Mrs. Magee arrived. There was that swirling black, grey, then white-



ness as Rebb realized that his aching head was being cradled in his mother's arms.

Rebb had been declared well, if shaken, by the family doctor and the excitement had abated by the time his father arrived home from work. A good look at the circumstances convinced Mr. Magee that Rebb had spun in from the "High House" basically because anger had overridden his good judgment, causing him to disregard normal safety precautions. Once again he lectured his son on the subject of controlling his temper.

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Curious that Rebb would be thinking of these and other such incidents now, almost 20 years later, as he sat on the steps of the Riggs AFB Transient Officers' Quarters waiting for transportation to Base Ops. Perhaps it had been the sight of that funny little red-headed kid yesterday, furiously kicking the wheel of the "too big" bicycle he had just fallen from. But Rebb had heard the highchair episode so many times he thought he remembered it, and he did remember the fall from the mulberry trees—as well as the lectures on temper accompanying this and other incidents. One in particular stood out, and Rebb grinned sheepishly to himself as once again he relived that evening at "High Rock."

★ ★ ★

Home in the spring from his soph year at State, Rebb was pleasantly stunned to find a highly metamorphized Lucy known as "that gorgeous chick on your street," also home for the summer. Remembering the way she used to chase after him, Rebb contemplated a rather heavenly summer. But Lucy had grown up in more ways than one—and the competition was keen. So it was late summer before things had progressed to the point where Rebb ventured taking Lucy to that local trysting place known as the High Rock. The Rock itself really wasn't very high—just a few feet above the tops of the trees growing on the slope beneath—but it afforded a view of the valley and, with the grove of trees to its rear, was all in all a naturally pretty place. Now the Rock, being smallish, was rarely occupied by more than one couple at a time, and an unwritten rule dictated "turn taking" when several couples were about. Likewise, courtesy and discretion dictated that a couple on the promontory be permitted to vacate voluntarily. Interruptions were rare, but it happened to Rebb and Lucy that night. Rebb's naturally short-burning fuse permitted the usual instant and violent explosion. He leaped to his feet, and whirled about—mind and tongue forming invectives to hurl at the intruders. But they never came out. The leap and the whirl had been much too violent for safety on the edge of that rock. He teetered momentarily, pitched up, and fell over backwards. That sickening pattern — of swishing branches, breaking limbs (one of which was Rebb's), landing with very little forward momentum, total darkness—once again repeated itself. This time the return to consciousness had its rewards. The whirling whiteness became Lucy's blouse and the cradling of that particular aching head had been especially tender—as Lucy comforted him.

★ ★ ★

Capt. Magee snapped back to reality with the appearance of a staff car. It was his, and on the way to Ops he ran mentally over the day's business. First, to get back to West Coast AFB, by noon if possible, so that he could get his staff visit report out of the way before the weekend. The TDY was getting old and he was looking forward to a free weekend with Lucy and little Jimmy.

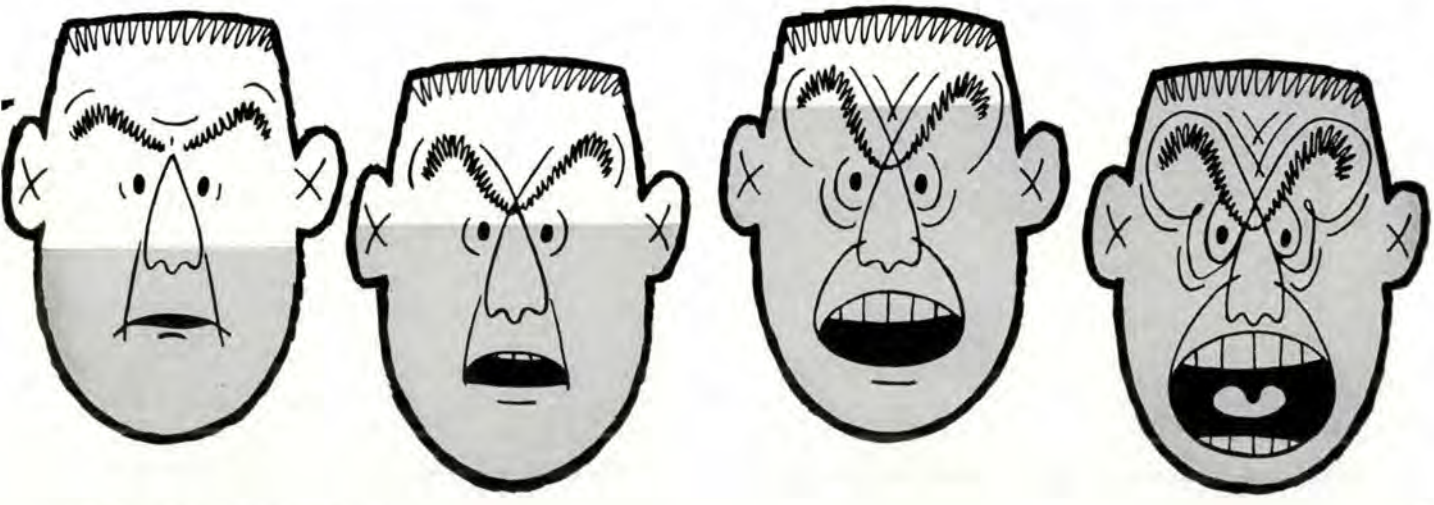
The flight should be no problem—he had filled out the forms last night. It was only 550 nautical miles to the Kerville Omni where he would begin one of those long, complicated letdowns, probably via Hillside. But you could always expect good weather and he would have plenty of fuel—just about burn out the tips on his trusty-T by Kerville.

The weatherman threw Rebb the first curve of the day. "Unusual, sir, almost unheard of this time of year but West Coast has 1000 and 1—looks like it's solid to about 24 too; little change is forecast for the next six hours. You see, this low slipped down here on us last night and she's kicking up some. . . ."

A little upsetting, being so unexpected, Rebb thought as he selected an alternate. But really no sweat.

Clearance signed, he was pleasantly surprised to find his bird parked right in front of Ops and an airman from the alert crew ready to help with his bag, the walk-around etc. "Best service I've had since the General quit riding with me," Rebb remarked to the beaming A/1C.

"Recommended by Duncan & Heinz, you know," said the latter as he helped the Captain with his shoulder straps.



Power plugged in, Rebb called the tower for clearance, getting the usual, "It's on request, standby" treatment. Then he went carefully over the checklist item by item, skipping only the seat pins, which he preferred to leave until ready to taxi. Next he checked and rechecked maps, letdown plates, computer, etc. It was clear and unlimited at Riggs, so his VFR climb request would undoubtedly be approved and he would be on top at least to Kerville—looked good.

"AF Jet 75433, this is Riggs tower. Your clearance is coming through. You may start up . . ." Rebb had the fire burning before the transmission ended and was ready to copy when the tower called again. It all came in fine, just as he had requested, right up to—" . . . climb direct to Pipp intersection to reverse course to the Riggs Omni, to maintain 4000 until 2 minutes southwest of Pipp. Cross Riggs Omni at or above . . ."

Here Rebb cut in with irritation in his voice, "It's CAVU and I asked for a VFR climb, so why this complicated, uncalled for departure?"

"We'll check ATC," the tower volunteered. Moments later Rebb was informed that he could climb VFR if he got off by 0938.

It was 0934. "5433 will make it," he informed the tower, signalling for chock removal. Rebb taxied fast, checking instruments and internal tanks, and indulging himself in some sotto voce profanity. Canopy locked, power checked, shot of alkie, "Rolling," he called to the tower.

"Clear for takeoff," they told him.

Takeoff and climb were uneventful —first checkpoint, O.K. Rebb began to relax. Then, "Left tank feeding slow again," he noted to himself as she required more and more right trim. "Must write that up." Eventually full trim was in. "Probably trim back as the left tip feeds," he mused. "It did that the last hop anyway." And the trim did start to come back . . . but only part way, and then the tip light was blinking. It finally stayed on.

"Must have a little JP trapped out there," he thought. Still no sweat, though. Kerville was 10 minutes up the road and the overcast had become solid under him. The bird was flying fine and there was plenty of fuel. "Couldn't be much trapped, but I might as well check her controlability at low speeds," he said to himself. So he popped the brakes, dropped the gear and lowered flaps. At 140 it took just a little right pressure and of course almost full trim. "No sweat," he muttered as he cleaned the bird up and set about the business of getting an approach clearance. He was almost on Kerville now.

The man in the center came right back loud and clear, "Cleared to let down to 25,000 over Kerville, call Hillside approach for further clearance."

Hillside was equally prompt and accommodating. "Cleared to the Hillside Range, cleared to let down to 20,000 immediately, hold northwest of Hillside, one minute legs, left turns, you will be cleared for a No. 2 standard ADF with handoff to West Coast GCA, no delay expected. Expected approach time 1102." Just about time for one circuit in the holding pattern, he calculated.

Rebb checked the cockpit—pitot heat on, windshield defrost on, oxygen, fuel, a last shot of alkie. Then he started the descent. In the soup at 23 . . . thick but very little turbulence. By Hillside, his transition to the gages was complete. He felt at home as he slowed her down, making a smooth entry into the holding pattern. Three calls and still no reply from Hillside Approach. He could hear other traffic and the transmitter seemed O.K. "Clowns in RAPCON must be having morning coffee," he thought, somewhat irritated. He was about halfway around the back turn and the clock showed 1100 straight up. Be on top of Hillside right on the money at 1102. "Hillside Approach," he fairly shouted.

"Roger, 75433. We have you in the pattern at Hillside Range."

Rebb asked, "Is 5433 cleared to approach at 02?"

"Negative, 433, one aircraft had to go around a minute or so ago and we have a jet inbound from Kerville with minimum fuel, expect a 15 to 20 minute delay."

Rebb began to burn a bit brighter. "Listen, Hillside, 433 is a jet too, and if you hold me that long I'll be screaming minimum fuel . . ."

"Stand by," was the reply.

But the needle went around at 02 and Rebb had no choice but to turn outbound. Perhaps unconsciously, he eased back a bit on the throttle and trimmed more up-elevator. He was mentally computing fuel. How long could he hold here, approach, and still make his alternate? He sure didn't want to go to that alternate—take the rest of the day to get back. Damn the luck and those stupid approach people.

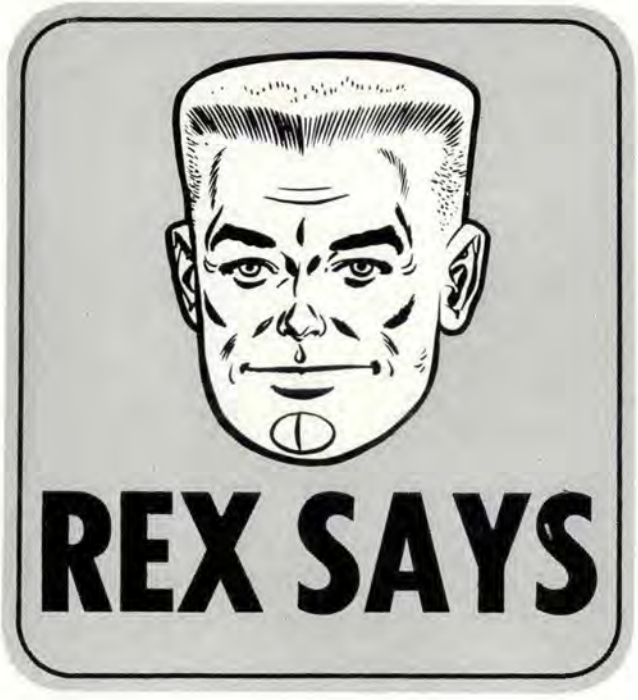
Rebb had just rolled out on the outbound leg when approach came through, "433, if you can approach immediately, we can get you in, what is your—"

Now they tell me, Rebb raged inwardly as he replied, "433 approaching now," and he laid her over to the left, reefing in.

There was almost no warning—Rebb couldn't tell whether she had rolled, pitched, switched ends, or what. It was altogether the most disorienting maneuver he had ever experienced. There was no anger now. This had been replaced briefly by panic and then by grim determination and concentration. Needle, ball, airspeed, spin recovery technique—idle power, stick back, aileron neutral, full right rudder—looks like she's coming out—ease the nose down—now the altimeter. How much air between us and the 3000 foot hills under the high cone? 8000 would have to be it.

Then the left wing went down again. Frantically now, Rebb punched off the tips. Why hadn't he done that the first time? He started the spin recovery routine again, but the altimeter was already spinning down from 9000—look again—. No, no mistake, have to give up and get out. Rebb realized that he was sobbing as he pulled the visor down and hooked his heels in the footrests. The altimeter was already on its way toward 7000 when he tugged on the armrests. The left one came up easy but the right one seemed to be stuck. He pulled harder—still nothing. Then he remembered, in that mad scramble to get off in four minutes at Riggs he had forgotten to pull the seat pins. Panic set in as Rebb made a frantic attempt to get at the pins, the locked harness interfering. In final desperation, he opened the safety belt and leaned over. One pin, two pins, he was pulling on the third pin . . . when that swish of branches, splintering of limbs, that resounding crash occurred.

For Rebb there was darkness—a darkness that comforting arms could never push away. ▲



The F-100D pilot, with a wingman, was on a GCA final. The wingman asked for more power because of the sink rate and low airspeed. The leader stated he could only get 84 per cent and ejected shortly after. The seat did not separate until just before impact. The pilot was killed. Investigation revealed there was an in-flight separation of the throttle linkage from the fuel control. One clevis next to the fuel control had become uncoupled.

REX SAYS — *This is a pretty high price for a pilot to pay for somebody else's carelessness or lack of attention to detail. "For the want of a nail. . . ."*

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The pilot of an F-86H aircraft entered a normal landing pattern, dropped the gear handle and flaps and made the normal "gear down and checked" call on base leg. He did not, however, visually check his gear indicators. His gear doors opened, but the gear did not extend. On final approach, as the pilot started his roundout for landing, the mobile control officer observed the gear up and advised the pilot to go around. The pilot started his go-around and at that time noted that his indicators indicated "gear up." On the go-around, the gear was recycled and operated properly. Subsequent recycling tests of the gear failed to disclose any further malfunction of the gear mechanism. The pilot involved in this incident was extremely fortunate. The mobile control unit was inoperative at the time and the mobile control officer was in the tower. He observed the unsafe gear condition by using binoculars, although the aircraft was carrying three external fuel tanks, making it difficult to determine the gear position.

REX SAYS — *This incident highlights two important points that must be re-emphasized. First, the importance of a visual check for safe gear conditions before making that "automatic" base leg call; second, the combination of a series of small events (i.e., mobile control temporarily inoperative, three tanks on the aircraft obstructing a clear check from the ground of the gear condition, and the pilot failing to check his indicators) are always leading factors in an accident. Elimination of the little items can easily lead to a reduction of accidents. It is fortunate that the mobile control officer was performing his duties properly in this case, thereby saving another aircraft.*

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After an Air Defense scramble, the F-86D pilot arrived over his destination. When the landing gear was extended the right main gear would not indicate safe. The pilot returned to an airbase where crash equipment would be available if needed. During the return flight he attempted to lock the gear down by maneuvering the "Dog" so as to jar the gear into place. Two other aircraft reported that the gear appeared to be down but the indicator still showed an unsafe condition existed. The pilot kept trying to correct the condition until his fuel ran low. Upon landing, the right main gear collapsed and the aircraft skidded off the right side of the runway. The drag chute helped but did not prevent major damage. There was no fire and the pilot got out safely.

REX SAYS — *Remember the old saying "For the want of a nail the shoe was lost, for the want of a shoe the horse was lost, for the want of a horse the battle was lost," etc. In this accident, a penny's worth of grease by the IRAN facility smeared in the neighborhood of the right gear down-lock assembly would have allowed the gear to lock down. Squadron maintenance personnel didn't check the lubrication of the assembly. A penny's worth of grease and a few minutes' labor!!*

●

A student pilot on a solo night transition flight was completing his mission. He wheeled the T-Bird onto the runway for a full stop landing. One-third to one-half way down the runway he realized that the right brake wasn't doing its job. A go-around at this point was out of the question so he called for the aircraft in front of him to keep to the right. He made a barrier engagement all right but the right hand webbing shear pin failed to shear and the nose wheel collapsed.

REX SAYS — *Two people played a role in this accident. The star actor was the character that signed off the postflight as completed when it wasn't. He either hadn't serviced the brake reservoir with brake fluid, or he serviced it improperly. This "ain't" right! The accident board recommended that "falsification of official records be brought to the attention of maintenance personnel." Let's go a little stronger: we don't need people like that around. The student pilot came in for knocks too. Turned out he hadn't checked the brake pedal pressure per the checklist says DO. Had he known his right brake was weak or inoperative, the chances are he would have planned his approach and touchdown in a manner more conducive to a better barrier engagement.* ▲

Through official channels, the Directorate of Flight Safety, RCAF, has informed us of the similarity between RCAF tow target aircraft markings and conspicuity markings of USAF aircraft. The following item was suggested for inclusion in FLYING SAFETY Magazine:

"The RCAF has for the past several years used a fluorescent paint in fire orange color to mark armament training tow aircraft. This marking scheme is similar in fact nearly identical to the conspicuity markings for USAF aircraft as outlined in T.O. 1-1-667. It is recommended that USAF pilots take cognizance of this similarity and be particularly cautious about flying in close proximity to fluorescent marked CF-100, Dakota, Mitchell, Sabre and T-33 aircraft, when flying over Canada."

The automatic seat style parachute is in short supply although adequate quantities have been procured to meet authorized requirements. This chute is currently used only in T-33 and B-57 aircraft and some crewmembers are being denied the advantage of fully automatic equipment in ejection situations. The automatic seat chute is obviously being used for purposes other than authorized. The Aero Medical Safety Division recommends that commanders should take immediate action to make certain their organizations are not contributing to this shortage.

Sufficient quantities of the M-12, one-second delay initiators are in supply channels to replace all M-4, two-second delay initiators for automatic lap belts. The M-4 initiator has been made obsolete for use on the automatic lap belt system. Here again, the Aero Medical Safety Division strongly recommends that all using commands should take positive action to make sure the M-12 initiators are installed on all ejection seats. The continued use of M-4 initiators, instead of the M-12, can mean the difference between a successful or unsuccessful ejection.

The California Forestry Division has come up with some tips to airplane drivers about the fire dangers still prevalent in some parts of our country. First, they point out that while it isn't always possible to control the flight of disabled aircraft it is often possible to pre-plan certain missions to avoid high fire hazard areas. The point is that abandoned or crashed aircraft have started many serious and expensive fires throughout the State of California and other western states. It is further pointed out that flying sight-seers over fire areas greatly complicates the firefighting job. Within the last few years fire control agencies have greatly increased their use of aircraft in extinguishing fires. Planes and helicopters are now being used extensively for dropping chemicals, ferrying firefighters, scouting, and mapping. Unauthorized planes endanger necessary fire control activities. Pilots therefore are urged to avoid flying over fires unless the fire has just started and information is needed to report it properly. The Forestry Division also points out that the use of fire or flares to signal for help in a dry forest area can often result in the downed airman acting as his own executioner.

Orange-colored flying clothing will soon be available for aircrews whose mission does not require flights over unfriendly areas. The purpose is to facilitate search and rescue efforts in the event the crews are forced down in unpopulated areas. The K-2B and CWU-1/P flying suits will be available in orange color as well as in the standard color. The L-2B and MA-1 flying jackets with orange-colored lining will also be available. Requirements for flying clothing of this type should be submitted to AMC when that Command indicates a readiness to receive such requisitions.

While we're on the topic of clothing: Aircrews are reminded to dress for the climate of the area of flight. For example, the clothing worn on takeoff from a base in Florida will not be warm enough for a mission in areas like Minnesota, Montana, Colorado or Maine, to name a few. And we don't want a "repeat" of the tragic crash that happened about this time last year involving a C-119 and crew. How about re-reading the article "Horror in Hell's Canyon" on page 8 of the February 1959 issue? There's a real lesson to be learned and it is most appropriate for this time of year.

Early this year two F-89 pilots found out the hard way that there is more than one way to take a look-see at the landing gear while airborne. One pilot had an unsafe indication so he asked his wingman to take a check for gear position. The wingman obliged but too eagerly. He flew under the troubled craft when "somehow he was drawn up and into it." Forward stick action was too late and both birds were laid up for repairs. Landing gear can be checked safely. There's no need for circus stunts in Air Force operations.

In April of this year the pilot of an F-100 had to abort takeoff when he found he had a restricted aft stick movement. The plane tore away the barrier and sustained major damage. Investigation showed that the stick movement was stopped by the ventilating hose on the immersion suit. This is the same problem that came up several years ago with the oxygen hose in other aircraft. An isolated case, but it can happen again!

A recent SAC message directed all B-47 pilots and crewmembers to be alert to the following situation: "Several instances of engine flameout have occurred during takeoff in B-47 aircraft. This can occur when all of the following conditions exist:

- Uncovered forward boost pump, resulting from acceleration forces and extreme angle of attack.
- Reduced fuel loading in main tanks.
- Failure of the aft main tank shutoff valve in the closed or partially closed position.

B-47 crewmembers should be aware of the flameout possibility to preclude hasty reactions which could jeopardize the lives of the crew."

WELL DONE · knowledge · training · ability ·

On the night of 1 January 1959, Lieutenants Thomas and Chestnut departed South Weymouth NAS, Massachusetts, in a T-Bird bound for Wright-Patterson AFB, Ohio. At 24,000 feet they were on top, but continued climbing to 40,000 and levelled off. The Trusty-T performed nobly until it got near Pittsburgh, and then grew cantankerous. First, the de-ice warning light went on. Although the de-icing system was activated, the warning light continued to flicker. Then the cockpit went off like a Roman candle. The generator-out light started to flash, accompanied by a full-scale loadmeter jump, and the cockpit lights arced brilliantly. Then the inverter-out lights went on and electrical smoke filled the cockpit.

The battery and generator switches were turned off, and all circuit breakers not necessary for flight were pulled. Then the battery and generator were turned on in an attempt to isolate the cause of the trouble. As the generator was turned on, the loadmeter indicated a full-scale overload, so the generator was turned off for the remainder of the flight.

The inverters were switched and this revealed that the low frequency radio compass, omni equipment, attitude indicator, slave gyro compass, and turn needle were inoperative. The APX-6 was turned to EMERGENCY, and a MAYDAY call attempted, with no success. The "T" was brought down to 35,000 and the fuselage tank boost pump was turned off. No triangle for GCI/ADC was flown since both inverters appeared to be inoperative and the battery power could not be depended upon.

Navigation was accomplished by means of flashlight, standby magnetic compass, world aeronautical charts, and the glare from cities reflecting through the undercast. Pitch reference was maintained by use of vertical speed, altimeter, and horizon. Bank was maintained by reference to the horizon. By the use of time and distance checks and with the aid of the world aeronautical charts, they figured their position to be south of Akron, Ohio. Shortly after, the glow of a large city could be seen through the undercast. The Lieutenants believed this to be Cincinnati, a city with two airports. The weather was the same there as at Wright-Patterson, so a letdown was started. IFR conditions were encountered at about 7000 feet.

The instrument portion of the letdown was made with the aid of the altimeter, vertical speed indicator, and airspeed indicator. Prior to letdown the decision was made that if VFR conditions were not reached by 3800 feet *(Cincinnati elevation is approximately 485 feet)*, a pull-up to VFR on top would be made and then an ejection accomplished. Fortunately, VFR conditions were reached at 4000 feet over the city. Two runways were sighted, coinciding geographically with the position of the two Cincinnati airfields.

They decided to land at what they believed to be Cincinnati Lunken Airport. They entered the pattern, lowered the gear and found that the nosewheel registered "unsafe." Neither recycling the gear nor actuating the emergency gear extension system could make the gear indicate "safe." Fuel was short at this point—45 to 50 gallons—so a short-field approach was made with the nose gear still indicating "unsafe."

As the aircraft touched down, the nose gear went into down-and-locked, so a full-stop landing was made. After the downlock pins were installed, the T-Bird was taxied in. Only then did the pilots discover that they had landed at Columbus NAS, Ohio, which had 6000 feet of lighted runway. Flight Service and ATC Center were contacted, and a full report made. There were no violations involved, and the incident was closed.

Through the exercise of superior flying skill and mature professional judgment, Lieutenants Thomas and Chestnut successfully mastered a serious emergency situation. Their performance reflects great credit on themselves and on the United States Air Force. Well done! ▲

1st Lt. Jeremy C. Thomas
3560th Pilot Training Wing, Webb AFB, Texas

1st Lt. James M. Chestnut

It doesn't cost much more to go first class.

Rock-A-Bye Baby

Capt. Earl W. Adams, Flying Safety Officer, 2856th AB Wg, Griffis AFB, New York.

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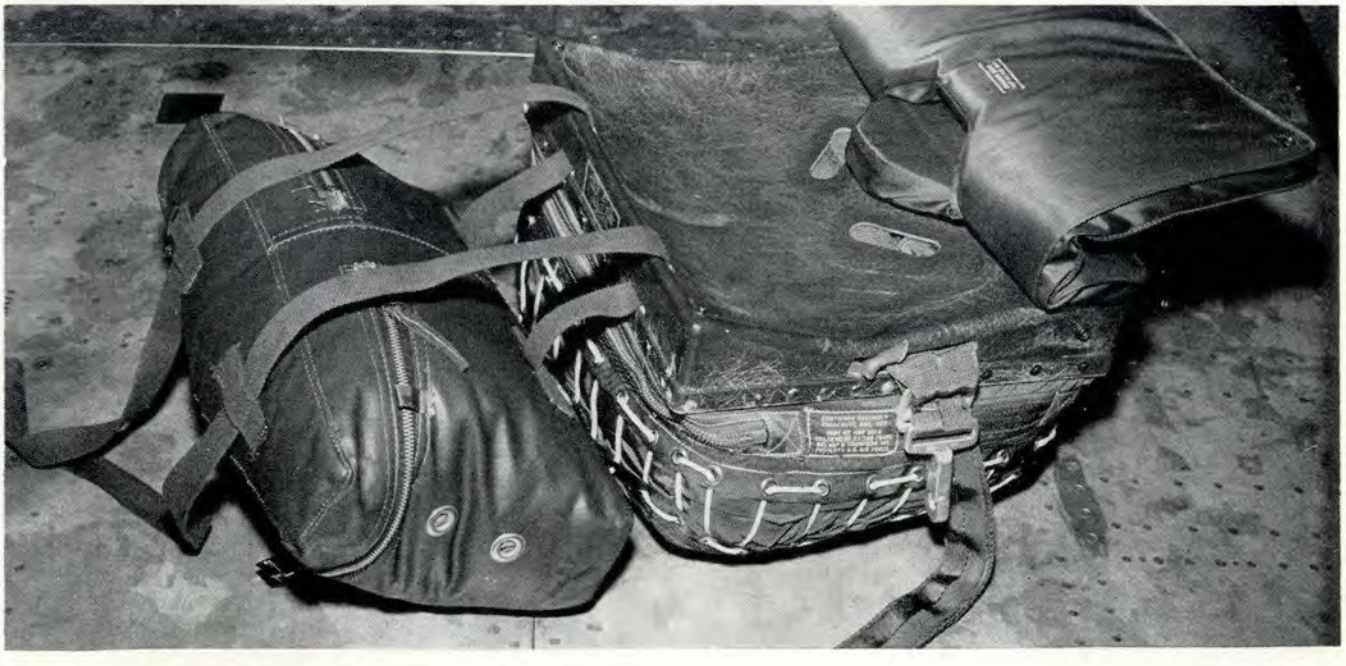
Sleeping bag does not interfere with crewmember's movements or cockpit room. Lower right photo shows straps and webbing of underside attachment.

Recently, two young officers assigned to the 465th Fighter Interceptor Squadron, 4727th AD Group, ADC, Griffis AFB, developed an idea which we believe to be eminently practical. In an emergency, it could be a real life saver. During their tour at Griffis, Lieutenants Michael G. Zaretsky and Mel Mendelsohn, R.Os. in F-89s, flew many missions over vast, cold and snowy wildernesses in the northeastern states and Canada. It often occurred to them that a sleeping bag would be a mighty handy thing to have along in case the bird quit flying some day and they were forced to make their way home by other less rapid means of transportation. Realizing that this would mean walking, and that this form of locomotion depends on the care and preservation of the old "frame," they decided to do something about it. With plenty of determination and ingenuity — raw materials consisting of needle, thread, zipper, straps and cloth—they fashioned an efficient, workable attachment to the seat packs in which to carry their sleeping bags. These pack attachments, locally manufactured, proved to be practical and popular, so a kit was made up for each R.O. in the Squadron. As FSO, I helped get the squadron outfitted with this welcome piece of survival gear. Lt. Zaretsky is now with the 756th AC&W Sq, Findland AF Station, Minnesota; Lt. Mendelsohn is at Laredo AFB, Texas.

Upper photo shows sleeping bag in stowed position. Illustration below gives top view of pack and attachment straps.



Once the cockpit check is completed, the ground service trailer is rotated into the launch position. The trailer makes any area a runway.

Peter F. Girard, Chief Engineering Test Pilot
Ryan Aeronautical Company, San Diego, Calif.

Part helicopter, part jet, but all airplane. As you lift off, you are . . .

. . . Standing on a

"I have not found the Vertijet a particularly difficult airplane to fly. . . . However, as in all airplanes, one must know its systems and capabilities."

That's the way Peter F. Girard, Ryan Chief Engineering Test Pilot describes flight in the X-13 Vertijet, the world's first jet VTOL airplane. Girard, who has made 125 flights in the Vertijet, is the only pilot who has flown a jet plane through a complete VTOL mission: vertical takeoff, transition, horizontal flight, transition and vertical landing.

"Since the airplane is experimental, every flight takes careful planning," Girard states, "much as if one were preparing for an instrument flight in a conventional airplane.

"Flying the X-13 might be compared to flying a combination jet and helicopter. I feel that my flight time in a helicopter has been valuable to me in handling the Vertijet. Control effectiveness and response of the X-13 are very good. Maneuverability, particularly in the vertical hovering attitude, is excellent—comparable to that of a helicopter."

In the lower speed region, the Vertijet can outmaneuver and outclimb any conventional jet fighter, even though it is an experimental plane. It was not designed for high speed flight so its potential in that category has not been explored.

The X-13 can run circles around the F-86 chase planes. It's like a souped-up Jaguar chasing a run-of-the-mill production automobile. A Vertijet-type airplane is able to turn within one-half the radius of today's high speed fighters because of its high thrust to weight ratio.

In a scramble situation, the Vertijet, not controlled in its takeoff by wind direction and wind velocity, can take off in the direction of the target, saving valuable time and fuel otherwise used by conventional jet aircraft during long taxis, and takeoffs which are often in a direction away from the attacking target.

Major tactical advantages accrue to the Vertijet. It is completely mobile and dispersable—two major needs for future combat. Virtually a "manned missile," the Vertijet concept endows piloted aircraft with missile mobility. Freed from runways, it would make an "aircraft carrier" out of every ship. It could go into immediate operation, providing supersonic air cover in combat theatres, without awaiting the construction of huge runways. It could be dispersed along coast lines to give supersonic interceptor protection at the most advantageous spots, regardless of airport locations. It would be virtually impossible for enemy aircraft or missiles to seek out and destroy the aircraft and their launching sites because they form small, widely dispersed targets.

Before each flight, Pete makes a careful walk-around inspection of the airplane to check all control surfaces, the jet reaction control system, hook assembly, dampers and damper actuators, and other components.

In the cockpit, while the Vertijet is still in a horizontal position on its ground service trailer, he runs through a complete cockpit check. Once the engine is started, the X-13 is raised to a vertical attitude on the ground service trailer while instrument checks are completed.

The X-13 control system has a conventional stick and rudder, not only for the usual aerodynamic controls used for horizontal flight, but also for jet reaction controls for vertical hovering and maneuvering. Its most unusual feature is the Ryan engineered jet reaction control system which provides precision control and maneuverabil-

Once nose hook is free of cable, Pete backs off using jet reaction control system. He begins rotation and transitions to horizontal flight.

