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THE COVER PICTURE

A new B-36 stands on the line at Carswell Air Force Base, Fort Worth, Texas, where the 7th Bomb Wing is based. See the article on page 2 for the story of how the 7th is conducting the first direct factory to bomb wing operation in Air Force history. On page 5 is an article telling how men of the 7th Bomb Wing are working out problems of daily living in "The House that the 7th Built."

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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.

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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.

LILY-WHITE HANDS

ADAPTED FROM CARIBBEAN AIR COMMAND FLYING SAFETY BULLETIN

PILOTS often gripe about faulty maintenance and complain that some of the aircraft they have to fly are in sorry condition. It is just possible, however, that pilots should look to their own lily-white hands before yelling "dirty fingers" at the maintenance section.

A ground crew can work for days to condition an engine completely, and then the flight crew can, through improper operation, foul it up in one flight. The ways in which flight personnel can cause engine difficulty are many and varied but consist mainly of improper starting technique, improper taxiing of aircraft, improper stopping of engines, and improper reporting of difficulties encountered. If optimum aircraft utilization is to be obtained with minimum expenditure of maintenance man-hours and maintenance parts, flight personnel must work closely and constantly with maintenance personnel. Neither the maintenance crew nor the flight crew can carry the burden alone.

The first major mistake frequently made with regard to engine operation is improper starting. Engines are constantly hydraulicked, plugs fouled out, engines backfired, etc., due to a misunderstanding of the requirements for a good engine start. This in turn results in link-rod failures, short spark plug life, air induction system repairs, etc., which impose an unjust load on maintenance personnel. A primary cause of starting damage is failure to pull the props through. This task should never be omitted. The proper starting procedure for any aircraft is available in the T. O. If pilots would make certain they *know* the proper procedure and use it consistently damage to engines caused by improper starting would be eliminated.

The second offense committed by pilots is improper taxiing of aircraft. The greatest taxi error is taxiing too fast. It is an all too common practice to taxi at 1000 to 1200 rpm. With engines set at this speed for taxiing the aircraft will move at a rapid rate and any decrease in speed can be accomplished only by continual braking. Of course this causes a great deal of unnecessary brake maintenance.

Taxiing at 1000 rpm or more is a result of a common belief that engines will "load up" or get too hot if idled at less than 1000 rpm. This belief may be the result of experiences with improperly adjusted carburetors.

T.O. 03-10-51 requires that engines be set to idle properly at speeds from 450 to 600 rpm. There is no need to use excessive rpm for taxiing since engines adjusted in compliance with this tech order can be idled at low rpm without danger of fouling the plugs. It is also unnecessary to use automatic lean mixture settings on the ground since the carburetor provides the proper fuel-air mixture. Flight personnel as well as maintenance personnel should be familiar with proper idle mixture and speed adjustment and must insist on these adjustments being correct.

Many maintenance man-hours are wasted because of improper reporting of engine trouble. It is all too common for pilots and flight personnel to analyze a difficulty and establish the corrective action to be taken. This is reflected in entries in AF Form 1A, such as "carburetor lean—replace carburetor," etc. Even though the analysis may be correct, troubles should not be reported in this manner.

Pilots should describe any difficulties encountered and give full details, but leave the decision as to cause and corrective action to maintenance people. By making Form 1A entries which give detailed symptoms of trouble, a pilot not only helps maintenance people but he enables the next man to fly the plane to check for these symptoms to determine whether the trouble has been corrected.

Improper stopping procedure is the final sin of which many pilots are guilty. Proper stopping procedure is simple if pilots will only practice it! T.O. 02A-1-29 entitled "Engines, General" gives the proper procedure. The engine crankcase section needs to be properly scavenged of oil prior to the actual stopping of the engine to eliminate excessive oil drainage past the pistons and to prevent a subsequent hydraulic lock at the next engine start. However, prior to the actual scavenge run the engine should be operated at approximately 1000 to 1200 rpm for sufficient length of time to permit cylinder head and oil temperature to stabilize at lowest readings. After the cylinder head temperature has stabilized, proper scavenge of the engine is obtained by operating it at 1000 to 1500 rpm for approximately one minute. The engine may then be stopped.

Conscientious effort on the part of flight personnel with regard to these phases of engine conditioning and flight operation will make the task of maintenance personnel a lot simpler and will result in a better, more efficient, and safer Air Force.

AIRPLANES aren't like animals. Where an elephant is clumsy by contrast to a cat, the powerful muscles of the B-36 respond gracefully and with nimble electronic swiftness to the touch of fingertips. This mammoth bomber is complicated, yes, but when the crew understands the B-36 from nose to tail they know it is a safe airplane. The B-36 is a teamwork airplane with its 15 crew members highly specialized and critically checked in their training and performance of their respective jobs.

New aircraft are normally flight and static-tested by Air Materiel Command for many months before they are turned over to tactical units. Not so with the B-36. It rolled right from the factory to the bomb wing, in order to accelerate the program. This means that simultaneously with AMC's tests for modifications, Strategic Air Command was training crews to maintain and fly the B-36.

The 7th Bomb Wing, at Carswell AFB, Fort Worth, Texas, first of the SAC units to receive the six-engine plane, began ground school training a year before the first airplane was actually delivered. Now, with squadrons coming up to their assigned strength of six B-36 bombers each, crews are flying airplanes which incorporate improvements and modifications they helped make on their flights and maintenance lines as they combined service tests with training.

Sharing in the development of the B-36 into a true intercontinental bomber, officers and airmen of the 7th Bomb Wing have been able to observe from the inside how industry and the Air Force have combined the latest research and developments of scientists in many fields to produce what they are convinced is the spearhead of the Air Force's ready-for-combat force in being.

They know for example that an order for a bomber which will carry 10,000 pounds of bombs 10,000 miles was an order full of endless, complicated problems. And weight is the most important of these problems. In solving the weight bogey, many new materials and types of equipment were required.

Paradoxical as it may sound, the complicated electrical system of the B-36 with its 300 electric motors saves weight. Explain that? First, let's look at the rule of thumb used by aircraft designers and engineers. They figure that to add a pound to the airplane's existing weight requires nearly a pound of fuel and oil to maintain the plane's design maximum range. The B-36 requires .82 pounds of fuel for each added pound of weight to hold its range requirements. Therefore, strict control had to be exercised on how many pounds could be added over the design weight without detrimental effect on airplane performance.

"The way engineers talked about taking a pound off here and a pound off there sounded like they were in the girdle and reducing pill business," is the way one 8th Air Force officer described the conference of project engineers and draftsmen.

The outstanding example of weight control is an electric motor which had to be developed to drive a hydraulic pump. Maj. John D. Bartlett, who headed the Carswell crews in checking out other 7th Bomb Wing personnel, said in reference to the development of the needed motor, "Advanced engineering principles and the use of new materials resulted in a 16-hp motor which weighs only 22 pounds, or 1.37 pounds per horsepower." He pointed out that several years ago the best aircraft electric motors weighed approximately 10 pounds per horsepower.

Rather than install thousands of feet of heavy cables, push-pull rods and other "plumbing" connecting the engineer's and pilots' controls with engines and accessories, the maximum use is made of electrical energy. The smallest of the plane's 300 electric motors is a 1/50-hp motor that opens and closes the carburetor air filter door, while the largest is the hydraulic pump motor already described. Three alternators driven by three of the plane's engines produce a system current of 400-cycle, 208-volt alternating current. The alternators develop the current while turning at a speed of 6,000 rpm through a constant speed drive. The AC system was adopted because it permitted considerable weight saving in required wire gage, actuators and generators. A secondary network is supplied with direct current by six transformer-rectifiers which take their power from the AC circuit.

Other savings in weight were accomplished by using magnesium alloy for certain parts of the B-36. Weighing only two-thirds as much as aluminum, use of 8,000 pounds of the magnesium alloy saved 1900 pounds. Of course aluminum is used in great quantities and an artificial aging process which increased its strength up to 40 per cent allowed savings in that metal.

Another hefty reduction in weight came when each of the large single landing wheels were replaced by four 56-inch high pressure tires on each of the main gears. This change removed 2,600 pounds from the landing gears besides giving a greater footprint area which allows the plane to operate from any base that can accomodate B-29's.

While the airplane still grosses over 300,000 pounds, the reducing diet strictly adhered to throughout its inception and growth gives the B-36 great endurance and load-carrying capacity. It's a heavyweight without a known pound of useless fat. It's all muscles and nerves.

The control system is so designed that one pilot can easily maneuver the big bomber. The pilot controls trailing edge tabs instead of the actual surfaces and actually moves trim tabs when he moves the controls. Normal feel is given the controls by the use of springs.

The flight engineer is at the nerve center of the huge bomber. It is an engineer's airplane, as any B-36 pilot will tell you. From flight planning before takeoff to the end of a mission it is the engineer's job to squeeze the most out of the airplane. He knows the bomber's weight at any point of the flight, informs the pilot of rate of fuel flow in pounds per hour per engine during pre-flight runups as well as during each stage of the flight.

Flight plans are computed for long or short missions predicting fuel and oil consumption. 1st Lt. J. W. McKim, 7th Group Flight Engineer, gave an example of how close such flight plans are figured. On a recent flight which was predicted to use 27,000 gallons of fuel, an accurate check after landing showed that consumption had been within 75 gallons of the predicted.

Conditions which the flight engineer must consider in his flight plan include gross weight at takeoff, density altitude of each stage of the flight, brake horsepower, rpm, power actually delivered to the propellers, measured in pounds of torque, time, fuel per hour, fuel remaining after each stage, true airspeed, indicated airspeed and distance.

A B-36 crew consists of an airplane commander, two pilots, two flight engineers, four 1037's (radar observer—bombardier—navigator), two radio operators, a remote control turret mechanic gunner, one electrical mechanic gunner, two armorer gunners and a radar remote control gunner.

"The airplane commander really is a commander," according to Capt. Charles A. Thomas, pilot of the 7th Bomb Group Standardization Board. "The two pilots are the executive officers of his command post."

Four wheel main gear distributes B-36 weight. Permits Operation on any runway suitable for B-29's

As the pilot's operating instructions explain, the commander must use every effort to gain the necessary knowledge to become an efficient and safe commander of the 15 men who are trusting their lives in his care. "You must learn the airplane from nose to tail and you must see that your crew members learn their respective jobs completely," is the big assignment handed the men selected as airplane commanders. "It is not possible for you to attend all the courses of instruction for each crew member," the Strategic Air Command handbook informs the commander, "but their progress and records should be checked constantly. Get to know each man's duties and problems as it will be up to you to devise methods for performing them efficiently. If knowledge is lacking on some specific point, it will be up to you to supply it. Learn to use all the available sources for getting answers to questions and problems you do not know or cannot solve. Consult the T. O.'s, maintenance bulletins, base regulations, and the men who maintain the airplanes. Do not be afraid of a little dirt and grease; get out and work on the airplane yourself."

Check-out requirements for the crews who man the B-36 are both extensive and intensive. To qualify as a first pilot a man must have at least 1,000 hours of four-engine time, of which 600 hours are in the B-29 and finally 50 hours trainee time in the B-36. During these 50 hours the pilot must demonstrate proficiency in day and night landings, instrument flying, emergency procedures and demonstrate that he learned thoroughly what they taught him about the airplane and its equipment during the ground school course.

Every crew position on the nimble heavyweight demands a technician. Nobody merely "rides along." Each man is constantly busy during almost every minute of each flight. The checkout requirements for all the crew members are equally as exacting and comprehensive as those of the pilot.

A three and a half million dollar airplane is worthy of such care.

MAJ. H. P. ANDERSEN
Flying Safety Staff

THE HOUSE THAT THE 7th BUILT

SUPPOSE someone presented you with a radically new home, minus all of the trimmings, and stated flatly, "It's all yours. Fix it up to suit yourself."

That's about the same position that Carswell AFB's 7th Bomb Wing personnel found themselves in when they received their first new house in late June of 1948. They've received many more new houses since then and they are still fixing them up to suit themselves. The "houses" being, of course, B-36's.

One of the greatest pleasures of having a home is in being able to come home to its comforts after a hard day at the office. Similarly, one of the greatest contributing factors to flying safety in long-range aircraft is crew comfort. It is in this respect more than any other that the B-36 can aptly be called the house that the 7th built. And is still building.

As was stated in the article preceding this one, the 7th got the B-36 fresh from the factory so to speak. This was done in order to insure that the big craft would reach full operational status at the earliest possible date. Such being the case, little was known about the plane in reference to crew comfort and equipment. True, aircrews received almost 18 months training before the first B-36 was delivered, but there is a big difference between book learning and actual practice. Then too, there were many problems that were unknown until they were encountered under actual flying conditions.

As a starter let's look at the food problem. Regardless of what argument any man may give you, food is of prime importance to his physical and mental well being. In the past war food in flight did not present too serious a problem. Except for B-29 operations in the Pacific, the majority of the missions flown seldom exceeded seven or at most 10 hours and this coupled with the fact that the crews were chowed immediately preceding takeoff did much to eliminate the hunger factor. In cases where food was considered necessary the packaged field rations such as the "K" and "C" were used.

However, with the advent of the B-36 and the concept of intercontinental bombing where time is a factor that cannot be bypassed, the food problem assumes striking proportions. This became readily apparent with the first flights of the big bomber.

The first stop gap measures for the food problem came in the form of the packaged rations and prepared in-flight lunches, but it was the contention of the Food Service people and the Flight Surgeons office that a more suitable solution could be found.

The first forward step towards better in-flight meals came with the use of a newly developed canned meal coupled with the use of the hot cup. These canned meals, designated the IF-2 and IF-3, presented a variety of foods. They included hamburgers, beef and pork, boned chicken, spaghetti and meatballs, apricots, peaches, cookies, bread and crackers and various desserts. They also contained plastic eating utensils and napkins. Although nutritious and suitable these meals were not accepted as the final solution to the problem and work on the project continued.

Now the men of the 7th have what they think may be the solution to the problem. It is what they call the frozen pre-cooked meal. It was originally developed for the Navy, who used it successfully on their MATS routes.

It consists of a small lightweight metal tray divided into three sections. These sections are filled by a meat and two vegetables. When initially prepared in the tray the food is seven-eighth pre-cooked and then flash frozen. It is then wrapped in aluminum foil and a paper wrapping and kept in cold storage until it is ready for use.

The pre-cooked dinner may be comprised of the following components: Meats: roast chicken, swiss steak, tenderloin steak, roast turkey, veal stew: Vegetables: lima beans, diced carrots, mashed potatoes, english peas, sweet potatoes, and green beans. These frozen meals are supplemented with fresh bread, a beverage of some sort such as tea, coffee, fresh milk, fruit cocktail, or some other dessert, and cookies. These supplements are all drawn from regular field ration supplies and they are to be kept in a refrigerator of aluminum alloy using dry ice to store the meals and fresh foods.

For cooking the frozen meals while in flight the 7th Bomb Wing personnel have perfected an oven very small and compact, about 12 by 18 inches and 12 inches deep. It runs on the airplane's electrical circuit and will reach a temperature of 385 degrees Fahrenheit. The frozen meal can be prepared in the oven within 15 minutes time. However, the oven must be pre-heated for five minutes before the food is put into it. An oven in each compartment means two ovens in each airplane.

An advantage of the frozen meals is that everything used with the meal including the tray that it is packed in and the plastic utensils supplied with it are discarded after each meal. This helps the sanitation problem considerably. Another advantage is the weight and space factor as compared to the weight and space required if a full size galley was installed. Also, they provide a balanced nutritious meal. The large variety of foods available will serve to eliminate monotonous and unappetizing repetition in the menu. These pre-cooked meals have not yet gone into full use. As soon as some of the small faults are ironed out the 7th expects to have them in operation on all aircraft.

CLOTHING

When the B-36 first went into operational use, personal equipment that was used was drawn from existing Air Force stock. However, 7th Bomb Wing personnel later found that they would benefit by making their own changes or by devising entirely new equipment. They found that most of the parachutes used were bulky and that the weight added greatly to fatigue on prolonged flights, so they have modified a B-8 harness to use with the A-5 chute pack. The chute is buckled on the front of the harness and the new set up will allow the chute to be unhooked from the harness during flight. They can be easily and quickly snapped on.

At present 7th personnel are using standard altitude equipment but have been making various changes and improvements as they go along. They are using the A-13A mask. They are also working on an oxygen resuscitator. In case a crew member should be overcome by lack of oxygen the mask can be fitted to his face and the resuscitator used in the same manner as an oxygen tent.

The personnel of the 7th Bomb Wing are also developing a bends bag to be used in event of explosive decompression. This bends bag is vinylite with an attachment that will fit the oxygen outlet

"B-36 Kitchen Stove" for cooking meals in flight

and will be used to de-nitrogenize anyone who should suffer a case of the bends in the event of explosive decompression.

B-36 crews believe that they will not use the single-point liquid-oxygen system. They prefer the standard bottled oxygen due to the fact than on such a large ship if the one single source of oxygen should go on the blink they would be at a loss to provide one or the other compartments with oxygen. A ditching jacket has been devised which resembles a large canvas night shirt with snaps around the bottom. In the event of rough ditching, these snaps may be affixed to rings on the floor of the aircraft and will hold a man stationary throughout the ditching.

The pressurizing system works exceedingly well and provides conditions of at most 12,000 feet and frequently nine or 10,000 feet when the ship is cruising at 40,000 or above. The system is so effective that oxygen masks are not worn by crews on flights below 40,000 feet.

A heat exchange which provides heat for the ship is located at the turbos. There are also two heating units in the nose to be used to eliminate window frost. There has been some trouble in regulating the heating system and it has often been necessary for the men to remove parts of their clothing due to the fact that the heating system provided too much heat. However, this will be straightened out.

The 15-man crew works in two shifts and there are always two observers, two pilots, one engineer, and one radio operator on duty at all times. This has been done so that the men may rest on long flights because it has been found through experience that the men become fatigued and cramped on long flights at high altitudes.

In the aft compartment there are two tiers of three beds each. They are constructed of tubular steel with a stretched nylon covering. The Arctic sleeping bag is sometimes used in conjunction with these beds.

There is little noise in the fore compartment and talking can be done in normal voice. There is a slight noise aft but not so much as to be bothersome. The B-36's are equipped with regular six man life rafts and there are two raft compartments easily accessible in each main compartment of the ship. There are also additional rafts installed internally which are released on ditching.

One of the big problems encountered by 7th personnel is that of indoctrination. The toughest part of this indoctrination problem is that part of transition training of new crew members to the bomb phase. The 7th is considering adding a second radio operator to each crew and sending them to the Randolph School of Aviation Medicine to be trained as altitude-oxygen and first aid men.

On bail out a jump master is designated for each main compartment in case an emergency requiring abandonment of the bomber. He is responsible for proper crew preparation. Three rings on the interphone system designates an emergency, one long ring designates bail out. The jump master is the last man out of each compartment.

So far the people on the B-36 believe that they have the emergency equipment problem licked. And their largest remaining problem is that of personal clothing and training. The core of their problem is to adapt their equipment and procedures to the plane taking into account flexibility, weight, and space. The 7th is working on these things in conjunction with AMC, and progress on various problems moves forward as fast as the planes change and the men learn from it what their operations will permit.

EJECTED TO SAFETY

Editor's Note: Upon hearing of Lt. Farley's emergency ejection Capt. James L. Dumas, FLYING SAFETY's Research Editor, flew to March AFB and interviewed Farley at the hospital. This story is the result of that interview.

"Without the ejection seat I would be a dead duck," says Lt. Robert E. Farley, the first USAF pilot to use the ejection seat during an emergency. "It would have been impossible for me to have gotten out of the F-86 without the seat."

Thus the first emergency use of the ejection seat can be classified as successful, and credited with a "save." This was expected by all persons familiar with the seat and with the results of the live ejection tests made by Capt. Vincent Mazza over San Pablo Bay (reported in the October issue of FLYING SAFETY).

Lieutenant Farley and Major C. M. Isaacson departed March AFB on 29 August on an instrument proficiency flight with Lieutenant Farley observing for Major Isaacson. The wheel-fairing doors on the F-86 flown by the major failed to close after the wheels were retracted. Rather than land with the wing tanks full, Major Isaacson decided to fly at 11,000 feet until the fuel was exhausted from the wing tanks of the two Sabres.

A course was flown that took the two planes over the desert near Indio, California. While cruising at approximately 200 mph, Lieutenant Farley informed Major Isaacson that he had lost aileron boost and that there was a "nibbling" at the controls. