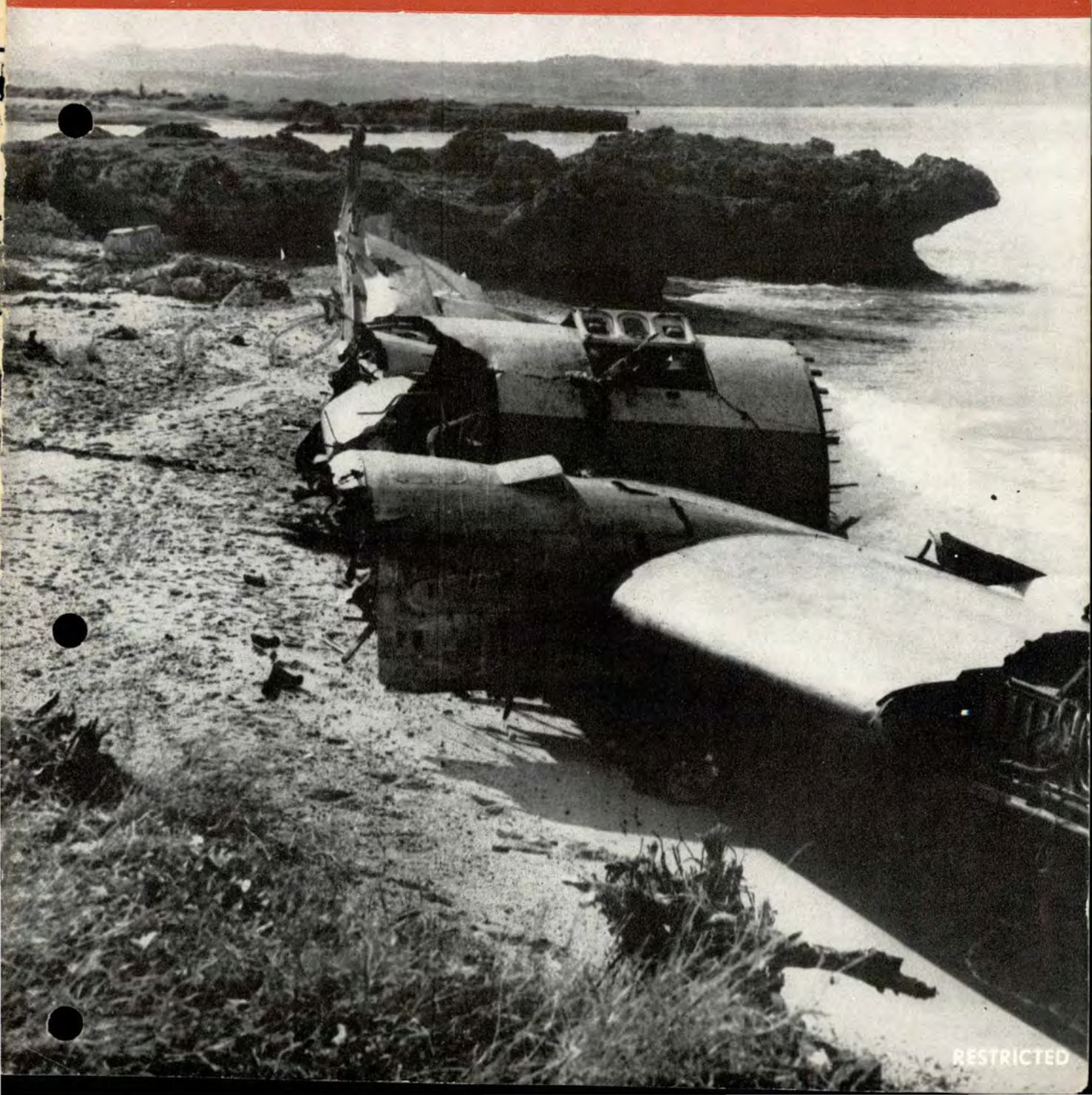
Flying Safety

HEADQUARTERS UNITED STATES AIR FORCE • RESTRICTED

DECEMBER 1949



RESTRICTED

FLYING SAFETY

DEPARTMENT OF THE AIR FORCE
The Inspector General, USAF, Directorate of Air Inspection, Flying Safety Division, Langley Air Force Base, Virginia

Volume 5 No. 12 **December 1949**

CONTENTS

ARTICLES AND STORIES

FEATURES

COVER PICTURE

The beached section of the B-29 shown on the cover of this issue was pulled from shallow water after the superfortress stalled out and crashed while turning on final for a simulated two engine landing. Loss of directional control, caused by failure to maintain a constant safe two engine airspeed, was the primary cause of this accident.

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SHARE YOUR IDEAS

FLYING SAFETY Magazine welcomes comments, criticisms and editorial contributions from all members of the United States Air Force. Readers can help the magazine promote safe flight by offering information on procedures, equipment or training methods that have been effective in decreasing aircraft accidents. Address your letters direct to the Editor, FLYING SAFETY Magazine, Langley Air Force Base, Virginia.

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

Facts, testimony and conclusions of aircraft accidents printed herein have been extracted from USAF Forms 14, and may not be construed as incriminating under the 70th Article of War. All names used in accident stories are fictitious.

EDITORIAL

WHAT YOU DON'T KNOW WILL HURT YOU

Human errors. We charge approximately 85 per cent of our Air Force aircraft accidents to mistakes or boners made by USAF personnel.

Could it be that in regarding flying, day in and day out, year after year, we have come to take it for granted that mishaps caused by human error are as unavoidable as the tides? Apparently we have. The reaction to the mistakes made by operators of aircraft has not been nearly so critical, nor the punishment for negligence as severe, as when for example trainmen, bus drivers or ferry skippers make mistakes.

Why is this? Is it because the public better understands a ferry boat or a bus and consequently expects operators of these conveyances to take precautions against the known hazards? Regardless of the answer, we do know that the public through the regulatory powers it gives to commissions and courts will not tolerate foolish or careless operation of these older forms of transportation. This is illustrated significantly by the numbers of prison inmates jailed because their negligence or violation of safety laws added up to manslaughter or other crimes.

It is true that performing maintenance on an airplane is much more complicated than repairing a motor vehicle. Likewise the man in the cockpit of a military plane has to manipulate more controls and interpret more dials in correct sequence than does the man at the wheel of a ferry boat. Many of us are inclined to let it go at that, saying, "you see, the opportunity for error is greater in aviation. That's why we have so many accidents."

But new thinking on aircraft accidents won't let it go at that. Today we believe that airplane disasters are not inevitable. It is now clear that we can avoid costly errors in the maintenance and operation of Air Force planes by making safety an everyday practice. Its start must naturally be conceived on the manufacturer's drawing boards—safer airplanes. At the same time every Air Force unit and individual must concentrate everlastingly on doing the job right. This is safety reduced to its simplest term.

The first place to attack human error in the operation of aircraft is in training. Training can lick complication. A wheelbarrow would have been a complicated machine to a caveman. And he probably would have spilled it whether it was loaded with a subdued female or a mastadon's tusk.

With all our opportunities for learning to fly and service Air Force planes the right way, there is no excuse for eight out of ten accidents to be charged to human errors. Certainly not if we are dealing with grownups rather than with adolescent cutups. That old skull and crossbones dearly loves the man who in his disrespect for others is downright careless—the discourteous person who cuts others out of traffic patterns, hogs the radio channels, or plows through airways at wrong altitudes.

Then there is the practical joker whose horseplay ends in a tragic air crash. And the hurry-up-let's-go type who always does everything full throttle, exceeding the limitations of his men and machines. And the tight-dry-fit mechanic who hammers a part into place because it is quicker than machining or adjusting it to proper tolerances.

You could go on adding examples. They all would support our contention that human error in aviation, as in pushing wheelbarrows, is really nothing more than a lack of comprehension.

NEW

On the sprawling plains east of Oklahoma City live a group of Air Force magicians. At least to an outsider there would seem to be magic at work within the walls of a converted aircraft factory that now houses among other things the Oklahoma City Air Material Area's jet engine overhaul depot at Tinker Air Force Base.

In one end of this building come broken, aged and unwanted J-33, J-35, and J-47 jet aircraft engines. Out the other end pours an endless stream of shiny, new-looking engines, each one ready to spin its vapor trails across the skies with more power than it knew the day it rolled off the factory assembly line.

The magic worked inside the walls of the giant plant is the result of 300 to 400 man hours per engine spent in disassembly, inspection, rework and overhaul, assembly and test. That final test requires that the engine produce higher thrust output than that required for original factory delivery.

All jet aircraft engines in the USAF turned in for depot overhaul or UR inspection are processed by the OCAMA depot.

DETECT DEFECTS

First stop for engines coming through the depot is disassembly. Here each engine is taken completely apart. No two pieces that can be separated are left together. Workmen and inspectors are constantly on watch for anything unusual that might show up during the disassembly. The parts are cleaned and turned over to the inspection section.

In the inspection section each part receives a going over that misses nothing. All steel gears and shafts are magnafluxed. All case parts such as flame tubes, ring and tube assembly, diffuser case and stator case (on the J-35 and J-47), aft frames and turbine and compressor rotors are zyglo inspected. The J-33 engine compressor rotor gets a careful reflectorscope inspection also.

Throughout the inspection process inspectors are alert to catch any defective parts and make frequent checks and tests not called for even in the T.O. A continuing process in the Air Force is the attempt to extend the life of aircraft engines.

Hamilton AFB recently requested authority to

operate two J-35 engines to 400 hours since the engines already had 300 hours and were still in good condition. After a careful examination of J-35 engines up for 200 hour inspection at OCAMA the authorization was granted. Jet engines are new in the Air Force history and there is still much to be learned about them. These special checks frequently turn up a problem not encountered before that requires the combined efforts of factory and Air Force maintenance to overcome in this continuing effort to turn out better engines and give them longer life.

MANUFACTURERS ASSISTED

For instance, one such inspection not called for in T.O. disclosed a warpage in the aft frame of the J-35 engine. It was discovered by centering the frame in a lathe and checking it with dial indicators and calipers. Frames that could be sprung or machined back into shape were returned to service, the others discarded. As a result of this discovery the manufacturer redesigned the aft frame to eliminate the trouble.

On another occasion it was discovered that the guide vanes on the J-33 diffuser case were cracking. OCAMA recommended that a radius be cut out of the leading edge of the vane to stop this cracking. The manufacturer adopted the idea and the trouble was eliminated.

LAMPS FOR OLD

PARTS ARE REWORKED

After inspection the engine goes to the parts rework section. This section is divided into three subsections. One sub-section does rotor rework and balancing, another sheet metal work (welding, machining and straightening dents) and a third sub-section, the machine shop, reworks all parts such as gears, flame tubes, etc.

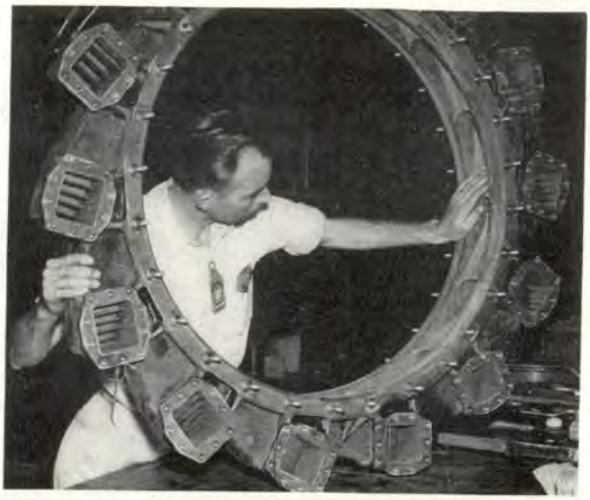
The rotor rework and balancing section is just what its name implies. If inspection has found some blades on the multi-stage compressor of the J-35 or J-47 need replacing the compressor is unstacked. To do this the main shaft is frozen with dry ice and the rotor stage is heated at the inside diameter with a blow torch and lifted off. Defective blades are then removed and replaced with serviceable ones. New blades are purposely made slightly too long to permit machining down to a perfect fit. After the blades are installed the stage is placed in a grinding machine and the blade tips ground to the correct diameter.