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ABOUT THE AUTHOR

Pete Girard has been with Ryan Company for 13 years and is dean of its test flight crews. He has flown almost all types of aircraft from the B-24 bombers (in WW II) to flying boats, jet fighters and helicopters. Three years ago he placed second in a class of 36 at the Navy's most "exclusive" aviation school for civilian and military personnel at the NATC, Patuxent River, Md. He was one of five civilian pilots. During the 5½-month gruelling course of instruction he was either attending ground school, flying planes or making reports, 12 to 13 hours a day, 6½ days a week. Prior to test work on the Vertijet he was Ryan's chief aerodynamics engineer. As far as is known, Pete is the first person to pilot a jet powered VTO machine. He flew this tethered test vehicle for the first time 24 November 1953.

Tail of Hot Gas

ity even when the aircraft speed approaches and reaches zero. Through this system the engineers have achieved stable, maneuverable flight in the X-13 while it is supported by a column of hot gas with no airflow over its surfaces in hovering attitude.

The four instruments which are most important in flying the Vertijet are the turbine tachometer, airspeed indicator, altimeter, and vertical velocity indicator.

"For vertical velocity indication," Pete says, "I use a sailplane variometer which is quite responsive. In a pinch, I'd fly the Vertijet without the use of any instrument except one—the tachometer. It's the one indispensable instrument because it tells me thrust—and it's thrust alone that keeps us flying while in the vertical attitude.

"When the airplane is completely vertical, my feet are raised above my head, even though the seat is designed to tilt forward 45 degrees to accommodate the different positions for vertical and horizontal flight. This feet-high position is quite strange and somewhat awkward at first, but after a few flights one gets used to it. It's not unduly uncomfortable or fatiguing, because you spend only a few minutes in this attitude at any one time."

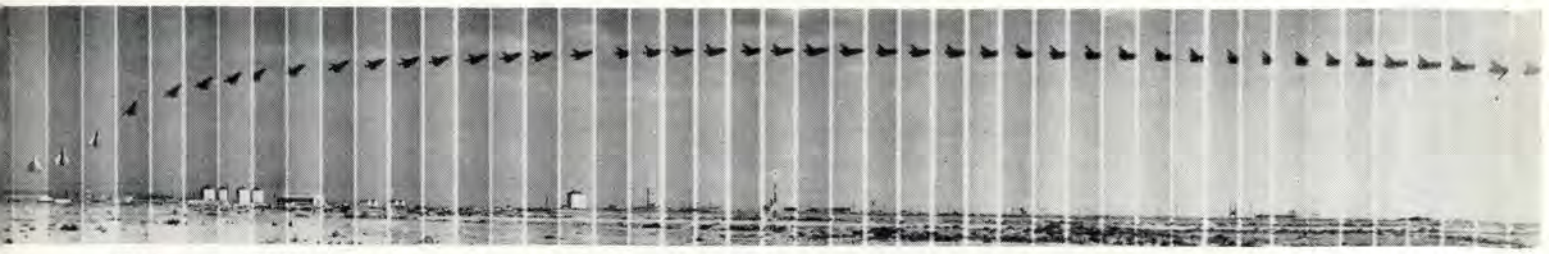
The Vertijet uses a simple hook and keel bumpers as its only devices for takeoff and landing. It sheds the weight of landing gear, flaps, doors, dive brakes, catapult and arresting gear, and related actuating equipment. This means the Vertijet concept permits design of combat aircraft which would be 10 per cent lighter than conventional jet aircraft. Elimination of this "dead load," associated with the operation of the airplane on the ground, would permit more "live" engine weight and performance to be built into the airplane for its airborne mission. Ryan engineers have designs for combat aircraft, based on the Vertijet concept, which possess substantially greater rate of climb, maneuverability, acceleration and higher speed than any combat aircraft now in use.

Here's how Pete describes his technique with the X-13: "To take off, I gradually add throttle, getting more engine thrust, until the delivered thrust slightly exceeds the weight of the airplane. The Vertijet begins to rise and the nose hook comes free of the cable. The X-13 is hovering—standing on a streaming column of hot jet exhaust gas. When I first tried hovering, I was naturally concerned about controllability. However, the jet reaction control system in the X-13 is extremely responsive and effective. In the vertical hovering attitude, it almost puts a helicopter to shame.

"Then I back the airplane away from the ground service trailer by easing back on the stick and holding the rudder neutral. To turn the plane around for the transition, I kick right rudder and the plane rolls about the vertical longitudinal axis to the right. Wind velocity affects the Vertijet slightly, but not nearly as much as it did the propeller VTOL planes. I merely lean the airplane in the direction of the wind to compensate for it.

"The transition from vertical to horizontal flight is generally made between 100 and 150 feet altitude, although I have made it as low as 50 feet. I make it a practice to complete the transition as quickly as possible to save fuel. The actual transition is like shifting gears in an automobile. Thrust is added and the plane is gradually pitched over. Throughout the entire transition I watch the ground, glancing into the cockpit once or twice to check the airspeed.

"The transition to level flight is an enjoyable experience. During the early stages, the airplane buffets, much as it would in a high speed stall in a conventional air-



Liftoff, vertical flight, rotation, transition, and finally horizontal flight are shown through the eye of the multiple exposure camera.

plane. The buffeting, which is caused by separated air flow, is not objectionable; in fact, it serves as a guide to the progress of the transition. As the airspeed increases, the buffeting vanishes quite abruptly. I'd compare it to driving a car at high speed down a rough road, and then suddenly breaking out on smooth concrete.

"At a speed of 180-200 knots the transition is completed and the airplane is flying with conventional controls.

"The transition from level flight back to vertical flight and letdown is more difficult than the transition following takeoff. Greater judgment is required because the airplane must be brought through a complete stall, without zooming or losing altitude.

"The landing pattern which I use is surprisingly similar to that employed by conventional jet fighters. For the entry transition, I keep the plane at an altitude of 150-250 feet. As I let down and commence the approach to the ground service trailer, I use the top of the trailer with reference to the horizon as a visual aid. I have developed a quick scan method, frequently shifting my eyes from the outside visual references to the cockpit instruments. Once the X-13 is close to the ground and in a vertical attitude, I rotate the airplane to the right, with the wing chord plane at 35 to 45 degrees to the approach path, which gives me excellent visibility out the left side of the cockpit.

"The last 50 feet of the approach are covered slowly. By this time, I feel as though I've got it made. Just before hooking on, I rotate the wings parallel to the face of the ground service trailer. After the hook has engaged the cable, and the plane's keel bumpers come in contact with the trailer bed, I cut the engine.

"I have been asked if the X-13 is as safe an airplane to fly as the Century Series fighters. It's not a fair comparison to make, because the Vertijet is an experimental aircraft and the Century Series are operational. However, I think that an operational Vertijet with increased fuel capacity and other production improvements would be as safe, it not safer, than planes of the later Century Series.

"Another point to remember is that the conventional jet plane has inherent disadvantages which the Vertijet does not have. For instance, on final approach, the pilot of a conventional jet has to decide whether to make a final commitment to land the plane or take a waveoff and go around again. Sometimes a waveoff is impossible to negotiate. In the X-13, I never have to take a waveoff because I can make radical course adjustments and altitude corrections, as needed, until I've engaged the cable of the ground service trailer.

"Also, when the conventional jet pilot makes his commitment to the runway, he is traveling at a speed of anywhere between 120 and 180 knots, and is in an airplane which possesses a high amount of kinetic energy. This means that the tolerance for errors in judgment is very small; should the pilot lose control of the airplane the results would be disastrous. In the X-13, I don't have to make a commitment to the runway and I am landing in an aircraft which is traveling at a very low speed, possessing little kinetic energy.

"The feeling of security and of complete control of the X-13 is a function of the pilot's confidence level. After a string of 15 or 20 flights, you not only feel as if you have complete control, you *do* have complete control. I have actually reached the stage where I fly the X-13 largely by the seat of my pants."

The X-13 Vertijet was conceived 10 years ago when the Navy authorized Ryan to study the problem of controlling a jet airplane in motionless flight. On May 31, 1951, Ryan engineers achieved the world's first remotely controlled, free hovering jet flight as a result of these studies. The construction of a Navy VTOL test vehicle was begun. On November 24, 1953, Ryan test pilot Peter Girard made the world's first piloted hovering jet flight in this test vehicle.

In 1953, the Air Force awarded Ryan a contract to build and flight test the X-13. The first Ryan Vertijet flew, using temporary conventional landing gear, on December 10, 1955. On May 28, 1956, the Vertijet, equipped with a temporary tail-sitting structure, made its first vertical hovering flight. The first transitions from vertical to horizontal flight and back, were made on November 28, 1956. In final configuration, with hook only, the X-13 made its first complete takeoff, transition, and landing at Edwards Air Force Base, April 11, 1957.

Constructed of aluminum and titanium, the delta-wing X-13 is 24-feet long, 15-feet high and has a wing span of 21 feet. It is powered with a Rolls Royce Avon turbojet engine in the 10,000 pound thrust class. It can be flown with about the same level of skill as that required to fly a helicopter.

Pete says, "I think the strangest sensation I experienced in flying the Vertijet came during one of the first transitions 5,000 feet above the ground at Edwards Air Force Base. It was like sitting in a chair, suspended in space. I was hovering completely motionless, could hear the racket of the engine, but had the feeling there was absolutely nothing supporting me in my perch.

"Yes, the Vertijet's a lot of airplane, and it has a lot of capability. But, as I said, whether it's a Vertijet, conventional jet, four-engine prop job, or just a puddle-jumper that you're flying—KNOW YOUR AIRPLANE!

LEND A HAND

Maj. Jesse C. Wilkins, Operations and Facilities Branch, DFMSR

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'Tis indeed good to have friends! No one is more aware of this fact than the pilot in the airborne isolation booth during solid instrument conditions. Take the case of a pilot committed to land at a destination which has gone below minimums. He is unaware of this situation until, after a missed GCA approach, he is informed that the field is now socked in. Unfortunately, his one solution to the dilemma—proceeding to his alternate—is now impossible. The alternate ceased to be an alternate when he left the original cruise altitude and began his approach.

The end result of such circumstances is usually a crash while attempting a zero-zero landing, or an ejection and the loss of a valuable aircraft. A "successful" landing under these conditions usually results in a fine "pilot technique" story for bull sessions and nothing more.

Without fail each winter season produces several instances of the "I've gone about as far as I can go" sort of instrument flight that terminates in the same fashion as the instance above. Take the F-84 pilot who arrived at his destination after dark, cancelled his IFR clearance and flew in the local area to burn out fuel. He noticed that the lights of an adjacent town were slowly being blacked out by cloud cover. He called the tower and queried the tower operator on the current weather. Only *then* was he informed that the weather was rapidly closing the field. No suitable airfield was within his fuel range. He was committed to land *here* and *now*. Several GCA approaches later he landed long and went off the end of the runway. Major damage to the aircraft, but he escaped with his life. Why wasn't the available weather information relayed to the pilot before the base socked in?

Then consider the F-100 pilot caught out on a bombing mission who, after reaching a critical fuel state, as far as alternates were concerned, began a GCA with a precipitation ceiling of 500 feet, visibility of ¾ miles and deteriorating. End result? Pilot ejected, aircraft destroyed. Why wasn't the pilot informed of the deteriorating weather and diverted to a suitable alternate before fuel became critical?

Or take a peep at the two F-102 drivers launched on a SAC vs ADC mission. Existing weather? It was clear, with visibility over 15 miles, temperature *43*, dew point *41*, winds *calm* and forecast to remain so throughout the mission. Even Mal Function would have realized the danger of rapid fog formation. At the completion of the mission the F-102s returned to base and began a penetration. Upon reaching 5000 feet the pilots heard the recovery director instruct all mission aircraft to recover at the briefed alternates. The flight of two '102s went to tower channel and requested weather and a GCA since fuel state would not permit recovery at the alternate. The sky was now obscured and visibility 1¼ miles. The outcome of the flight was that one '102 landed long, wiped out the left main gear and ran off the runway. The second '102 pilot *(weather now WOXOF)* struck some trees on the first GCA approach, pulled up and began a second GCA with 400 pounds of fuel remaining. He then touched down 2500 feet down the active, ran off the runway at 3000 feet and back onto the runway at the 5800 foot mark. A live pilot, but a damaged aircraft. Hairy? You know it! The big question is, why the delay in instructing the pilots to recover at the alternate?

It is ridiculous that in our time of rapid communications, world-wide coverage and pilot-to-forecaster service that accidents of this nature continue to occur. The intent of the writer is not to cast the eight ball to any individual or organization but rather to point out that all the facilities are present at each base operations to forewarn inbound or local flights of existing or approaching hazards to flight.

The newly published AFR 55-48 *(which replaces AFR 20-47)* clearly directs that the operations officer will: "Notify all personnel concerned of the existence or probability of severe weather, high winds or other phenomena which will affect air base facilities or the safety of aircraft in flight or on the ground, when advised by the weather forecaster or observer on duty or by the control tower operator. A procedure for notifying pilots of aircraft departing, arriving, or flying locally, who can be reached through communications facilities available to base, will be included."

This advisory service is recognized as a need by AFR 55-48. But commands must meet the old problem of additional manpower necessary to provide the flight monitoring and advisory service the reg requires.

As a solution, AFA 55-48 now directs the operations officer to afford the desired service only during IFR conditions. In part, AFR 55-48 requires the base operations officer to "provide terminal monitor and advisory services to inbound aircraft during instrument conditions when weather conditions are below established minimums, provide assistance to pilots of inbound aircraft before penetration, including information concerning alternate airfields and the safe recovery of inbound flights."

The regulation emphasizes instrument conditions, but this does not mean that weather trends can be disregarded until the time the field is below minimums. On the contrary, it is the period when the weather is going below *VFR* minimums and the probability is increasing that the field *may* go below IFR minimums that the greatest care and vigilance must be exercised. This is the dangerous time, the time when the accidents occur. Operations officers should therefore closely monitor weather conditions during this period so as to note lowering weather trends and thus be able to divert inbound aircraft prior to the time they depart cruising altitude.

We *can* and *must* prevent thrusting a dilemma upon the pilot which places him in such compromising circumstances that he begins to function with all the speed, grace, and poise of a three-legged centipede. Rather, let us be our brother's keeper and lend all assistance possible to our flying mates aloft. ▲

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WØX
W1X
W2X
-X

Meeting of Minds

Maj. Clarence P. Talbot, Jr., Det 4, 9th Weather Gp., Dover AFB, Delaware

"Don't any of you guys ever look outside?" It wasn't so much a question as an indictment. Still, it had the desired result. From every corner of the weather station people stumbled over themselves in an attempt to get to the source of this blasphemy before further damage could be done. The first to reach the scene was the duty forecaster, but only because he was nearest. The duty observer and the Weather Detachment Commander came in a close second and third, respectively.

The source of this excitement was a bristling pilot who looked as though he was ready and willing to take on the whole bunch, singly or en masse. Since he also sported a set of gold leaves, the remainder of the weather personnel deferred to their commander.

"What seems to be the trouble?" The gentle voice, thought the Detachment Commander, turneth away wrath. Unfortunately, it doesn't always work.

"That," said the irate pilot, pointing an accusing finger in the general direction of the "current weather" display. "That blankety blank thing says that you have a 2000-foot ceiling. Am I right or am I wrong?"

The Detco peered over his bifocals toward the display. Sure enough, there was the offending phrase. "M20+" (measured 2000-foot ceiling), it read. He was forced to admit that the pilot was right.

"And just five minutes ago I came across the field at 600 feet and I could barely see the runway," the pilot continued. "What do you think of that?"

Aside from the fact that this episode was spoiling his entire day, the Detco didn't think much of it at all. He moved a little closer to the weather display in order to read it more clearly. Suddenly he saw something he had missed at first.

"See this?" Now it was the Detco who was pointing a finger. His, however, was pointing toward a specific item, rather than at the board as a whole. The item he had zeroed in on was "−X" which came right before the M20.

"Know what this means?"

"Certainly," snapped the pilot, who prided himself in remaining current with all aspects of flying. "That is thin obscuration. But let me tell you that there was nothing thin—."

"Whoa, whoa!" This time it was the Detco who was bristling. One thing he couldn't stand was any misinterpretation of the elements.

"Hold on just a moment. Obscuration it is. Thin it isn't. Although that little minus sign generally means thin when it is in the cloud column, that isn't always the case."

The pilot felt his case slipping ever so slightly but he wasn't going to be talked out of anything. Everyone knows how these weather types can talk.

"So?"

"In this case the minus means 'partial,' and—."

"Ah, ha!" The pilot would plug this loophole before it developed. "Don't try to tell me that less than one half of the sky was obscured. It's real bleak up there and it covers most of the sky."

Confident that he had nailed tight the last possible avenue to escape, the pilot settled back to watch the Detco become evasive. He was doomed to disappointment.

"A partial obscuration," said the Detco from memory, "is a term used to denote that one-tenth or more of the sky, but not all the sky, is hidden by surface-based obscuring phenomena. This means that nine-tenths of the sky can be obscured and it is still called partial."

The pilot would have liked to challenge this but the Detco was speaking with the confidence born of a sure thing. Besides, he was fondling his Circular N, the WBAN *(Weather Bureau, Air Force-Navy)* Manual of Surface Observations. One thing the pilot had learned was never to bet against another when it was his game. Still, he wasn't going to give up without a struggle.

"If more than half the sky was covered, how come

Whether the discussion concerns football or weather, understanding and agreement can be reached only if everyone concerned knows the signals. If the pilot can't read the weather sequence, he and the forecaster are doomed to spats and chats.

there wasn't a ceiling height on the low stuff?"

"Change number—," here the Detco flipped through the pages of Circular N until he found the right passage, "change number five states that heights are not prefixed to symbols 'O' or '—X.'"

"I suppose it's legal but it still isn't right." Lawyers, all the time lawyers, thought the pilot. "How's a guy supposed to know what to expect if he doesn't get anything more than a thin—I mean a partial obscuration symbol to go on?"

"Well, you might start by getting some respect for that little symbol. You aren't the only one to confuse its meaning, but then this fact won't help you when you try to let down into some obscuration. Then, too, you might try twisting that do-dad in the cockpit and speaking some words into channel 13."

The pilot felt a little guilty about this so he quickly diverted the conversation into another vein.

"If the obscuration always extends from the surface upward, how can its base be any height but zero?" Here he had the Detco trapped. If he tried to say that it couldn't be anything but zero he was dead, for his own station had carried W2X earlier in the day.

"You are right, technically," Detco answered. "The base of the obscuration is always zero; however, there can be a height figure given. In fact, if it is a total obscuration, there must be a height figure given, even if it is only zero. But, the height figure given does not refer to the base of the obscuration, which we know is always zero, but to the vertical visibility up into the clouds, drizzle, snow or whatever the obscuration may be. For example, the symbols W2X *(indefinite ceiling 200 feet obscured)* would indicate that the observer had clocked his balloon up into the obscuration for a time equal to an altitude of 150 to 249 feet. He could see that far up at that point at that time. Similarly, if the symbols read W1X, they would indicate that the observer could see his balloon until it disappeared somewhere between 50 and 149 feet. If the sequence read WϕX, then the observer couldn't see very far up beyond his own nose. In 50 feet or less, that balloon disappears into the obscuration in a hurry. But no matter what the height figure given, the symbol W, meaning 'indefinite ceiling,' should alert the pilot to the possibility that the ceiling may not be as good as reported because of up and down *(slant range)* visibility differences. You can see farther and better up into the obscuration than you can see down."

Irate Pilot knew he had been bested. The Detco spoke with the assurance of a professional operating on his home ground. So why fight it? Perhaps a few more morsels of information could be picked up on this subject.

"Now, Major, to go back to the original "—X" with which we began this discussion," the Detco continued, "let me give you a rule of thumb. If you see a plain "X" for obscuration on the sequence, you'll know that any flying will be done IFR. But, if the "X" is preceded by a dash (—), then you know, as we discovered that there is only a partial obscuration, and you might take off and be under blue sky by the time the wheels come up."

The Detco paused for breath. These impromptu lectures took a lot of wind. Hmmmm, must be getting out of shape. He turned a page of his Circular N. Irate Pilot cast a glance toward the door.

"One last point, Major, and I'll step down from the podium. There may be a partial obscuration and a ceiling over that. Your symbol then might read '—X2+,' indicating a 200-foot ceiling topping the obscuration. Okay, my dissertation is over. I'll flip you for a cup of coffee."

This was a mistake, for this happened to be the pilot's game, as he quickly proved by winning both a cup of coffee and two doughnuts as well.

"Well, you can't win 'em all," the Detco was heard to mutter as they ambled toward the coffee shop. ▲

VFR, GCA, TPT, EGT, IFR, RPM, HFT— ***HFT?*** *You've heard of the abbreviations many times. You may hear HFT a good bit more. It stands for . . .*

HFT

Human Factors Team

The term "Human Factors Team" should be defined in order that a common kicking off spot may be established. The word "team" is simple enough: two or more persons banded together with a common purpose. The "human factors" part, however, defies a pat, black and white, hard and fast definition. We know that it is impossible to take the human factors out of everyday life. Think for a minute. What do you do, come into contact with, what do you eat or where do you sleep that doesn't involve a human factor in some way, shape or form?

In flying, human factors mean the difference between life and death, a busted airplane or one intact. Why, for instance, can you fly a GCA some days without a hitch? Everything goes right. On azimuth, on glide path, you break out at 200 feet and there is the runway right ahead of you? Then, the next week you can't bust 1000 feet and 3 miles? You wander back and forth across the glide path like a drunken driver. You can't find a power setting that holds your rate of descent steady. Finally, you either slop your way out of the weather or take a waveoff. Why? You can't have lost your touch in a mere seven days. Maybe you had a knock-down-drag-out with your wife that morning? Maybe you stayed at the party too late? Did the kids keep you awake half the night? Worried about your next physical exam or instrument check? More bills than money? These are human factors as applied to driving an airplane. They can be as fatal as a low altitude flameout with your pins still in the seat.

Upper right, each newly arrived student is invited to an informal get-together at the Chaplain's home. Lower left, members of Reese's HFT discuss the locally devised survival kit.

Not too long ago an F-102, with pilot aboard, crashed out of control in the Utah desert after having completed an air-to-air rocketry firing mission. On the way back

Lower left, Chaplain Stowers explains the preflight of the T-34 to student officers' wives. Upper left, flight surgeon does some hangar flying with student pilots at a flight-line snack bar. Physiological training detachment personnel spotcheck the oxygen system of a T-33.

to home base, the wingman tried to stay with the flight leader during some acrobatic maneuvers for which they had not been briefed and were not authorized to perform. The wingman last saw the flight leader as he disappeared into some clouds in a tight climbing turn. The accident board found the primary cause of the accident to be that the pilot allowed himself to enter a maneuver from which he could not recover during unauthorized acrobatics. Testimony showed that the pilot was normally a steady going individual and an excellent pilot but that recently he was irritable. Why? Perhaps three weeks of lonesome TDY, a "trouble" letter recently received from his family, and a chewing out for incorrect starting procedures of a TF-102 had something to do with it. Were these irritations enough to make him get into a situation that ordinarly he would have avoided?

Then there's the fatal accident involving an F-84 driver who crashed into a residential area on the West Coast during a penetration and low approach. The pilot and his wife had been separated for over a year. They had arranged to meet and he was on his way when he crashed. Whether this was to be a reconciliation or a pre-divorce meeting has not been established. Because of total destruction of the airplane the accident board found the cause could not be determined. The most probable causes were spatial disorientation, instrument failure, or materiel failure of the airframe or flight controls. But I wonder, could the pilot have been thinking about his wife waiting for him at the gate to Base Operations, their meeting, their troubles, the children? During this lapse of concentration could he have gotten into a position from which there was no return?

Back in June of 1958 Major Willis T. Stowers, chaplain of the 3500th Pilot Training Wing, Reese AFB, Texas, had been kicking around an idea of recognizing and eliminating an accident potential *before* the accident happened. In the first stages of organization a team called the Early Identification Group was formed. Besides the wing chaplain, the team consisted of the flight surgeon, the physiological training officer and the personal equipment officer.

In the August 1958 issue of the *Flying Safety Magazine* there was an article by Robert H. Shaw, Directorate of Flight and Missile Safety Research, entitled "If I Were The FSO" in which Mr. Shaw recommended the formation of a Human Factors Team. Since Chaplain Stower's ideas were right in line with those in the article, a visit to the "head shed of flight safety" seemed appropriate. The Wing Flying Safety Officer, Major Fred Shriner, was wholeheartedly behind the plan and arranged for the group to spend three days at the Directorate of Flight and Missile Safety Research.

The group received such encouragement that upon their return to Reese AFB they renamed themselves The Human Factors Team and proceeded to get official sanction from the boss, Colonel D. Ross Ellis. The team not only received official sanction but 100 per cent backing by the wing commander, his staff, and his group and squadron commanders. (A word here about support from the boss man. After reading this article, if you are encouraged or enthusiastic to form a Human Factors Team, be *sure* you have the complete, unadulterated cooperation and support of your commander *before you start.* If you do, you've got it made. If you don't, you're beat, so save your time and spend it where you can do more good.) Air Training Command Headquarters was consulted on the idea of an HFT. They liked it and gave the go-ahead. In fact, Chaplain Stowers was given an additional chaplain to insure that he would have the time to give the plan his full support.

How does the team operate, what does it do, how does it get action? Remember the original name? Early Identification. Basically that is still the main theme: locate a trouble source and eliminate it before the fact—not after. Right from the beginning the instructor pilots were brought into the picture. They are in a good position to first detect a slump in the student's flying or mental attitude. If for no apparent reason, a fine-type student pilot busts a couple of rides in a row, he is referred to one of the team members for help.

Take the case of the cadet whose previously good fly-

ing started going below acceptable standards. In talking with the boy, Chaplain Stowers learned that there was good reason for a poor mental attitude and the resulting sloppy flying. The cadet had started receiving doctor bills for the pre-natal care of a young lady with whom he had been keeping company at his former station. The bills, plus a few well-chosen words from the young lady's father on marital responsibilities, legal action, child care, etc., had the young troop "shook." With the chaplain's help the situation was properly resolved and within a few days the cadet went back to flying with his original eagerness and ability. This could well have been a deteriorating situation which might have ended in a fatal accident or a broken airplane.

In another case, similar symptoms showed up in a cadet who had been an excellent student: poor rides, lack of interest and a definite change in personality. Again, Chaplain Stowers was called. The chaplain found that somewhere along the line this cadet had strayed and overnight had become a husband. In so doing he had made himself an "illegal cadet." *(It is still required that cadets be unmarried and remain so until they are commissioned.)* This wasn't too bad until the bride announced, via letter, that she was pregnant and had every intention of joining her husband. The cadet naturally envisioned being thrown out of the Air Force with a wife, a baby, and no groceries. A pretty fair set of reasons for worry. Was this cadet an accident looking for a place to happen?

There were rumors going around that more than a few of the student officers' wives were pretty dissatisfied with the lack of attention by their husbands. After a full day's schedule at the base some of the student officers didn't care too much about staying out until midnight and then having to get up at 4:30 or 5:00 in the morning to start all over. Some of the less adept were spending their evenings studying to keep their academic grades up to snuff. Whatever the reasons, it was true that the wives were not contributing to a quiet and peaceful home life. The Human Factors Team reasoned that if the wives had a glimpse of some of the rigors of their husbands' schedules they might take a more reasonable attitude. So an indoctrination flight was arranged for the wife of each student officer. They flew in the T-34 belonging to Reese's local flying club. The wives went through a complete preflight in the hot Texas sun. Then came the flight itself, which included considerable acrobatics. A rundown of what their husbands went through daily, plus the flight, gave the wives a new insight. Result? The pressure came off at home.

During a regular biweekly meeting of the team the subject of hypoxia was taken up. Several recent local hypoxia incidents were discussed at length. As a result of the meeting came this recommendation to the wing commander: All personnel flying jet aircraft at Reese should be given a written examination on hypoxia, oxygen equipment, and escape procedures. The "boss" bought the recommendation and it was done. Remember the old adage "A stitch in time saves nine"? Who knows! Later the team recommended that any student pilot failing the written portion of the physiological training test be grounded until a re-examination was passed satisfactorily. This recommendation was placed in effect by the Pilot Training Group.

Personal equipment technicians examine the automatic timer.

Even the subject of the student snack bars came into consideration by the team. Both Pilot Training Squadrons had real fine snack bars. They were operated by the squadrons on a nonprofit basis *(real ham sandwich —10c)* and manned by the cadets on a rotating schedule. There was a threat that the snack bars might have to cease operation since they were not being staffed by regular food handlers observing proper sanitation standards. The Team went to work, headed by the flight surgeon, and in a short time all lower class students had been issued food handling certificates. Sanitary standards had been met and the base veterinarian included the snack bars in his periodic inspections. Result: the snack bars are open, serving good food at a reasonable price in a clean, attractive atmosphere.

Right now the latest team project is developing and testing a survival kit for the T-33. For their central Texas location they have come up with these minimum components:

- Snake bite kit.
- Multi-purpose knife
- Compass
- Insect repellent
- Pocket cable saw
- Waterproof matches and container
- All purpose sewing kit
- Chapstick
- Halazone pills

Two proposals for carrying the kit are under consideration. One, a pocket sewn on the side of the standard flying boot; the other, a light vest similar to the one used for carrying shotgun shells.

Space doesn't permit us to go into detail about the many other ideas and problems that Reese's Human Factors Team has considered or the actions that have been taken as a result of their recommendations. The team members themselves frankly admit they have only scratched the surface. They feel that when the true value of the Human Factors Team is realized, it will become a most important cog in the commander's machine.

You can have a "jumpin' up 'n down" HFT at your base if you follow these simple instructions:

- Get the commander behind you 100 per cent (or go out and get a commander that will support the effort).
- Find a chaplain, a flight surgeon, a personal equipment officer and a physiological training officer who are interested enough to *make* it work.
- Advertise it.
- Get people to believe in the effort.
- Have the team work closely with the flying safety officer.
- Be painstaking in the effort to find a solution to each problem. ▲

Tips for T-Bird Drivers

Maj. Wallace W. Dawson, Fighter Branch, DFMSR

Sometimes you can't help but pity the poor T-Bird for some of the things people do to *it*. Of course, by doing things to it, they often hurt themselves too, some of them for the last time. The real tragedy about it all is the fact that the things they do to the T-Bird have all been done before, publicized and warned against.

It's a lead pipe cinch that the guy who forgot to fasten the gunbay doors before takeoff, knew better. Even if he didn't know better, the condensed checklist which he is supposed to be using, tells him to fasten the doors. In fact, it tells him this on page 1, and it's even underlined.

It is also a cinch that the five pilots involved in the porpoises, hard landings, short landings and loss of control on landing roll recently all knew *how* and *where* to land the airplane.

Also, the four IPs who flew their aircraft into another one on a bright, clear day, or who allowed their students to go too far, knew better. They had to or they wouldn't have been IPs.

Think of how surprised the airplane must have been the day when the four pilots induced flameouts by forgetting to turn on fuel switches.

I'll bet the airplane was pretty disgusted too with the two guys who just plain sat there, and flew and flew until there was no fuel left.

One student pilot even fell out of a lazy eight and somehow managed to talk the bird into spinning. *(This ain't easy.)*

Another pilot let a bump in the runway convince him that he was truly airborne, so he sucked up the gear and staggered back in—on his stomach.

One guy lost an argument with a thunderstorm—after being told for years that when he got to the hairy stage he's better leave 'em alone.

Another pilot proved AGAIN that a T-33 is not the best tool to use if you want to move approach lights.

How much has been written on jet wash, wingtip vortices, turbulence behind a big airplane, or call it what you may? Yet one pilot contrived to maneuver his T-33 behind a B-57 in the pattern, snapped, and spun in.

One pilot lost control of the airplane when a tip wouldn't feed.

These people all knew better; they had been on flights before and had had no trouble, so why? Needed experience? In one case, definitely. Carelessness? Definitely —in more than one case. Overconfidence? You can say that again, in more than just one case. Complacency? You bet. After all, the T-Bird is only a trainer. . . (!)

So, where do we go from here? There sure wasn't much originality about any of these goofs; they had all been committed before, and in spades too. So, where *do* we go from here? Why *did* the guy forget to fasten the gunbay door? Why did those five people get into landing troubles?

Not having the answers to these questions we have to make as good a "guesstimation" as possible in an attempt to keep it from happening again. Maybe we should all conduct a personal operations safety survey. Maybe we should go back and read this article again and review these goofs individually, asking ourselves all the while, if it's true that, "There But For The Grace of God Go I?"

Maybe we should review in our own minds the last trip we made. Did the fuel actually come out pretty close to the plan? Were all the preflights good and thorough? Were we always plenty ahead of the weather? The airplane? Was crew rest really adequate? Did we eat plenty of the right food? Go easy on the smoking and drinking? In other words, was it as safe a flight as possible? Was there any time when the old GI neck was stuck out unnecessarily? If the answer to any of these questions is wrong, then it could be true that, "There But For The————." ▲

Does Light Rain Influence Pilot Judgment?

Jack Nendell, Research Analyst, Operations Analysis Branch, DFMSR

The effect of light rain on inflight visibility—and its relation to accidents—is a subject that has not been explored. Recent major accident reports were hand screened to see if light rain conditions existed and were not considered as a cause factor in the accident. Pilots who might possibly have information on the subject were contacted on an informal basis in an attempt to collect firsthand data. Approximately one-half of the pilots responded with information. Data submitted had little support for a theory that light rain might be a factor seriously affecting visibility and consequently resulting in faulty pilot judgment. This response might indicate a general lack of respect, knowledge or recognition of a weather condition which is a hostile factor in pilot judgment. This lack of respect, knowledge or recognition could be as serious as the other extreme—apprehension causing tension in the pilot confronted with bringing himself, his crew, and his aircraft safely home. With a light rain condition, the pilot is confronted with the problem, particularly in landing, of searching an area visible through a somewhat distorted windshield in order to detect and recognize distinguishable landmarks. Searching under adverse conditions takes time, which is at a premium in high speed jet aircraft. The reduced and distorted visibility is a problem which must be recognized. Heavy rainshowers during flight are recognized and accepted as a hazard, whereas light rain is possibly slighted, overlooked, or not recognized as a phenomenon to be reckoned with. The condition of light rain affects the pilot's decision time, his reaction time, his search procedures, his visual cues for detection, the adaption of his eyes to the situation, his attentiveness, and his ability and skill in performing necessary operations. Light rain causes minor windshield distortion, which might lead to minor pilot deficiencies, ending in an accident.

Examples of accidents where light rain was present and not considered as a cause factor are as follows: A T-33 pilot with very little solo time attempted six landings, porpoising on each attempt, and finally collapsed the nose gear on the last effort. The six attempts were all alike; on each one the pilot racked the aircraft around on a close-in pattern because of the deteriorating weather. The weather was reported as three miles visibility in light rain. The cause factor was listed as pilot error. Several different instructor pilots flight checked the pilot after the accident and all rated him above average in flying ability. Information received after the investigation confirmed suspicions that the light rain on the windshield ". . . did assuredly affect the pilot's judgment and was a contributing factor in the resulting accident. A T-33 which had landed only a few minutes prior to the accident reported a reduction of approximately 70 per cent of forward visibility through the windscreen. The aircraft was successfully landed by the pilot while looking out one side of the canopy. The runway appeared extremely distorted through the windscreen, thus accurate depth perception became a real problem."

A B-66 pilot allowed his aircraft to touch down too hot and long on a 9000-foot runway. The drag chute failed and the aircraft received substantial damage when it went off the end of the runway. The reported visibility was two miles in light rain. Pilot factor was listed as the cause of the accident due to improper braking technique. The accident pilot subsequently reported that the light rain had had no effect on his forward visibility and that any effect of the light rain on his judgment was unknown.

An F-89 pilot aborted takeoff due to poor cockpit visibility. The aircraft was destroyed when it went over the end of the overrun. The pilot received a major back injury. Operator error—use of improper procedures and techniques to effect a safe stop—was listed as the cause of the accident. The weather at the time of the accident was 1½ miles visibility with light rain. Recognition of light rain as a possible basic accident cause factor is pertinent.

The adequacy of rain removal systems on various types of Air Force aircraft is a point of interest. Selected pilots were asked to comment on the effectiveness of rain removal equipment and the preferred location for the control of a rain removal device. Response to this question was discouraging. Most F-100 pilots stated that they considered the rain removal system inadequate. One pilot reported: "The system readily removes very light rain which causes little or no hazard to pilots. In the event that rain is heavy enough to obscure the windshield and canopy, the rain removal system is not capable of clearing sufficient moisture to prevent reduced forward visibility or distortion. In addition, high power settings are necessary for proper operation of this system; thus, during the critical touchdown portion of a landing, little clearing is provided. Furthermore, the rain removal switch should be located in the left part of the cockpit so that it would not be necessary to shift hands on the control stick to activate the switch."

The only comment received on the B-66 was, "In comparison to other systems developed for rain removal, the B-66 system is very good and highly effective."

A review was made of Unsatisfactory Reports, and none could be found where an operating rain removal system was thought to be inadequate. If command action is necessary to improve or provide rain removal

equipment on Air Force equipment, then positive information, such as contained in URs and hazard reports, is a prerequisite.

In conclusion, light rain—especially when coupled with dawn, dusk, or night conditions—could affect a pilot's visibility and therefore affect his judgment. It is difficult to determine the degree of seriousness of the problem, but it should be recognized as an area of accident potential to which insufficient attention is paid. Awareness of the possibility that light rain could be a basic accident cause factor should help contribute to accident prevention. Any additional information on this subject will be welcome. Send it to the Editor, FLYING SAFETY Magazine. ▲

★ ★ ★

O-BENTO

Colonel Robert F. Hemphill, 1001st Operations Group, Andrews AFB, Md.

One wintry day last year I took a look at the forbidding crags and defiles of the Japanese Alps from a sharply silent, flamed-out T-33 and really got that survival religion. I decided then, as the moment of truth inexorably approached, that I'd never be caught without the proper survival gear again—if I got away with it this time. With a relatively small amount of effort and foresight, I could have been ready for the long walk home.

Fortunately, the walk was a short one, away from a convenient rice paddy where the bits and pieces of the dead bird lay. But the brush with a bailout made me ask myself: "You weren't ready for that emergency, were you!" I got busy. Having learned that it could happen to me, too, I got hard-headed about parachute fit, life vest condition, canopy release and ejection systems of the aircraft I was to fly. And I got serious about the proper flying clothing to be worn on each mission.

Then I rounded up a compass, lighter, knife, wrench, small flashlight, sun glasses, and an o-bento box and began carrying them in the pockets of my flight clothing. The o-bento box is the Japanese equivalent of our lunch pail. It is made of light metal with a closely fitting top and measures 5½ by 3½ by 1½ inches. It readily accommodates halazone, antibiotic, and stimulant tablets as well as fishing line, leaders and hooks, safety pins, razor blades, adhesive bandages—you name it and you can pack it. There is nothing standardized about the contents. My o-bento includes the things I want if I'm down in the tall timber. Your selection might be different, depending on the type terrain you fly over.

When fully packed, my o-bento weighs about half a pound and fits neatly into the bottom leg pocket of my flying suit. I have reinforced the pocket so bailout won't rip it open. The o-bento can be waterproofed by wrapping it with tape. One addition I'm going to make to my gear is a cigarette-pack sized transistor radio. Then if I do go down I can settle into my parachute canopy sack, well fed with wild roots, berries, and planked trout, and soothe myself to sleep with music. I'll just vacation until the pluck-and-luck boys of Air Rescue retrieve old watakushi. ▲

Unguided Missile

I hope that the May issue of FLYING SAFETY has been read by those who form IFR control policies. The article on the IFF installation in the T-33 and the short story about the lieutenant's unfortunate effort to depart in his F-100 are faulty only in their modest understatement of circumstances all too common.

One definite safety hazard created by surprising, novel and cryptically worded climbout instructions was not treated in the F-100 story. This hazard begins with a current thesis that VFR departures should be discouraged. Consider the pilot who files IFR out of a crowded area and who must climb perhaps 20,000 feet in VFR conditions before reaching the haven of a high overcast. He becomes an unguided missile during any part of this climb that must be spent locating newly assigned check points and fussing with radio controls. If IFR departures continue to be the challenging chore that they so often have been, the VFR climbout seems the safest course whenever it is feasible.

Maj. Harley E. Barnhart
C&SS, Maxwell AFB, Ala.

★ ★ ★

Autopilot Calisthenics

The story entitled "A Slight Change in Plan," (FLYING SAFETY, May 1959) certainly pointed out a major hazard often encountered when flying single place jet aircraft. However, it could have had a very different ending, such as, "Then the lieutenant engaged his autopilot and began to figure out his new flight plan."

For a long time the parts for the F-100 autopilot and auto LABS system were in very short supply, and as a result, the operational autopilot was the exception rather than the rule. Now, the situation is much improved.

The biggest problem is getting the fighter jocks to exercise the autopilot on each flight and to write up any discrepancies. We now require the flight leaders to open up the formation at some time during the flight, if possible, to give each pilot an opportunity to exercise the autopilot. At the end of each flight, the pilot is required to enter on the Form 781A a statement that he did or did not exercise the autopilot, together with any discrepancies noted.

Colonel W. L. Curry
Hq 474th Tac Ftr Wg
Cannon AFB, New Mexico

★ ★ ★

Chip Detector Light

A few months ago I had an experience in a helicopter which, fortunately, did not result in serious consequences. The circumstances leading up to this incident, however, are worth mentioning.

At the time of this incident I was on a mission in an H-21B helicopter when engine trouble necessitated an emergency landing. Because of a simple little device on the panel called a "chip detector light," I received advance warning and had time to pick out a suitable area and made the landing with power. This device consisted of a circuit from the engine magnetic sump plugs to a warning light on the instrument panel. When a particle of metal settled on the magnetic sump plugs it closed the circuit, causing the warning light to come on. Since this incident happened, however, the "chip detector lights" have been removed from our helicopters because, as I understand it, AMC has not run field tests to determine their worthiness.

Our squadron has four helicopters and during the period from December 1957 to May 1959, we experienced four engine failures. By the greatest good fortune, only one resulted in damage to the helicopter, but I just wonder how long Dame Fortune is going to keep smiling on us? If there is some means of being forewarned of a failing engine—and I'm convinced of the merits of this "chip detector light"—then, why not use it?

1st Lt. Orbie G. Robertson
5040th Ops Sq, APO 942, Seattle.

Latest info we have is that the Middletown Air Materiel Area Modification Review Board has approved proposals for installing a magnetic chip detector light in both the H-19 and H-21 helicopters. Hope this answers your query, we'd like to hear about the 5040th's experience with the detectors when you get them.

CROSSFEED

LETTERS TO THE EDITOR

Mixed Up '781s

In the April issue you had a "Rex Special" which dealt with the problem of mixed up '781s. We in Army Aviation have the same problem of misplaced '781s, or placing the form in the wrong aircraft.

We think that we have the solution in my H-13 platoon. We require all pilots and crew chiefs to "sign out" the '781 prior to flight or performing maintenance. At the same time the pilots are briefed and pick up other needed equipment. This does the job for us. I think the idea is worth passing to others.

WO-W1 Ervin E. Rhodes, US Army
82d Aviation Co, 82d Aviation Div
Fort Bragg, North Carolina

★ ★ ★

FLIP Changes

You may wish to mention a new leaflet describing changes in the FLIP Planning Publication. Its purpose is to alert field activities of the new FLIP Planning Chart Low Altitude, U. S. Distribution has already been made, and in all probability the chart is now in use throughout the field.

Here is some background information and future plans which may be of interest. The scale is 1:1,824,000. The three charts (covering the United States) when fitted together provide a wall chart 6 feet by 9 feet. The information shown is that which is required for preliminary flight planning, including all LF/MF and VOR airways, except that only the direct route radials are shown for the Victor airways. It depicts all operational navigational aids, all active aerodromes with military landing rights, and hard surface runways at least 3000 feet long, airspace reservations, ADIZ boundaries and a pictorial index of the FLIP Enroute Low Altitude Charts. Basis of distribution is one copy to each base operations office, with one copy to other offices performing flight clearance functions or flight briefing activities. It is scheduled for re-issuance once every three months.

Lt. Col. Ross J. Foster
Director of Operations, ACIC

Contributions from Hq ACIC are always welcome. The most recent was an article entitled "More Chart Chatter" (March 1959).

★ ★ ★

More Chart Chatter

This refers to an article, titled as above, published in the March 1959 issue of *FLYING SAFETY Magazine.*

You may think me renitent, recalcitrant, or just plain stubborn, but it's going to take a magnitudinous amount of real sound selling for the powers that be to convince me that the bundle of papers with the fancy new titles is really the ultimate system for directing the pilot from point A to point B.

Personally, I hate unconstructive criticism and I am most certain that the troops who fathered these new documents are sincere, diligent and nice but...

The Flight Planning Document, as I understand it, was designed to provide data for flight planning in an established base operations. It is not needed in the cockpit, quote, "at least for those single piloted aircraft not having ample space for day-bed and board" unquote.

Just how many single pilot aircraft types does it take to dictate flight needs of us "you call we haul" drivers? This is a pretty poor planning factor and it is a real mistake to think that any transport can operate long without some of the basic material contained in that document.

Further, where do you obtain the information at non-Air Force bases if it's not carried along in the old "black bag"? MATS has taken this problem by the horns and obtained us MATS types the right to an Airborne Manual and I hope that everyone else realizes the need and screams loud and long.

Let's romance a bit about this Flight Information Publication, Enroute Low Altitude and the attendant Low Altitude Arrival Charts. Being a C-124 driver on the West Coast, it has been my biased opinion that Travis AFB (as the primary Pacific departure/arrival point) is a pretty doggone important terminal. Well, now, while reviewing these new charts in the comfort of my well-upholstered swivel chair, at my desk with fluorescent light, I whipped out the San Francisco Area Arrival Chart and prepared to look things over. Somehow I kept running out of paper a bit north of Benicia Intersection. No Travis. This did not make my already suspicious mind restive, but being basically nice, I refolded the chart in accordance with your directions and pulled out Chart No. 1. *Travis was found.* Now the primary holding fix is *Fairfield Intersection* and being familiar with the area, that *little green triangle* superimposed on the *little green airway* indicating the *fix* was finally found (red lights, schmed lights). Mileage from Travis Range four (4) miles (20-15 vision) *Travis TVOR?* Travis *TVOR*, not there in *green, blue, gray* or *black.*

Let me assure you that trying to *locate fixes* is no easier in a *dark* cockpit. I am not going into all the details, but by the time my last night flight was completed, that piece of paper looked like a week-old

San Francisco Chronicle and my flashlight was just about burned out. (No near-miss this time.)

I wish that everyone would take a few minutes and compare the Jeppeson Manual coverage of the same locale. The San Francisco Area Approach Chart is printed in nice big letters. Travis is *included* with all its facilities and every fix, mileage, etc., on the chart stands out like a batch of sore thumbs. I hate to be disloyal, but they have beat us badly, coming and going.

We all know that in addition to the USAF/Navy publication the Coast and Geodetic Survey publishes flight data charts and very, very similar charts they are to ours. I don't know why they do, but they do and they do a good job!

Here's my point. Granted the Jeppeson type depiction may be expensive, but it's better than what we have used or propose to use. That's the important thing, especially now, when we all know how foolhardy it is to glue your eyeballs to a piece of paper on the inside of the cockpit, searching for a little green triangle on a little green airway, especially in terminal areas.

So, why doesn't someone upstairs combine the efforts of the Air Force, the Navy, and the Coast and Geodetic Survey, eliminate all this duplication for similar products, and publish some enroute and terminal data worthy of the name?

Capt. Jack H. Wrinkle
Hq WESTAF, Travis AFB, Calif.

Facilities Branch, DFMSR, says: "Most of his points are well taken and we agree with them. However, it is hoped that his squawks were also given to the MATS Project Officer for the Operational Evaluation of the FLIPs, which was conducted and presented to the Aeronautical Chart and Information Center, 26 through 28 May 1959. The evaluation was for the purpose of obtaining pilots' ideas for the improvement of ACIC products. Constructive criticism, you know.

"Reference to the terminal plate will often save much searching for fixes near the destination. In the example given, all the information he was after could be found on the Instrument Approach Procedure (Terminal Plate) for Travis."

Thanks, Captain, for a very interesting letter.

★ ★ ★

Altimeter Error

Several pilots have misread their altimeters by 10,000 feet while attempting instrument approaches at Patterson Field. Perhaps it is happening elsewhere, too! The error is more apt to occur in jets where rapid changes in altitude are experienced during penetration.

A simple check that might prevent this embarrassment and perhaps avert an accident is to check the cabin altimeter (it's easy to interpret) while on the downwind or other low point in the approach prior to final. If you're in a T-Bird (they are the more frequent offenders), your cabin altitude will be pretty close to the actual altitude. Open the cabin pressure dump if there is still doubt. Of course, don't try to fly the cabin altimeter. Use it only as a crosscheck.

Capt. Elro M. Swindle, USAF
Flight Test Engineer
Directorate of Flight and
All-Weather Testing, WADC

Survival

In the February 1959 issue you published an article entitled "Horror in Hell's Canyou," which raised many eyebrows among the troops here. At one time ours was a C-119 equipped squadron and had made many logistics flights covering most of the United States and, on occasion, had flown into Canada and Alaska.

After reading the article, I dialed Fort Bragg, which is adjacent to Pope AFB, hoping to get in touch with the "Little Army Corporal" mentioned in the story, who had been receiving local admiration through Army releases. I had an interesting conversation with him and gave him a copy of the article, after which he agreed to conduct an informal lecture on his adventure with death versus survival.

We accepted his information enthusiastically and were surprised to learn that the men in the survival party had made no reference to the survival booklet attached to each chute. Obviously, none was aware of its location. The "Little Corporal" believes that with the aid of this booklet and a small tobacco tin filled with some simple survival tools and concentrated food, all five men in the party would have survived.

1st Lt. Harry R. Beard
778th Troop Carrier Sq (A)
Pope AFB, North Carolina

See Col. Hemphill's article "O-bento" on page 27. *The men who went down in Hell's Canyon had on light summer flying clothing and did not have a survival kit among them. Winter is with us; dress for the climate and terrain you will be flying over.*

★ ★ ★

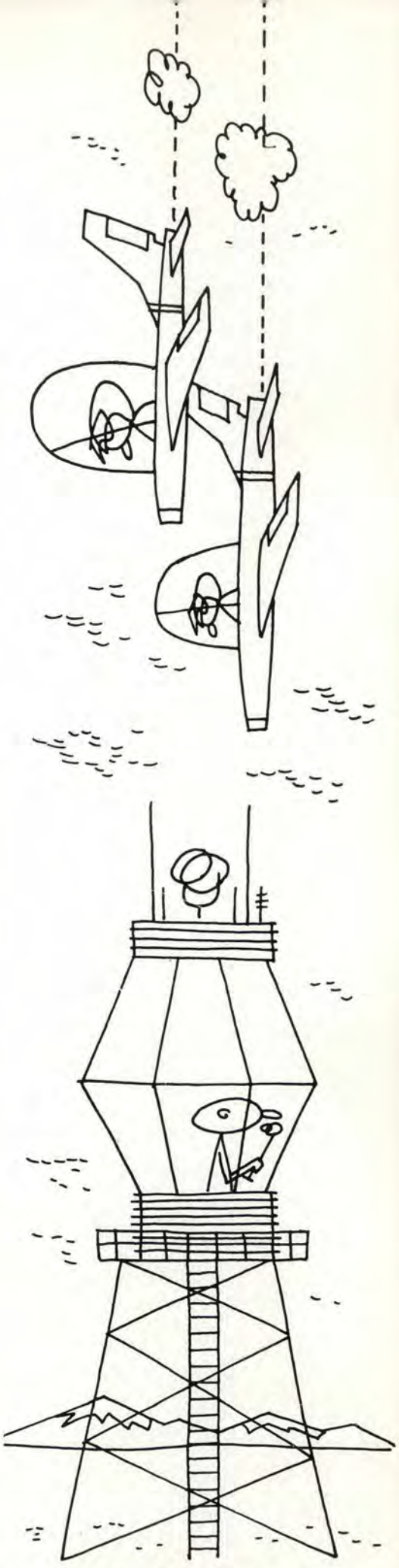
Bulbs—Buttons—Knobs

During a visit to Okinawa a few months ago, I became involved in personal equipment through a junior officer whom I know. Not only this officer, but the pilots in his squadron were concerned with being able to find the dinghy CO_2 bottle release strap, in case of a night bailout over water. If they can't find the strap, they can't inflate the dinghy. They didn't particularly appreciate this prospect.

The personal equipment officer feels considerable responsibility for the pilots and, in order to provide for them, decided that perhaps a small button on the end of the actuating strap would give some means of identification. (A photograph of the suggestion he has in mind is enclosed.) He pointed out that bulbs, buttons, and other types of knobs are already being placed in cockpits and on survival gear to help the operators select the proper item. After taking these pictures, I suggested that he send in a UR.

The idea is, of course, particularly applicable to T-33 operation where the dinghy is carried in a back pack.

Col. James I. Cornett
Hq 5AF, APO 925, San Francisco



"Rodge, 345, cleared for straight-in with two."

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