After grinding, the individual stages are statically balanced so that when all are assembled the complete assembly will not be far from perfect balance. Hydraulic pressure is used to fit the stages together on the main shaft. After the rotor is completely assembled it is balanced as a complete unit. Then it is spin tested at 8000 rpm for one minute and balanced again and checked for dimensions. It is then ready to go to the final assembly line.

The J-33 compressor rotor is reworked in a similar manner. All three turbine wheels are reworked, but a spin test is not required except on specific cases where a spin test has been ordered by AMC headquarters.

In the sheet metal sub-section of parts rework, dents and distortions in sheet metal parts are removed and cracks welded. The welding is done by

J-35 and J-47 burner tubes receive careful inspection. Here bellows connection for flame crossover tube is checked.



Above. J-33 diffuser case receives minute visual inspection.

Below. J-33 inner liners being repaired by heliarc welding.

Below. J-33 engines being prepared for storage. Bags contain silica jell. Engine is final-wrapped in heavy metal-foil paper.

the heliarc method which uses a tungsten electrode with inert gas around it to confine the heat to a small area. Filler rods used are stainless steel. After welding is completed all welds are zyglo inspected to make sure there are no bubbles or cracks, then the weld surface is machined smooth.

The machine shop sub-section reworks all cases, gears and shafts and makes any modifications required. Although a few modifications on jet engines can now be made in the field, most of them are still done at the depot.

After the engine is through the parts rework section, those parts which require it are sent to the paint section for a new coat of paint and the engine moves on to the sub-final assembly line.

BACK TOGETHER AGAIN

While the main engine components are going through the overhaul process the accessories are also being processed in another section. All accessories are taken apart and inspected. Worn or defective parts are replaced and the accessory reassembled and sent to the test section. The accessory test section is an intricate laboratory where the various accessories are tested under conditions which simulate all possible operating conditions under which the accessory may be called upon to function when it is back on the airplane. For example, the barometric is tested to make sure fuel flow will be correct for all altitudes, temperatures and power settings. After the accessories are completely tested and approved they are sent on to the sub-final assembly station.

In the sub-final assembly section all major components are assembled—accessory, compressor and burner sections—with inspectors carefully checking to make sure all tolerances and torque limits are within prescribed limits. Then the major components are sent to the final assembly line. The final assembly is a production line where all components are fed into the line and the engine completely assembled ready for test. Except for replacement parts the original engine as it was received is reassembled.

After final assembly the engines are placed in specially designed test cells. The engine is run at various indicated rpm settings and ambient air, compressor and tail pipe temperatures carefully checked. Specific fuel consumption for each rpm setting is recorded and the engine checked for indicated thrust.

After a test run of 45 minutes duration the indicated readings are converted to sea level conditions to arrive at actual thrust being delivered by the engine. This thrust output must exceed the thrust requirements put on the engine at factory acceptance. Before the engine is removed from the block, a cor-

rosion preventive oil is run through it. The turbine wheel is then given another zyglo check to make sure no defects have developed.

The engine is then ready for storage processing. All openings are sealed off and the engine placed in a clean shipping box with the proper amount of silica jell to absorb moisture. The box is sealed with a humidity indicator attached and turned over to supply for distribution to using agencies.

For the average engine approximately ten days have passed since it started through the overhaul process. The engine is the equivalent of a new one except that it can develop more power.

CANABALIZING IS DANGEROUS

Supervisors at the OCAMA depot had a note of warning to using agencies of all jet engines. It is very dangerous to canabalize one engine to keep another running. Each jet engine is a complete unit with all its accessories tested and adjusted to fit that particular engine and no other. A mechanic who takes a governor, main fuel pump, lube pump, barometric or any other accessory from one engine and puts it on another is jeopardizing an airplane and the life of a pilot. Such a swap might be made once or twice or even several times without apparent ill effect, but sooner or later such practice will result in disaster.

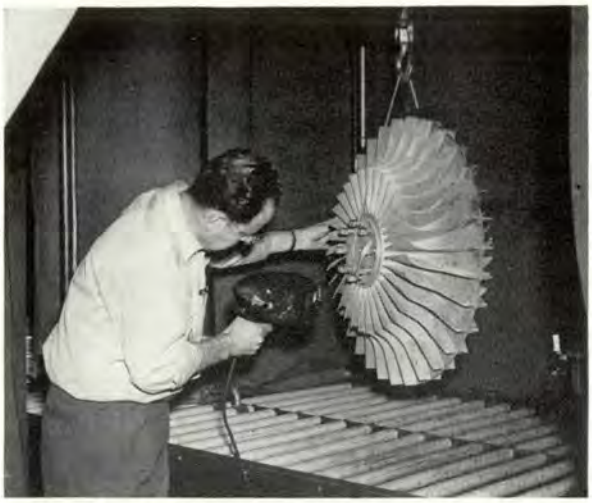
If using agencies had the testing equipment to determine whether accessories from one engine would function properly on another, it would be safe to interchange them. But until that stage of development is reached it is the urgent advice of OCAMA engineers that canabalizing be avoided.

LOOSE BITS OF TROUBLE

They had a word of caution for people who work on jet aircraft, also. Don't leave tiny bits of safety wire, screws, nuts or any other foreign objects near jet air intakes. The intake will pick up foreign objects left anywhere near the intake area and cause unnecessary damage to the engine.

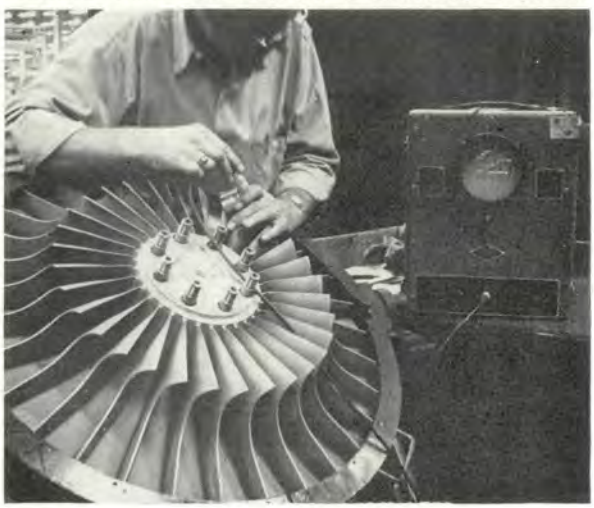
One request of using agencies was made by the jet engine overhaul supervisors. Be sure that engines sent in for depot overhaul are complete. Even if certain parts are damaged they should be included to make sure a complete unit arrives at the depot. When engines arrive with parts missing it places an added burden on the people who have to make the overhaul.

The merchant of the arabian knights who traded new lamps for old couldn't hold a candle to the jet engine overhaul department of OCAMA. It not only trades new engines for old, but takes the old engines, turns them into new ones and gives them back to the people they came from.



Above. J-33 compressor receives zyglo inspection.

Below. As further check compressor is reflectorscope inspected.



Below. J-35 compressor rotor is machined to correct diameter in the "Parts Rework" section of jet engine overhaul.

THE CASE FOR GCA

A statement that GCA is without doubt as safe as the instrument flying technique and proficiency of the pilot will stretch a bull session into the wee hours. Many pilots will render discourses of varying length on the risk involved in placing oneself in the hands of an individual on the ground who is subject to error because he is human. And they will recall the names of a few pilots, or crewmen and passengers who have taken up the study of the harp in recent months, adding impetus to the feeling held by some that GCA is an organized method of meeting one's Maker. This thinking is especially prevalent when the Maker has covered his greatest creation with a 200-foot ceiling.

"Why," they ask, "must airplanes strike buildings way off to the side of a runway, or trees and wires on the approach, or overshoot and dig a wing into the ground if GCA is so near perfect?"

The answers to those questions are not one-syllable words, but by summing up a recent violation reported from an eastern Air Force base, we'll simplify the solution.

It seems that a pilot who felt that the final director was the funeral director and the center line was the cemetery was tooling along at night in a B-26 toward his destination. Mushing along in the soup, our boy found himself faced with the prospect of making an instrument letdown and a GCA. After flying over the range station and making an identifying turn, he set his gyros and settled down to flying the pattern.

"Another routine approach," the GCA officer who happened to be in the trailer thought to himself. One look at the scope, though, changed his mind. After turning onto the final, the B-26 pilot broke out momentarily in a hole in the overcast. Although still six miles out on the final, our harp candidate for the week descended to an indicated altitude of 260 feet and continued to fly the final at that altitude. Even though flying below the clouds, he missed the field entirely and was finally convinced by GCA that a go-around was in order. The second time, as he turned onto final, he broke out into the same hole in the overcast and promptly descended to 260 feet again. This time, proving that practice makes perfect, he flew over the outskirts of the base. Still at 260 feet, he made a 360° overhead approach and landed.

Now lets suppose that a tree 50 feet tall had been perching on a hill 220 feet above sea level somewhere along the final flown by the B-26. If that had been the case and the B-26 had piled up, the reverence held by most pilots for GCA might readily become irreverence.

Lets look at the case for GCA on this violation. For one thing, the final approach elevation scope is graduated in such a way that at a glance, the altitude of the airplane is known to the final director from the time it reaches the glide path on final until touchdown. Who did this character think he was kidding when he came tooling up the avenue at 260 feet? Himself? Lets not presuppose that this young

man stands alone on that score, however. The following stunts pulled by his contemporaries are what makes the job more difficult for GCA.

For one, when practicing GCA runs under VFR conditions some pilots while coming down the glide path try to help the GCA controller. Oftentimes the man not under the hood in a twin place airplane or the pilot of a fighter make corrections to line up with the runway before they are actually given by the final director. This is a noble gesture. However, the final controller can only assume that the pilot is holding the heading as given and any subsequent movement of the blip on the scope is an indication of wind drift. Consequently, the GCA final director will give another correction to compensate for the drift.

The helpful type of pilot now begins to think that the GCA controller hasn't a clue of what he is doing, so he helps some more by making another correction of his own which in turn is interpreted by the GCA operator as more drift. The vicious cycle then is set in motion with the result that the airplane misses the runway by as much as several hundred yards and all sorts of thoughts whip through the mind of the pilot who comes out from under the hood and finds himself flying directly over the base aqua system. A mental reservation is then made by the pilot that this particular GCA unit is not to be trusted any further than the GCA trailer can be thrown.

Then there is the pilot who has little or no trouble with the course in azimuth. He has all his trouble staying on the glide path. Usually, he starts out by informing GCA that he will fly the glide path at 130 mph. Rapid mental calculations considering the factors of a wife and two children and a low ceiling are converted into 10 mph each raising his airspeed to 170 on the glide path. The GCA operator operates considering the proper descent for the particular glide path based on the intended airspeed. That point should require no further amplification.

Then there is the throttle bender who on the approach uses everything from power off to war emergency boosts instead of constant power settings which will give a constant rate of descent. The only time he gets on the glide path is in passing through it.

According to Headquarters, Airways and Air Communications Service, many Air Force pilots have misinterpreted the advisory, "You are now at the GCA minimums for this base." Recently a comment was received from the Alaskan theater stating the pilot thought this advisory meant GCA was unreliable below the published GCA minimums. This comment was probably prompted by past experience when the GCA final controller said, "You are over the end of the runway, down the middle, take over visually and land." All the pilot had to do was reduce power and land. Now, with a couple of hundred feet still left on the altimeter, the first time an uninformed pilot hears the minimum altitude routine, the throttles are liable to come out by the roots in his effort to go around.

It appears that another reason for misunderstanding this GCA safety advisory evolves around the various interpretations of published minimum altitudes. The following explanation by AACS should clarify this point:

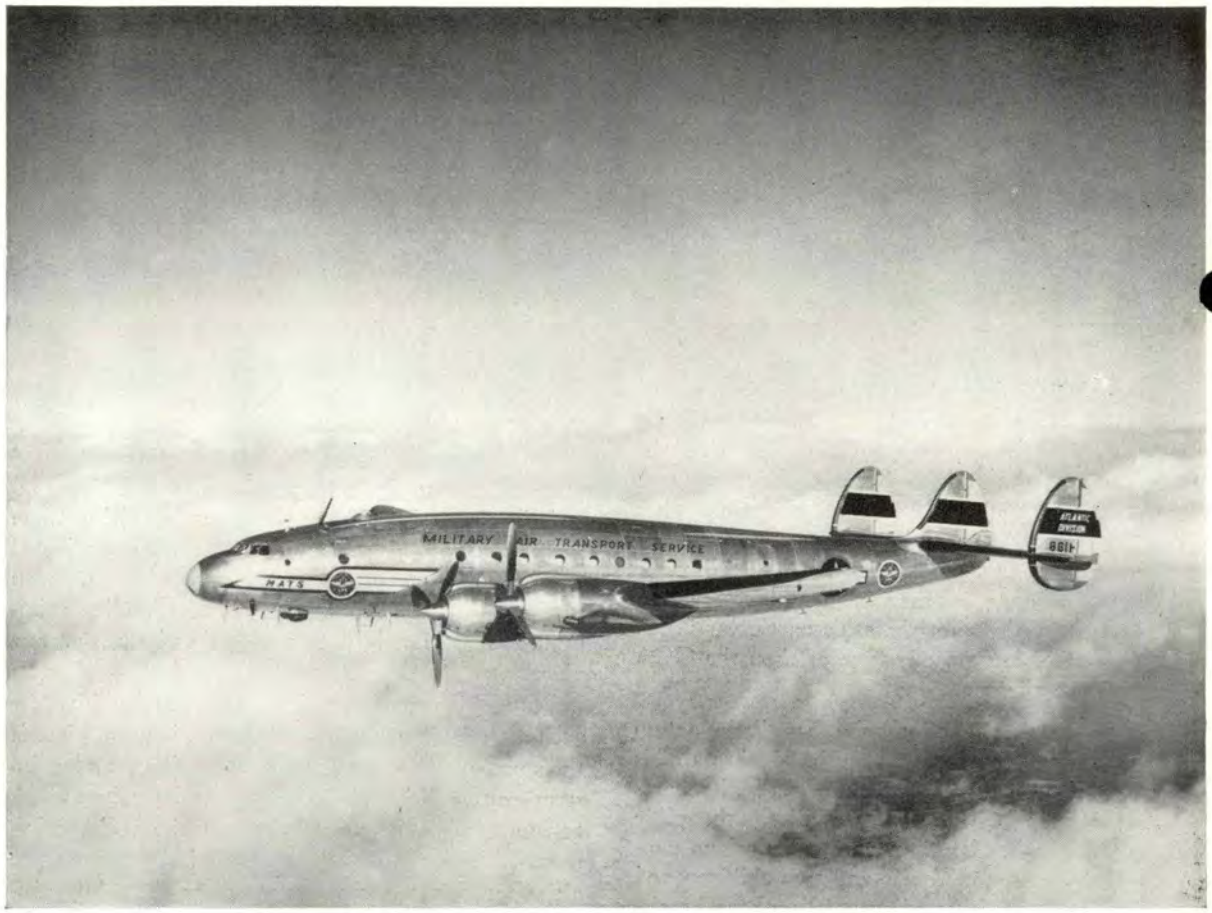
"The Air Force has published minimum altitudes for all Air Force bases for the primary purpose of insuring that the pilot has a certain degree of safety when making an instrument approach."

"The minimum altitude for any particular Air Force base is determined with regard to its location, surrounding terrain, navigational landing aids, and other pertinent data. In the interest of safety, restrictions are placed upon the pilots, requiring them to meet capability standards before they are issued a green or white card. The mere fact that a green card pilot has no published takeoff or landing minimums should not be interpreted that he can go any place, any time, regardless of weather. Rather, it indicates his experience, judgement, and ability are such that he is capable of determining for himself the margin of safety necessary for flight under instrument conditions. The pilot must depend on GCA to know when he passes through the GCA minimums. Tests conducted by AWS indicate that the altimeter is not accurate enough at these low altitudes for the pilot to determine exactly when he has reached GCA minimums."

Remember these points, and that when the final approach director looks into his scope you might well compare it with looking out a window and actually seeing your airplane. When he says you are high or low his instructions are based on the position of the blip which is your airplane. Work up your own constant power settings for the airplane you fly the next time you are out practicing GCA. Follow the GCA operator's instructions implicitly and see for yourself that he can bring you right down to the runway where you can take over visually and complete a landing. Keep in mind that when the chips are down GCA is making it a lot easier for you, so why not try to make it easier for them.

YOU CAN SET YOUR WATCH BY A CONNIE

By Capt. Raymond J. LaCombe
Westover AFB, Massachusetts



How would you like a job flying one of the Air Force's C-121 Constellations? If you have 3000 hours total time, 500 hours C-54 time and 200 hours night time you meet the minimum qualifications for getting into the only C-121 Squadron in the Air Force.

Of course, even if you get assigned to the squadron you still have to pass a rigorous five weeks C-121 engineering course and an even more rigorous flight check and green card instrument check. These very stringent requirements are the basis of the flying safety program maintained by the MATS C-121 Squadron at Westover AFB, Mass., currently engaged in conducting the Westover to Rhein-Main, Germany run with its eight "Connies."

The splendid record of this "Connie" squadron is attributed largely to strict adherence to its high standards of flying safety.

A pilot who meets the minimum experience requirements set forth above has a long way to go before he is put on as Aircraft Commander. First, he must complete a five week course in C-121 engineering. This is the same one panel operators take before starting to fly. If he successfully passes the written examination, a flying training period is started in which the standard checkout form is followed closely. This entails 16 hours of pilot time. Co-pilot time isn't included during this initial phase. During this training period, the pilot will shoot approximately 35 landings, all types of three and

two engine procedures, trouble shooting, instrument work, etc. He is acquainted with all the characteristics of the aircraft, both on the ground and in the air. After completion of his check out, he is set up as a co-pilot on the regular run. When he has logged 100 hours in the C-121, he is eligible to become an Aircraft Commander.

Here again nothing is left to chance. Base checks are considerably more difficult than the Green Card Instrument Check. Aural null letdown to low cone combined with a few other exercises deemed necessary for a transport pilot to master in order to prove his efficiency, make this check ride a real test of flying ability. After successfully passing, he is then set up to act as aircraft commander on a scheduled trip. His second pilot, however, is a check pilot, who will carefully observe his reactions, smoothness, and knowledge of route procedures. If the check pilot report is satisfactory, the pilot is then carried as an Aircraft Commander.

All these steps, however, are actually considered basic preparation. The most important phase of the Squadron's sustained flying safety and proficiency drive actually starts at this point. From here the Aircraft Commander is expected to take a base check every 90 days. No excuses are offered or accepted from anyone having an "off day." In addition to his base check, a line check is also required every 90 days. Every pilot is scheduled to attend the ditching school, sponsored by the Coast Guard at Floyd Bennett Field. This course is an excellent one and is strongly recommended to other units who do a great deal of over water flying.

A meeting is held each week for all flying personnel. Instead of a run of the mill flying safety lecture, new films are constantly introduced that appeal to the men. Flying Safety Bulletins and literature are carefully screened for material that might pertain to the mission. Any unusual incidents in the air due to icing, etc. are related to the group by the pilot in charge at the time of the incident. It makes a good bull session and we have no trouble keeping everyone interested.

Two standardization boards have been organized. The pilots board meets the first and third weeks of each month while the panel operators board meets the second and last weeks. All procedures are hashed over and a standard operating procedure is set up. Decisions and procedures adopted by the two boards are immediately put into operational use by all pilots and panel operators.

A school is now in progress through which all pilots in the squadron will acquire a CAA Air Transport Rating. Ten officers already have their ratings. The school will continue until everyone has taken the flying and written examination.

Up to the date of this publication, the average flying time of all pilots in the squadron, including administrative and line pilots is 4250 hours. The old adage, "the more you know, the more you realize how little you know," certainly applies to the men in the C-121 squadron. Although they all have quite a lot of time, everyone is very receptive to new ideas and there is always full attendance at flying safety meetings.

It's a standard gag around Westover AFB that anyone can look out the window and know when it is ten o'clock local. That's when the daily "Connie' flight to Germany starts to roll. You can set your watch by a "Connie" if it's from the MATS Westover Squadron.

Flying Safe

Capt. W. J. Crutsinger, Flying Safety Officer at March AFB, demonstrates how desert survival kit attaches to parachute. The kit was the outcome of a suggestion at a Flying Safety meeting held by First Fighter Group.

Editor's Note:

Each month FLYING SAFETY *receives a stream of requests from various Air Force flying safety officers for information or methods to be used in making their flying safety programs more interesting. We believe all flying safety officers will benefit from the story on the flying safety program as it is being conducted at March AFB, and we would like to publish others like it. If you have an officer that is doing an outstanding job in flying safety, please send us his story. If it contains ideas not published heretofore, it will be used in forthcoming issues of this publication.*

"YOU CAN lead a pilot to flying safety, but you can't make him drink it, especially if it is presented in a dull, impersonal, undramatic way," so says one of the best flying safety officers in the business. The man that spoke those words practices what he preaches.

Ask any pilot at March AFB, California, who is the best flying safety officer in the USAF and he will answer immediately that his own Capt. W. J. Crutsinger is tops. After talking with Captain Crutsinger for a few hours and listening to all the ideas he has for presenting and pursuing flying safety you too would have to agree he certainly is an excellent flying safety officer.

If you were to walk around March AFB with Captain Crutsinger you would hear various personnel say, "Hey, Crutsinger, when are we having another flying safety meeting?" It is easy to understand their anticipation when one learns how the flying safety meetings vary in their coverage and methods of presentation. Crutsinger explained it by saying, "I try to make them entertaining as well as informative."

Typical of the type meetings held at March AFB is the one held 24 September. It opened with the reading of an accident report from SAC headquarters pertaining to a transport plane crash at a western Air Force base. This real accident combined about all the errors in the book. Discussed in its entirety, it emphasized the necessity of proper flight planning, proper briefing of crews and passengers, and proficiency on the part of the pilot in the aircraft being flown.

As a result of the above accident the office of flying safety made a study of the qualifications of

ty EMCEE

all C-47 pilots at March AFB and made appropriate recommendations for additional training and rechecks before a C-47 standardization board. "If we flying safety officers are going to have any time for golf, we must do more to prevent accidents so less of our time will be used in filling out Forms 14," Crutsinger said. "I believe in accident prevention."

After a digest of the past months' local flying activities by Captain Crutsinger, the First Fighter Group expressed their gratitude to the local Search and Rescue Unit's helicopter helmsman, Lt. Jack Batty, for his remarkable rescue of one of their F-86 pilots from a tiny mountain mesa where he landed after ejecting himself from a diving Sabre (See WELL DONE, Nov. issue of FLYING SAFETY). Batty was ceremoniously elected "Pilot of the Month" and was honored with the traditional award of a three day pass by the flying safety office. Then the rescued pilot, Lt. Robert E. Farley, was brought forward and congratulated for having been the first USAF pilot to use the ejection seat in an emergency.

After the more formal portions of the program had ended, a timely and comical but point-making skit entitled "Winter Flying Operation Hints" was presented by Captain Crutsinger and his volunteer crew-members of a super-bomber. The cast, or crew if you prefer, consisted of an aircraft commander, pilot, co-pilot, bombardier, engineer, navigator, radio operator, left and right scanners, central fire control officer, reporter, entertainment committee consisting of a four-piece band, hostess for serving coffee, two Hula dancers, aircraft clock winder who doubled as a Geiger radioactive rays counter. Assisting the cast of the skit was an F-10001 pilot and a tower operator.

The plot or mission assigned the super-bomber aircraft commander was to drop an atomic bomb on the people of Lower Slobbovia in order to reduce the cost of the Marshall Plan. Aircraft commander, having 30,000 hours flying time, impressed upon the inexperienced pilot and co-pilot the importance of proper technique in all phases of cold-weather operation. Points covered in the more serious briefing included winter flying technique, proper preflight of all deicing equipment, proper clothing for cold weather flights, necessity for removing all frost, snow and ice from the wings, necessity for keeping the ramps, taxiways and runways clear of all snow and ice, proper check of instruments, technique for landing on snow or ice covered runways, proper dilution of engines after flight, and other items pertinent to cold weather operations. All these points were later covered in a rather hilarious manner, but certainly they could not be missed by the 400 F-86 and B-29 pilots attending the meeting. The skit opened with the aircraft commander speaking:

Commander: Mighty men, as you know this briefing has been going on for 37 days. By this time I feel that each and everyone of you are aware of the fact that I'm rough, rugged and have a 50-50 chance of getting our super-bomber into the blue. As you all know we can expect rather chilly weather in the general area of Lower Slobbovia.

Entire Crew: Aye aye, sir.

Commander: Are your wills in order.

Crew: Aye aye, sir.

Commander: Do you dread the thought of leaving your wives?

Crew, except Radio Man: NO NO, sir.

Radio Man: But sir, I just married a girl from Riverside last night.

At this point the Commander took out his revolver and shot the radio man, then said:

"As you all know I believe in mercy killings."

After all 30 of the aircraft's engines were started and the commander is preparing to start the takeoff roll, the tower operator says: "March Tower to super bomber commander, use only 60 miles of the runway. The tide is in on the West Coast." Co-Pilot: Sir, we are airborne. Shall I pull the wheels?"

Pilot: Fool! You know with only 2000 hours in this plane you are not qualified to touch any switch.

Co-Pilot: Sorry, Sir, I guess I lost my head.

Commander: Turn on the auto-pilot. Can't you see we have 10 feet of altitude and besides I have my time in for the month.

The flight proceeded through freezing rain hail, with Hula Hula dancers and band providing entertaining until the ship reached Fairbanks. The aircraft commander contacted Fairbanks control for weather over Lower Slobbovia.

Fairbanks Control: "All weathermen in Lower Slobbovia have frozen to death. Logical to assume synoptic situation very cold with ice in area."

The flight continued to destination then the plane returned to March AFB, with many points on winter operation being covered in a manner few of the listening pilots will forget.

In addition to the lighter type programs, such as

the one just mentioned, Captain Crutsinger has at various times obtained the services of some top-drawer military and civilian lecturers. These have included such notables as Capt. Allen Jones, chief pilot of United Airlines; Mr. Jack Bryan, chief North American test pilot, and Dr. Irving G. Krick, meteorological consultant from Pasadena, California. Dr. Krick at present is chairman of the American Institute of Aerological Research, which is doing long-range forecasting for the Air Force.

During some meetings local accidents are X-rayed, safety statistics read, and then they are thrown open for an all-out bull session which brings about a meeting of pilots minds and flying experiences. Factory representatives of the type planes flown at March AFB sit in on these sessions and hear a recital of "Bugs" or unforseen operational problems that develop in the planes. A factory test pilot may offer an immediate solution or take the problem back to his factory lab.

Many of the ideas and suggestions brought up at these meetings are channeled to where they will do the most good—C.A.B., C.A.A., SAC Headquarters, the crew chiefs, the aircraft factories, Air Force Headquarters, etc. One of the best suggestions brought up thus far was a desert survival kit that is attached to the pilot's parachute. This kit is described in full on page 23.

Unless a movie is to be shown as a part of the program, flying safety meetings usually are held in the officers' club during the last duty hour of the day. All pilots are required to attend and all other officers are invited. Refreshments are on the house. The club has found that during the evenings following the meetings the profits derived from amusement devices increase to more than offset the cost of furnishing free refreshments to those attending the meetings.

Not only does he go to great length to produce interest in his meetings, but Captain Crutsinger pursues a vigorous flying safety program. He has found that it is highly desirable that the office of flying safety maintain a constant check on all flight facilities, supervisors and pilots in order to uncover leaks and flaws that may be accident potentials. "The most important thing in the flying safety program is to instill confidence in all pilots that the flying safety officer is making no effort to crucify them, but is looking after their interest at all times," Captain Crutsinger said. Judging from the many suggestions he receives from various pilots of all ranks, he has been most successful in gaining the confidence of all personnel at March AFB. In fact, it is apparent to the observer that every officer on March is a flying safety officer.

Captain Crutsinger uses every means at his disposal to advertise flying safety. It is advertised on outdoor posters, bill boards and on the covers of matches dispensed by the officers club. He makes frequent inspections of all flight facilities to make certain that accident potentials are not being allowed to build up.

During one of his inspections he found that some of the crash firefighters were not qualified to perform their duties, so he made appropriate recommendations to his superiors and several of these crew members were given different assignments.

Flying safety is a full-time duty with Captain Crutsinger, and as he says, "It is a 24 hour job with me and then I don't get all done that I would like to do. I don't see how fellows who have other duties have time to do a job as flying safety officers. I would have to neglect one or the other if I had an additional job."

Airborne entertainment is provided bomber crew in skit. "Four Forts Quartet" adds zest to Flying Safety meeting.

Safety pointers for crew of "Long Range Flying Mission" are made in this scene from drama produced at March.

Captain Crutsinger was asked what goal he had set for himself as a flying safety officer. He said, "The overall flying safety program as conducted here at March AFB has a primary goal of establishing the proper mental attitude towards the problem. I firmly believe that if a program can be set up in such a way as to obtain full cooperation from the base commander, all section heads, squadron commanders, engineering, operations and communications offices, weather section and base operations that the accident rate will be materially lowered."

Evidently he is reaching his goal because March AFB won two Air Force safety pennants in the first half of 1949, and a better than average accident rate (.55) has been maintained from the beginning of the year through August. This rate was based upon 1000 flying hours per accident. During this period 31,000 hours were logged by March pilots, 10,000 of which were jet hours.

"Everything we do here is in hopes that it will cause our pilots to think safely," Crutsinger said. "We believe that if a pilot thinks safe, he will fly safe."

When asked what was his greatest aid in pursuing his safety program, Crutsinger replied immediately, "Working directly under the 'old man'." When asked how this helped he explained, "When you are working for anyone other than the base commander, you have to fight your ideas through several other people, depending upon the chain of command. Invariably you get stymied on some of your ideas, when you have to go through two or three people to the base commander. All flying safety officers should be assigned directly under the base commander and be responsible only to him. Furthermore, flying safety should be a full-time duty for the men assigned to reducing our accident rate."

In questioning Crutsinger, I asked what was his greatest flying safety problem. His answer was, "Well, probably the biggest problem is the desire of pilots to save face. One expert who has been in the study of accidents and their causes for the last 15 years has more or less proved this point. We try to eliminate the desire to save face, but it is difficult. A pilot finds it hard to dispell the idea that he has not lost face when he goes around after overshooting the runway."

Captain Crutsinger has been in the flying safety business for four years and his experience makes him well qualified for the job. He has a total of nine years in the Air Force and has flown fighters, medium and heavy bombers during seven of those years. Before receiving his commission he was a mechanic at Chanute AFB. Experience gained during his training and work as a mechanic help him do a better job as a flying safety officer. He can understand the problems of the maintenance personnel as well as those of the pilots. He worked for one year as an aircraft maintenance officer and six months as a communications officer. He has had experience in orchestras and other fields of entertainment that helps him present his program in an unabashed manner. One of the pilots at March said, "Crutsinger is not a flying safety officer; he is a master of ceremonies."

Regardless of the problems Captain Crutsinger encounters, he keeps plugging along and eventually masters them. He is justly proud of the records established at March AFB since he was assigned there. Similarly, all personnel with whom I came in contact with at March were proud of their flying safety officer. We wish the Air Force had more like him.

Emphasizing crew comfort on long flights, March Flying Safety dramatic club places Casbah aboard super bomber.

Part of crew of 30-engine bomber which accomplished a perilous cold weather mission on officers' club stage.

ON AND OFF THE AIRWAYS

Have you ever had the chills and done more than your share of sweating while flying IFR on airways after hearing another pilot reporting his position and altitude just off your wing tip on a collision course.

First thing you probably did was get on the horn and raise cain about Air Route Traffic Control selling you down the river.

Or, perhaps, you have given some other pilot the chills and caused him to sweat a bit as you plowed merrily across several airways while making a direct flight on the gages thinking all along about what a good boy you were because your altitude hadn't varied a foot since you leveled off about 500 miles down the road?

If you have been at this game even a little while, you have probably experienced both situations.

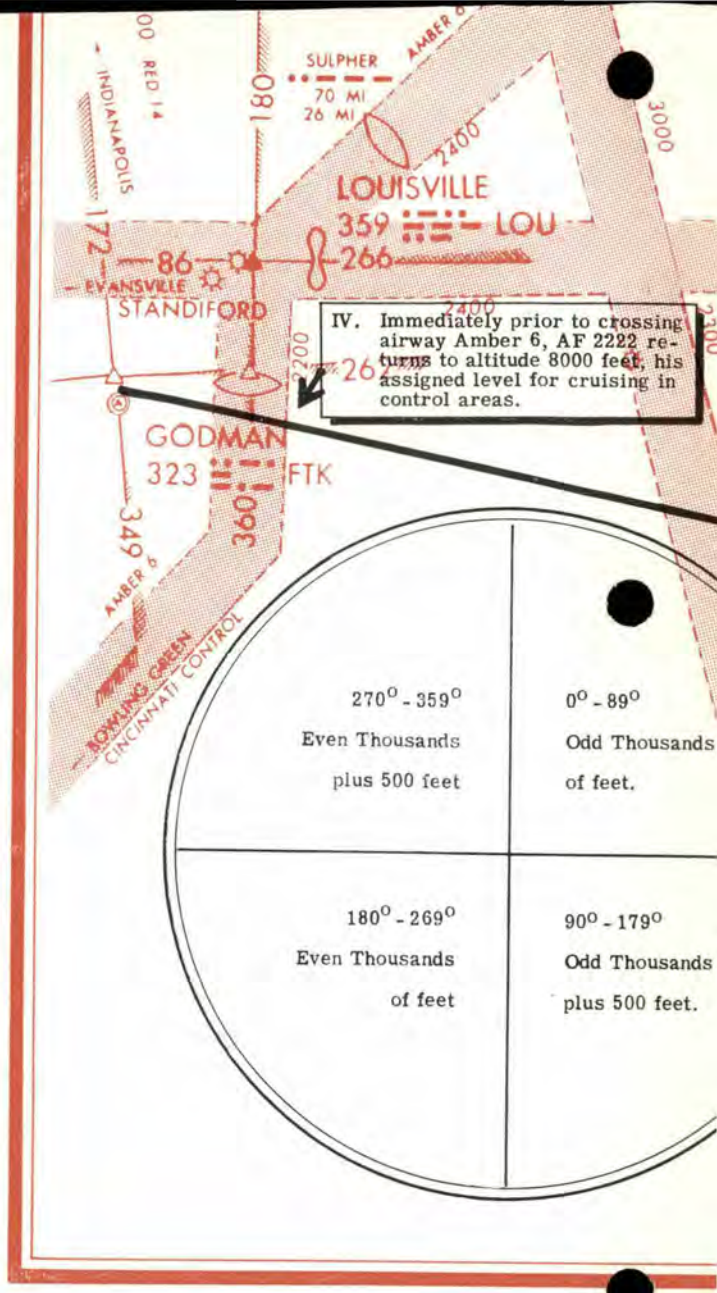
Judging from the fan mail received by ARTC, FLYING SAFETY and the Chief of Chaplains, many pilots are flying off airways at the altitude specified in their Air Route Traffic Control clearance when it is not the quadrantal altitude as determined by the direction of flight.

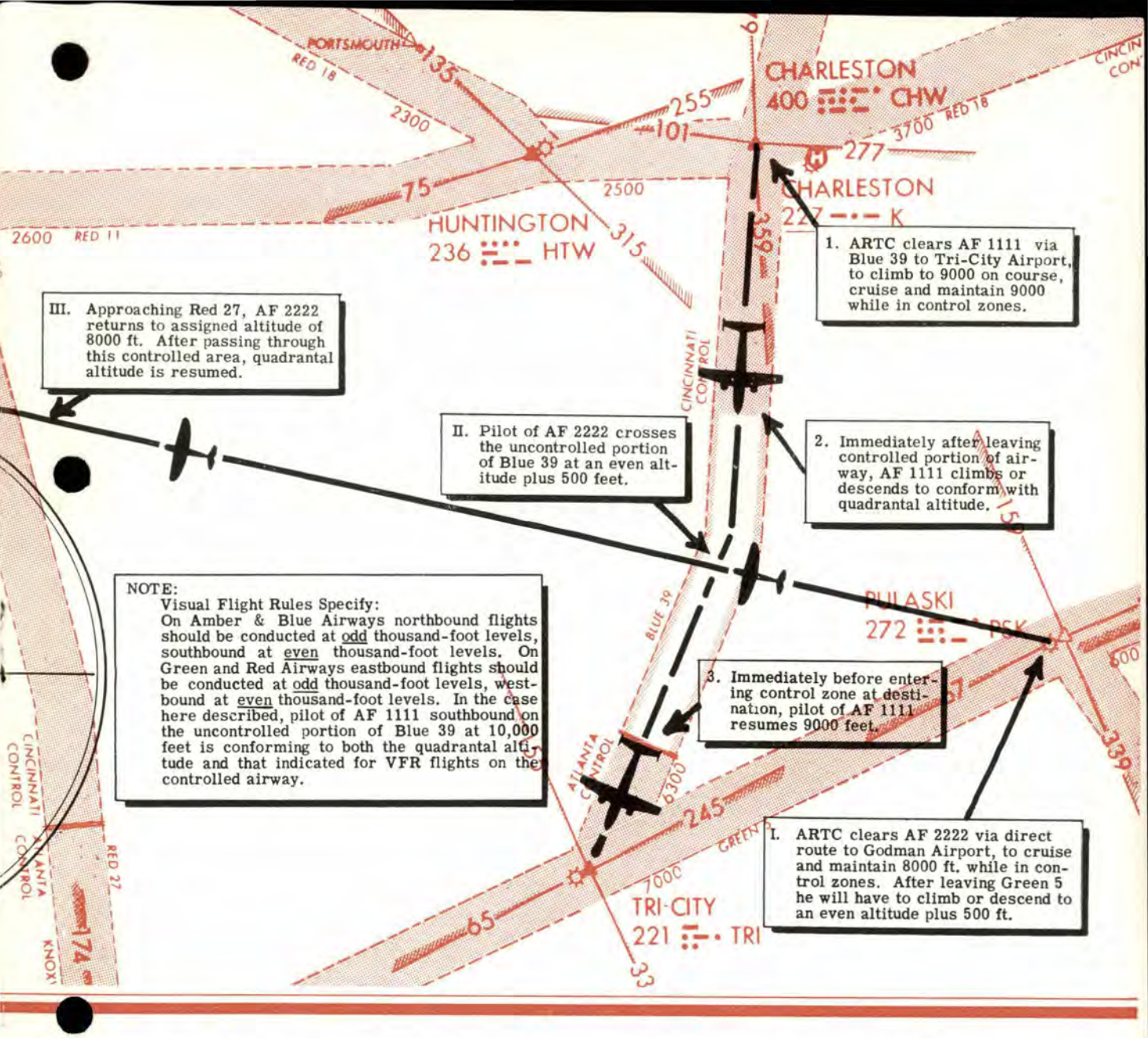
Lets clear up one point. ARTC has absolutely no control over airplanes and is not responsible for providing separation during any portion of an instrument flight that is outside a control zone or off a controlled airway. That detail is up to you, the pilot. ATC assigned altitudes apply only in controlled areas. And the solution to conducting a safe flight off airways on instruments is the quadrantal altitude procedure. Notice the circle divided into equal quadrants, and superimposed on the radio facility chart facsimile.

Lets suppose that we are about to make a flight from Charleston to Tri-City along Blue 39. You will note from the chart that the pilot was instructed to climb to nine thousand on course. Note also that after tooling along for a short time he left the control zone and climbed to the quadrantal altitude of even thousand feet. In this case he chose 10,000 feet, but he could have used any other even altitude. Immediately before entering the control zone at destination the pilot again went to 9000 feet. If Blue 39 had been a controlled airway, the entire flight would have been conducted at the 9000 foot altitude prescribed in the ATC clearance.

Probably the thing which is most confusing to the pilot when the question of quadrantal altitudes comes up, is the fact that altitudes are sometimes assigned by ATC with no apparent consideration of the direction of flight. Cease to be confused. They know what they are doing and what they expect you and someone else to be doing when you're on a controlled airway. The quadrantal altitudes are primarily for off airways flying.

Let's examine the problem confronting a pilot who plans to make an IFR flight direct from Pulaski to Godman. Assume ATC assigns him to cruise and maintain 8000 feet while in a control area. After leaving Green 5 on this flight, the pilot considering his heading would have to climb or





descend to an even altitude plus 500 feet. He would charge right on through Blue 39 at this even plus 500 altitude, but as he approaches the next airway, Red 27, a return to 8000 feet would be in order. After passing through this controlled area, the airplane would have to be flown at the quadrantal altitude until Amber 6 was approached. Then he would go back to 8000 again.

In other words, any time you are off airways and out of the control of ATC you may fly at any altitude you care to so long as it conforms with the quadrantal altitude for the heading flown. The only limitations are terrain clearance and the service ceiling of the plane you happen to be flying.

An uncontrolled airway is so designated because of inadequate radio aids facilities. It is an airway which has been requested by the using agencies and will in time be designated as a control area.

While going by airways is the safest and most accurate method of making an instrument flight, it is sometimes impractical for military planes. In fact, about 90 per cent of off airways IFR clearances are filed by military planes. If you must go "direct," plan your flight thoroughly enough so that your chance of tangling with someone else will be minimized.

LIGHT PLANES AREN'T TOYS

OLD SKINNY MEN! You can still earn your WINGS—if you are a regular Army officer, field grade, but still not over 36 years old or a company grade Army officer, regular or category III and not over 31. Also, you still have to pass a 64 exam and you can't weigh more than 170 pounds.

At Connally AFB, Waco, Texas, the Air Training Command of the Air Force has established a school to turn out liaison pilots exclusively for the Army. The trainees—all commissioned—come from the Infantry, Engineers, Signal Corps and Field Artillery to learn to fly the liaison planes. There are 35 students in each class and they spend 24 weeks at Waco receiving 140 hours at the airplane controls. Upon satisfactorily completing the course they are graduated with silver liaison pilot's wings.

Of the 140 hours, about 40 per cent is dual time. The L-16 receives the brunt of the beatings by claiming 125 hours of each trainee's time while the L-5 fares much better since it has only to suffer through 15 hours when the student pilot gets his instrument training in the back seat under the hood. Of the 125 hours, 101 are spent in transition—exactly like your old primary days, stalls, spins, s-turns, etc. with this difference:

1. Much more emphasis is placed upon high performance takeoffs and landings.

2. Fifteen hours are given in navigational training, five in night flying and four in night navigation.

In the stress placed upon the high performance takeoffs and landings, the Air Force has ten auxiliary fields around Connally. The auxiliary fields aren't what you think—paved mats, strips or good open sod fields, but run from a small pasture open at one end to a bent piece of backwoods road. After the 60-hour check the students start to learn this liaison flying. They begin by practicing their high performance takeoffs and landings at their home base off in the NW corner of Connally. Here they learn how to get their planes into and out of short

fields. Having mastered the art of slipping, their instructors take them out to an "easy" auxiliary field. Easy, in this sense, that it's fairly level, has at least one open end and isn't too short. The students soon advance to more difficult fields, some of which are closed on all sides and have hills and dales literally splashed here and there along what is euphemistically referred to as the runway.

During the course the tyros get at least one road landing. The road in all probability is some old wagon track in a farmer's back 40. This road has to meet certain specifications in that it can't be straight but must have a slight curve. In procuring these auxiliary fields the Air Force tries to get fields where horses aren't pastured as the horses seem jealous of airplanes and go crazy—cows, however, take the broader outlook and go placidly on about their business pretending the age of flight has not arrived.

Besides learning to fly, the trainees are also required to go to ground school. 128 hours of maintenance and engineering instruction are given along with other subjects such as meteorology, navigation and flight planning, principles of flight, communication and code, engine, instruments and their construction, flying safety, and personnel equipment. In ground school great importance is placed on engineering and maintenance studies for each liaison pilot is not only expected but required to maintain his own plane after he is assigned to an outfit.

After graduation from Connally, the liaison pilots are sent to advanced school at Fort Sill, Oklahoma for 13 weeks. There they receive an additional 50 hours flying instruction in the tactical uses of liaison planes learning artillery spotting and reconnaissance work.

There are still quite a few Air Force pilots flying light planes operationally in the various Air Rescue Service Squadrons and certain liaison flights. Instructors at Connally believe that there would be fewer light plane accidents if Air Force pilots used to flying more powerful planes will remember certain things about flying the liaison planes.

The L-16, for example, is restricted to 1300 pounds gross weight and should never be flown grossing more than 1350—which lets out that fat friend you were going to take for a hop. (Don't forget that the liaison pilots in the school can't weigh more than 170 pounds.)

Lack of power in the liaison planes is the biggest bugbear for hot rocks used to handling thousands of horse power in tactical planes. This is well evidenced by the many disintegrated remains of liaison planes hanging on tree tops and mountain slopes they couldn't quite climb over.

The liaison planes aren't equipped for cross-country instrument flying. (Those at the school have as their only flight instrument the turn-and-bank indicator, airspeed and altimeter.) The needle-ball airspeed technique is taught because liaison pilots frequently must fly missions in marginal weather and may have to go on instruments briefly when a low lying cloud is encountered inadvertently.

If you fly these grasshopper jobs remember they aren't toys. Take the advice of the Army pilots and the Liaison Pilot School and consider the limitations within which these versatile little aircraft operate.

Editor's Note:

Captain Hofmann was asked recently to offer a criticism of a short instrument flight refresher course which he had just completed. It was a good course, he said, but it left much to be desired. Upon reflection, his opinion was that the deficiencies of this course were common, in some measure, to other training which he had received at various bases. The remarks Captain Hofmann has made are based on his observations and experiences, and they are made from the point of view of the student and sometime instructor. His discussion does not criticize schools of such stature as those operated by the Air University and other major commands, but rather is aimed at the type of training sometimes conducted at base level, as for example, in accident study classes, instrument refresher courses, maintenance and engineering lectures, etc.

Continued aircraft accidents testify to the fact that the officers and airmen of the Air Force have not, collectively and individually, attained the level of education and training demanded in the use of the most modern equipment.

THE TRAINING of a pilot may be likened to a building. The foundation is the formal education which he has received before entering cadet school. The framework and superstructure are composed of what he learns as a cadet. Advanced schools may be thought of as adding new rooms and compartments to the original structure, while review and refresher courses are the periodic repairs which every house must have to remain in good condition. The very nature of the military service makes it impractical, as well as virtually impossible, to erect the substantially complete structure of an individual's military education in one period of formal schooling. It is necessary to make additions and alterations at base level, and these usually must be applied piecemeal.

It has been my experience that these bits and pieces of education obtained at base level often are added without serious regard for their relation to the remainder of the individual's educational structure. It is as though a house owner were required by the public authorities to add a chimney to his house regardless of how many it already had,

IS IT TRAINING—OR GUESSWORK?

By Capt. Henry W. Hofmann

or to patch the northeast corner of its roof no matter where or if the roof leaked. Such a requirement would be thought ridiculous. The frugal householder builds his house according to plan, repairs it as necessary, and employs additional materials to enlarge it one room at a time according to his requirements.

Likewise, a plan must be the basis of every unit's training program.

Look at your own school or training program. Is it built according to plan, or is it a patchwork job? If such an appraisal were impartially applied throughout the Air Force, I believe that the efficiency of many classes and courses would be found to be woefully low. The most common causes of this lack of effectiveness are:

1. *Instructors that are inept or inexpert in the subject matter being taught, and poorly prepared courses.* It is self-evident that an instructor who is not thoroughly grounded in the material he is teaching cannot impart much knowledge to his students. Neither is he likely to organize and prepare the course so that it can be assimilated. But even if an instructor is an expert in his subject, his effectiveness is limited by his skill in the art of teaching.

2. *Covering the subject matter too rapidly and superficially.* The temptation to gloss lightly over difficult or tedious material is compelling under any circumstances, but just before lunch or retreat it is entirely irresistible.

3. *Requiring students to repeat courses previously taken.* To require an individual to attend classes in a subject with which he is already familiar is a waste of time. It is, moreover, mentally stagnating, destructive of morale, and conducive of an improper attitude toward instruction generally.

4. *Ineffective tests and examinations.* The final examination is the climax of a course of instruction, and the grade which a student achieves is supposed to be a reasonably accurate measure of his knowledge of the matter taught. This, however, is infrequently the case because of certain malpractices in teaching and in the preparation and administration of tests.

5. *Emphasis on attendance rather than accomplishment.* From time to time, attendance at certain courses is made mandatory for a large number of people. It frequently happens then that the time and energy which should be spent in the preparation of

the course tends to be used to compel attendance. To make academic standards subordinate to the compilation of attendance records is to invite chaos.

6. *Dependence upon lectures.* The mind of the student must be stimulated if he is to learn. That is accomplished through demonstration, discussion, recitation, individual study and manual practice. Where a lecture is used in place of one of these, the efforts of instructor and student are largely lost.

7. *Lack of training aids, study materials, and equipment.* A great deal has been done to provide manuals, mock-ups, and the like in the Air Force, but nonetheless, it frequently happens that the only copy of a manual, which should be studied carefully and individually by each student, is that in the hands of the instructor. Similarly, the operation of a piece of apparatus is often taught without the apparatus itself being available to the student.

Not every course of instruction suffers from all of these faults, of course. Nor are these shortcomings found in the same degrees and combination. Where they do exist, it should be one of the principal goals of every student, instructor and supervisor to eliminate them.

Training courses, to be efficient, must be conducted according to the established, sound principles of pedagogy. This in itself, however, is not sufficient. Every class which an airman or an officer attends should be intended to advance or renew his knowledge of his profession and specialty according to an integrated plan which will make the most efficient use of his time, abilities and potentialities.

Reduced to practice, the first step of a training program for a group of pilots will be the preparation of a list of subjects which they must know thoroughly. This list might include Weather, Engine Conditioning, Navigation, etc. Then an outline of the topics to be taught, and examinations thereon will be prepared.

The second step, to insure that the student acquires the knowledge deemed essential, will begin with the administration of the examinations before any student has attended a class. From the results of these tests, the training officer will be able to tell who are well versed in what subjects and who are deficient. When he knows who must learn what, he can proceed to organize and schedule classes. At the completion of the course, a second, thoroughgoing examination in each subject will be given, and every student required to measure up to the prescribed standard before receiving credit therefor.

The third step of the plan, that of insuring that the knowledge imparted is retained, will be accomplished by periodic re-examination and attendance at refresher courses, as required.

This plan can be applied to any individual or category of individuals in the Air Force and at any level of command. Moreover, it can be applied to certain skills. Indeed, this is precisely the system that is used to maintain pilots' proficiency in instrument flying.

The distinction between the teaching of essential or primary knowledge and secondary, advanced, or general training must be made. Not everything that is taught an officer or an airman has the same importance. Consequently, it is not advocated that every course of instruction be administered according to the plan which is urged for the most important topics.

There is one other point to urge upon the administrators and instructors of base training programs. Students must be required to meet the highest standards of performance. A man will always gripe while he's taking a tough course, but when he has completed it successfully, he will have pride and respect for the school that taught it. Conversely, there is nothing but contempt for a course that any knucklehead can pass. How many men have you heard speak with pride of an organization which made no great demands upon its members?

From all this, it might appear that the troubles of our training programs lie with the people who administer them. It can be said "that if the student hasn't learned, the teacher hasn't taught," but considerable experience with lazy and apathetic pupils and classmates indicates that this is not a universal truth. The plain fact is, any man who wants to can learn in spite of a poor instructor or with no instructor at all. On the other hand, without the active cooperation of the student, no teacher, no matter how experienced and expert he may be, can teach much. Consequently, to all the other factors that affect the efficiency of a school must be added another of greatest important—the attitude and efforts of the students.

If the knowledge could be acquired by injection like a typhoid shot, training an officer or airman could be an easy matter. Unfortunately, the reverse is the case. Only a vast amount of intelligent effort, oriented and organized according to sound educational principles, will produce a successful training program and useful courses of instruction. And thoroughly educating USAF personnel in the use and care of modern equipment is the very bottom step toward promoting and insuring safe flight.

WELL DONE

to

1st LT. JERRY W. NOBLE

Hill Air Force Base, Utah

COULD YOU land a B-25 with the nose gear broken and cocked around at a 20 degree angle without causing more than just a wee bit of damage? 1st Lt. Jerry W. Noble of Hill Air Force Base, Utah, did.

While he was taking off from Moses Lake AFB, Washington, for a flight back to his home station the nosewheel began shimmying violently. Lt. Noble pulled the wheel off the ground and since he was rapidly running out of runway completed the take-off. The nose gear was checked visually in the air, and it was determined that the nose gear tire had blown and that the wheel was cocked to the left. The nose gear was retracted o.k., but the nose wheel fairing door would not close.

A decision was made to return to Moses Lake because of CAVU weather and the nice long, wide runways. All passengers were ordered to remain safetied in their seats. Approximately 200 pounds of tools and test equipment were moved as far back into the tail as possible by the crew chief. The airplane was circled around Moses Lake AFB until 300 gallons of fuel in the bomb bay tanks could be transferred to the main wing tanks.

Lt. Noble made two low approaches so that ground personnel could check the nose wheel. He was informed that the nose gear tire appeared to have blown and nose gear was still cocked to the left. After a second low approach, the plane was turned onto the downwind leg for a landing on runway 21. The wind was calm. The pattern was flown at 1100 feet at 160 IAS with one-quarter flaps. The three wheels indicated down and locked, green light on.

The tower operator instructed him to make a wide approach. As the B-25 was turned onto final at 150 IAS one-half flaps were lowered. On the final, the airspeed was reduced to 130 IAS. Approximately 1½ miles from touchdown, full flaps were lowered with airspeed further reduced to 120 IAS. Half a mile from touchdown, the pilot cut the battery switches. Touchdown was made on the end of the runway in tail low altitude.

Mixtures, ignition and main line controls were cut on touchdown. The control column was pulled full BACK dragging the tail the entire length of the landing roll. Since brakes were not used the B-25 came to rest on the main gear and the tail skid.

As a result of Lt. Noble's efficient handling of a critical situation the plane was landed with only the damage shown in the photograph.

For his headwork and excellent flying technique FLYING SAFETY awards this month's WELL DONE to 1st Lt. Jerry W. Noble.

Cross Feed

FLYING SAFETY IDEA EXCHANGE

While flying an F-84 and equipped with an A-13 oxygen mask, I was making a radio call to a wingman when I suddenly found myself totally out of breath. Breathing became so difficult for me that I had to pull the mask away from my face to get a breath of air. This happened quite a few times.

After the flight, I discussed my experience with various officers and personal equipment personnel in the squadron that I was flying with, and found that several of them had experienced this difficulty. We changed the pressure relief valve, which is located at the bottom of the mask where it connects with the hose, but this didn't do any good. We then took the valve out, washed it in clear cold water, and then reinstalled it. On my next flight the mask worked perfectly.

We tried the same trick with another mask that was giving trouble. It was cleared up. We found that these valves had to be washed about every second or third day. I'm wondering how many pilots are running out of breath using the A-13.

Robert J. Fitzsimmons
Major, USAF
Hamilton AFB, Calif.

"NOW TAKE A WEASEL"

Take a M-29-C Weasel, employ twenty man-hours, add two stretchers, two 15-pound carbon dioxide fire bottles, a saw-tooth razor blade and what have you: An XC Crash Unit.

At Great Falls Air Force Base, Montana the need for just such a vehicle arose and using material on hand just such a vehicle has been constructed. This land cruiser can travel thru snow, mud, sand or water. Rip thru barbed wire fences and underbrush at a speed of sixty miles per hour.

The idea was conceived by Capt. Benjamin F. Melvin, Base Ordnance Officer, and the completed unit is assigned to the base fire and rescue squad, for use in connection with crashes within a thirty mile radius.

TMPFGH AND BUMPF

The RAF uses a standard list of vital actions that are performed before take-off. These are quite apart from any cocpit check which is done on entering the aircraft, and applies to all types.

The following actions are performed immediately prior to lining up on the runway:

T—Tighten throttle friction nut.
Trim for take-off.

M—Mixture fully rich.
M-gear for supercharger.

P—Propeller control.
Flaps at t/o position.
Fuel on and check quantity.

G—Gills (cowl flaps).
Gyros checked and set.

H—Harness secure and locked.
Hatches closed.
Hydraulic pressure correct.
After take-off and again on the downwind leg prior to landing BUMPF is used.

B—Brakes.

U—Undercarriage.

M—Mixture.

P—Propeller control.

F—Fuel.
Flaps.

David Ogilvy
Pilot IV, RAF

DESERT SURVIVAL KIT

Because a major portion of the flying performed by pilots of the First Fighter Group is over the Southern California desert, it was concluded that a desert survival kit would be mighty handy in case of an emergency that required a pilot to abandon his plane. Capt. Robert Deloach at March AFB went to work on one.

He took the balsa wood seat filler used in the F-86 and made cuts that would house three pint cans of water (claimed by medics to last two days if used judiciously), a first aid kit, compass, jackknife, sun glasses, tropical chocolate, signal mirror and a small survival booklet.

After these items were inserted into the balsa wood block, it was covered with a zipper-equipped canvas pouch. Straps and buckles were attached so the entire unit can be fastened to a pilot's parachute. The kit adds only two pounds to the weight of the seat filler.

Items included in the kit cannot be drawn by squadron supply officers until AMC has had time to evaluate the kit and make the items available for issue. If approved by AMC, modification of the F-86 seat fillers could be made locally at AF bases.

McALLISTER'S SOUP CUTTER

After fouling up the Air Traffic Control system a few times and causing my ego no end of embarrassment by my failure to comprehend the intricacies of weather flying on the airways in a single engine fighter, my "lonesome type" brain cell started humming and it devised a system whereby my Jug and I could bore through the three dimensional wilderness without causing ATC to chew its fingernails clean up to the elbow every time they cleared NG 0015 Item Fox Roger.

When you're sitting in the old rocking chair of a "Fox-type" and the wing tips are the extent of your visibility you are the busiest little beaver that ever left "God's Green." Not only are you flying the guages, but you are computing ETA's, making position reports, and juggling a lap full of maps and a Radio Facility Chart that absolutely refuses to stay put. There just had to be a solution to this single brain, single engine weather flying, so out of my single engine brain came the "Soup Cutter." Incorporated in the "Soup Cutter" are the important little things which have more than once slipped my mind and have placed me in a position of embarrassment. It is a very simple plotter which contains nearly everything a fighter pilot needs to simplify his problems. The paper shuffling is over and the "Soup Cutter" fits right into the page of the Radio Facility Chart as a book marker. Position Reports are simple because it is right in front of you on the page of the Radio Facility Chart you are using and your computor is hanging around your neck on a piece of string. Another step has been eliminated and the CAA operators sit back with a sigh of relief as a fighter pilot flies over his station and transmits loud and clear in proper sequence a report that is coherent and in a tone of assurance.

If good training and good luck hadn't brought me through a hundred hours of weather time in single engine fighters I wouldn't have the guts to write this letter, but inasmuch as All-Weather single engine fighter pilots are few and far between I'm anxious to pass on my bit of knowledge to aid the other "lonesome types" who might be able to use it.

David F. McAllister

MEDICAL SAFETY

FATIGUE

Many inquiries have been made of this office to determine the possible effect of fatigue on aircraft accidents. Just how to measure fatigue, what to use as a unit of measure has long been a perplexing problem and still is. We don't know at this time how to measure fatigue but we do know something of the many causes.

Increased mechanization particularly as is found in the USAF with emphasis on speed and change makes for fatigue. It is hard to imagine any man in modern warfare more subject to stress and strain than the individual air crew member because of these many demands upon mind and body to which he is constantly subjected.

To a greater extent than any other crew member this is true of the pilot who in many instances is entirely on his own. He may be required to participate in acrobatics, cross country flights, even inter-continental ferrying and he will not have a Flight Surgeon constantly guiding him and reminding him of the necessity for excellent physical condition.

In the past when frequent examinations were a common occurrence many things were picked up and checked by the Flight Surgeon which now are being overlooked because of our critical shortage of medical personnel. These examinations served as important safety precautions and no doubt will eventually be reinstated. Regardless of this however, the crew member many times fails to realize that it is even more important to maintain a high day to day standard of fitness.

Fatigue attacks the weakest first—we all know that a high level of general health enables one to accomplish more with less tiring than the same individual who has not practiced the simple rules of healthful living.

The very nature of the pilot's work requires constant use of his eyes and an improperly balanced diet may eventually result in night blindness which may be the primary cause of a fatal accident. All the factors that produce fatigue in ordinary life affect the pilot also but in addition he enters into special conditions such as flight in extreme heat or cold, nagging vibrations and noises, incessant glare, storms all of which affect the man on the ground but not with the same mental or physical intenseness.

Fatigue together with tenseness and anxiety are inevitable in the career of a flyer. Sometimes these become exaggerated in the pilot's mind and color his mental and emotional outlook. If and when this happens, the Flight Surgeon should be solicited for his help and counsel. Too many emotionally upset people have attempted to read psychology or various books on mental hygiene with the idea of diagnosing their own difficulty and making their own adequate adjustment. This is extremely dangerous and futile.

The recognition of staleness from any cause is important to commanding officers. A timely change made in the usual routine often helps. It is the pilot's responsibility, however, to confide in his Flight Surgeon who may by simply preventive measures be able to cut the chain of disaster. Unfortunately, the pilot has been taught that he is above average (a superman) and not to complain; he thinks that to complain is a sign of weakness and that he will lose face by showing concern over a minor subjective symptom. Further, knowing that he may lose his flying pay, he disregards these early signs and symptoms and attempts to keep them his own little secret.

Let's not be guilty of this but confide in the Flight Surgeon whenever we feel that something is wrong. It may mean a temporary inconvenience, but this is far less serious than to underestimate the early signs of emotional upset and later meet with a serious accident as the result of our own neglect.

HOW HOT CAN YOU GET?

Capt. Ernie Moser, operations officer at MacDill AFB, an AF pilot with over 6600 hours, was making a routine test hop in a C-47. At least 1250 hours of his total time had been spent in the goony-bird, so there was no cause for undue concern. However, trouble developed—only one gear would come down! The tower was so informed and hurried consultations made with maintenance and operations. The result—"fly locally until most of your gas is burned up, then come in gear up and cut all switches before landing."

Captain Moser elected to come in before using up the gas, however, in order to lessen the possibility of an explosion due to gasoline vapor. Knowing from experience with the airplane that the landing gear extends six inches from the wheel well when fully retracted, and that free wheeling and full braking action was possible, he anticipated no difficulty on that score. He did expect trouble from the props though, as they extended beyond the margin of safety when rotating, or when straight down, and could cause a great deal of damage. So—on the final approach, Moser feathered both props, then quickly off-set them with the meshing switch so the props wouldn't drag, cut all switches, made a beautiful three-point landing, and put nary a scratch on subject airplane.

Maintenance personnel were on the spot with equipment and proceeded to jack the airplane up and put in the pins. They taxied it into the hangar, located and repaired the trouble in the gear system, and the airplane was successfully flown shortly thereafter.

Captain Moser's alert thinking and application of his knowledge of flying and of the airplane prevented an otherwise major accident.

AERIAL HITCH-HIKER

I'm an aerial hitch-hiker. But, fortunately, not yet one of these guys you read about in the papers when they say, "Three of the crash victims were passengers."

I've been hitch-hiking several years now and I've learned plenty. I've learned that your chances of getting out of any emergency situation that might arise depend mostly on you. Riding as passenger in non-scheduled Air Force tactical planes isn't like traveling on an airline where each plane is equipped with a smiling hostess to baby you along and do any required thinking for you. True, most pilots will at least give you a briefing, but some of them forget. Maybe they figure if you're an airman you ought to know a little something about airplanes.

The lesson I learned the hard way is that when you don't know, ask somebody who knows.

The first thing you'd better know about is that nylon ladder between sky and earth—the parachute. I'll tell you about three flights that wised me up on parachutes and several other things too. The first flight was in a C-47 cargo job.

After all were aboard, the pilot asked, "You all know how to use a parachute?" (More of a statement than a question.) Receiving no answer he disappeared with the rest of the crew into the forward compartment. The motors started and off we taxied to the end of the strip.

There was a great big joker sitting across from me who, in his endeavor to be comfortable, placed his number twelves right on top of my chute. He was highly insulted when I told him to remove them and straightened out my chute. It wasn't until then that I noticed the chute wasn't the seat pack type which I had seen before but a new one. I experimented with it for about ten minutes figuring out how it worked and adjusting it to fit.

There was a young soldier sitting beside me who asked me if it was o.k. to smoke. I said yes, and we started talking. He told me that this was the first time that he had ever been inside an airplane. I asked him if he knew how to handle the chute on the floor in front of him. He didn't even know what it was, much less how it worked so with my newly acquired knowledge, I attempted to explain the how's and why's.

It was at this point that a sergeant on the other side handed me a copy of the September FLYING SAFETY MAGAZINE. I started to read a story titled "Simple Arithmetic." It was a story of seven men who climbed aboard a C-47 and how one of them, a Sergeant named Joe, was ribbed about wearing his chute all the time he was flying. Along about this time the plane burst into flames, and he was the only one to get out. I started thinking. What would happen if this plane with twenty-two men aboard, apparently very few of whom had been taught how to use a chute, caught fire. It was then I decided that I'd be like Joe, and wear my chute the rest of the trip. We landed o.k. and I took my ribbing as I headed for the base operations building.

Arriving at base operations I was told that in approximately 15 minutes I could get a hop, to hang around and the dispatcher would let me know. The pilot came in to file his clearance. I was the only passenger. The plane was a C-82 and the first one I had seen on the ground. As I climbed in the crew went up a ladder, slammed a hatch leaving me alone in the huge cargo compartment. The pilot was in a great hurry and didn't take but a second to run up the engines. The next thing I knew I was hanging on for dear life to one of the cargo rings on the floor. I hadn't had a chance to fasten my safety belt figuring that I'd do so as he was running up the engines.

However, after attaining cruising altitude I got up and sat in the seat gingerly nursing a bump on my head and a skinned knee. A little later we entered some clouds and started bouncing all over the sky. We started to climb to get above the clouds and about this point I realized that at high altitude my thin sun-tan clothing wasn't the ideal uniform. All this time I wanted to talk with someone. As I sat there with my knees knocking and my teeth chattering, I began to wonder—how would I get out of this barn if something should happen. I looked around but couldn't see anything resembling an emergency exit. No one had told me what to expect or do in an emergency and I hadn't noticed how the crew chief had closed the huge doors at the rear of the plane. I didn't dare unfasten my safety belt, so I just sat shivering and bouncing and promised myself that if I got back to good old Terra Firma I'd never ride in the cargo compartment of one of these crates again unless I had on some warm clothing and company and knew all about the emergency exits.

The next day I got another ride going my way. After asking someone if there was room for another passenger, the dispatcher took my name, rank, serial number and home station and told me to go out to the B-25 that was parked directly in front. The crew chief told me to get into the rear of the ship which I did along with another airman, who was wearing a flying suit—the radio operator, I figured. The crew chief shut the hatch, the engines started and off we taxied.

I asked the chap in the flying suit if he knew who was piloting the ship. He replied, "The Colonel." I heaved a sigh of relief and figured that he wouldn't be a colonel if he wasn't good at this racket. We took off and about an hour out the plane gave a lurch to one side and felt as though we were flying sideways for a moment. I glanced out the window behind the other airman and saw that the propellor had come to a stop. I looked at the airman. He was looking out the window and his face had turned a greenish hue.

I checked the tightness of my chute harness and breathlessly asked the guy with the flying suit, "Is there any way we can call the pilot? What's the signal to jump? Has the crew bailed out? What should we do?" He said, "I don't know." I looked at him in amazement and said, "Aren't you the radio operator?" "Not me, I'm a file clerk in base headquarters," was his response. I was back in my rut—all I could do was sit and pray. With each lurch of the plane I prayed harder. After about five minutes the plane went into a slow banking turn and gradually started to descend. We came straight on in and landed with the other motor popping like a fourth of July firecracker. I was the first one out.

As I took a taxi home I figured that I'd had enough of this hitch-hiking without warm clothing, no parachute, and not knowing how to work interphones or emergency exits.

Now when I hitch a ride, if the pilot doesn't brief me on everything except the history of aviation and the number of treads on the nosewheel tire I ask him. I always know where the interphone set is and how to use it. I wear my parachute and know how to work it. I know where the emergency exits are and how to work them. I know the bail out signal. I know everything that I could possibly need to know before I climb aboard.

If you're an aerial hitch-hiker, brother, I advise you to do the same unless you want to hit the front pages one day in a story reading, "Three of the crash victims were passengers."

And, a plea to pilots: A minute lost on the ground briefing a passenger may save a life.—WCH.

KEEPING CURRENT

U.R. DIGEST

There are continuing reports of maintenance difficulties and unsatisfactory conditions existing when the necessary corrective action has been prescribed in the UR Digest (T.O. 00-10-1). The UR Digests cover discrepancies found in instructions and authorizations for modifications not covered by other Tech Orders. If the UR Digest is used to correct unsatisfactory conditions before they occur the result will be a considerable saving in man-power and equipment.

MACH 39

Rocket speeds as high as 30,000 mph are possible with the use of liquid hydrogen as fuel and liquid oxygen as an oxidizing agent, according to Dr. H. L. Johnson, director of Jet Propulsion Research at Ohio State University.

INCIDENTALLY

The worlds largest airplane tire—weighing more than a quarter of a ton with its inner tube—has been made in England for a British military transport. The new tire contains 224 miles of nylon cord.

• • •

The British have also built a new carrier-based jet fighter which has no landing wheels, but makes belly landings on a rubber mat on the deck. The planes are catapulted off.

• • •

Production of a typical new fighter plane requires as many as 13,500 different special tools.

NOISE HAZARDS

Air Force Regulation No. 160-3 warns of the precautionary measures to be taken against noise hazards. It warns that exposure, with no protection, for eight to 16 minutes to complex noise (similar to conventional aircraft noise) at a level of 130 decibels results in a hearing loss of 20 decibels, or greater, in the frequency range 500 to 3,400 cycles per second. Recovery of normal hearing after such exposures requires from six to 24 hours, depending upon the individual concerned. Transient physiological phenomena are vertigo, nausea, visual difficulties, fatigue, and/or irritability. All Air Force personnel should be familar with the contents of this regulation.

BACKWARDS

According to the Flight Safety Foundation, at least 50% of the passengers in a recent European airplane crash would have survived had they been sitting facing backwards. The majority of the passengers killed died as a result of skull fractures.

JETS

The British showed 24 types of jet planes at their recent annual exhibition at Farnborough. The U. S. has a total of 34 different types of jet aircraft flying or being evaluated. The British hold acknowledged leadership in the jet transport field while the U. S. leads in jet bomber development.

STEPPING IT UP

Instituted in 1930 by the late Charles E. Thompson, to stimulate development of faster aircraft, the initial National Air Race was won by Charles W. Holman. His winning speed was 201.91 mph.

The 1949 edition of the National Air Races at Cleveland saw the establishment of a new closed course record of nearly 600 mph. Capt. Bruce Cunningham from the 4th Fighter Group streaked around the pylons in an F-86 at an average speed of 586 mph, or 385 mph faster than the winning speed in 1930. Capt. Martin C. Johansen, also flying an F-86, recorded the fastest lap, burned the air around the pylons for one circuit at 636.4 mph to record the fastest lap in the history of the classic.

An increase of 385 mph in 19 years makes one wonder what the speed of Air Force planes will be in another 19 years.

ALL-PURPOSE FIGHTER

The USAF fighter development is organized in three functional categories: interceptor, all-weather, and penetration. A single type of plane that can successfully perform all these functions is highly desirable, but may be a long time in the development stage since a plane that will climb to 50,000 feet in less than five minutes, fly at supersonic speeds when equipped with air-to-air missiles, semi-automatic control systems and long range navigation equipment and radar is going to be SOME fighter.

TEMPERATURE INVERSIONS

Pilots who fly planes near their critical mach numbers should recognize the dangers which temperature inversions may generate. Temperature variations from —20 degrees centigrade at ground level to —7 degrees centigrade at 4000 feet have been recorded. This would cause a two and one-half per cent variation in the mach number. A pilot flying at a speed near the critical mach number for the airplane could easily meet with disaster if he dives into an inversion.

HALTED

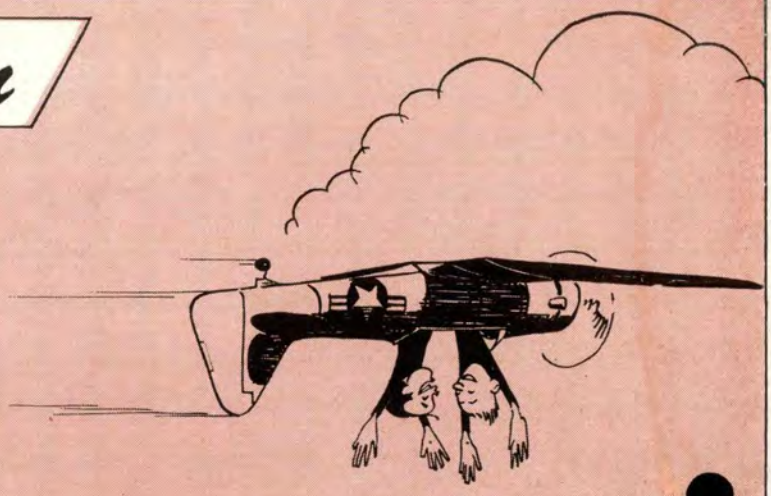
Because of the wide geographical scope of the grasshopper plague, only the airplane has provided an effective means of control. During the 1949 infestation, which struck hardest in northern Wyoming and southern Montana where the grasshopper population reached as high as 2000 per square yard, a fleet of 40 airplanes were used to spread poison bran over 2,700,000 acres in a little more than two weeks. To emphasize the results of this accomplishment, the Department of Agriculture estimated that the grasshoppers killed weighed 175,000 tons and would have filled a city block to a depth of 400 feet.

JET PILOTS TO WEAR ANTI-G SUITS

Continental Air Command announces a new policy of having all fighter pilots of jet aircraft wear the new Anti-G suit. Each ConAC pilot assigned to a jet fighter group will be issued the Anti-G suit as specified in the appropriate T/O&E. The suit will be worn on all acrobatic, dive-bombing and gunnery missions where excessive G forces may be expected.

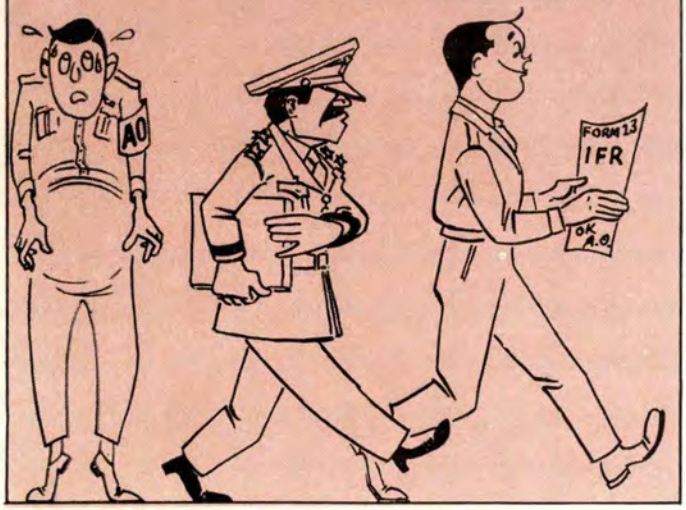
Instructors in the use and proper maintenance of the Anti-G suit will be members of the group who have graduated from the USAF Physiological Training program.

Mal Function

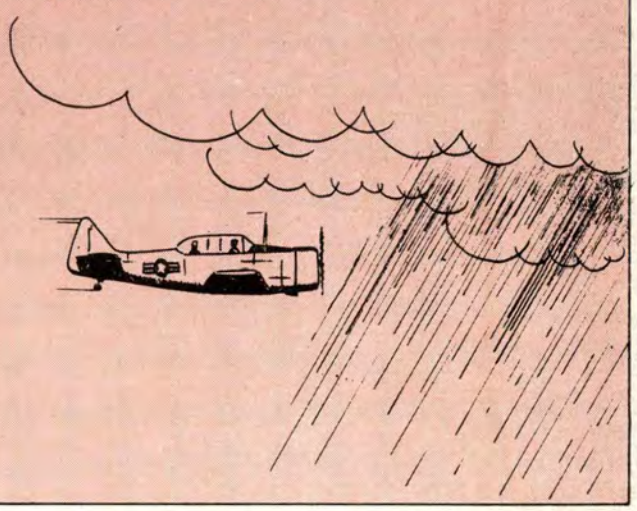


Instrument practice is for hicks
Mal would rather try some tricks

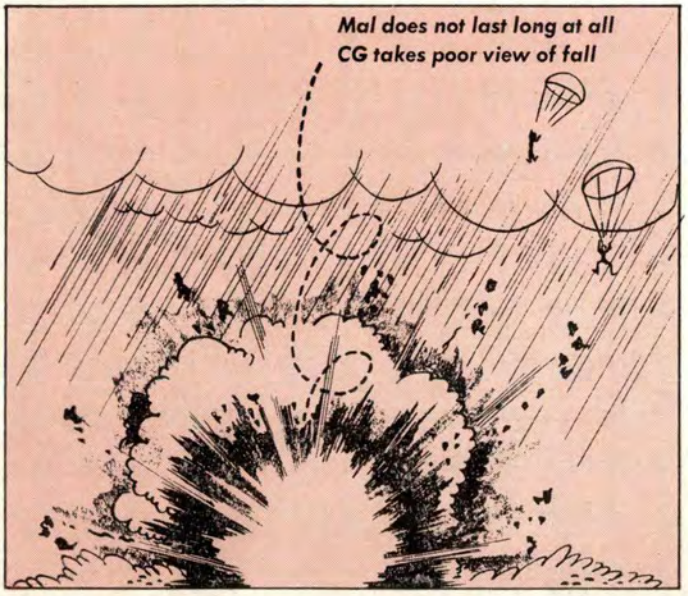
General requires ride
Fairweather Mal is at his side



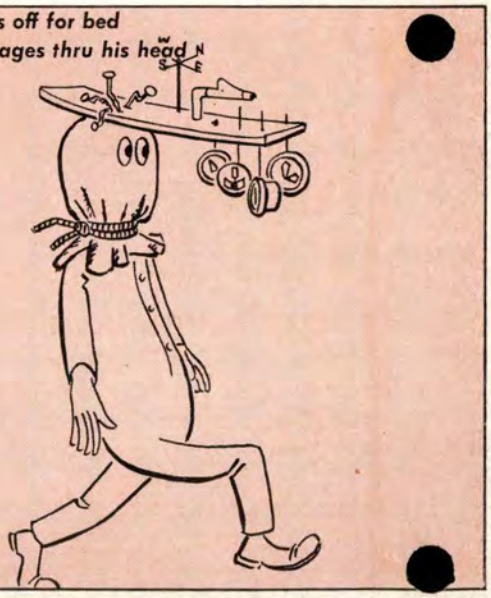
Behold and lo, Mal's in the soup
Will he spin, or will he loop?



Mal does not last long at all
CG takes poor view of fall



The General takes off for bed
While Mal gets gages thru his head



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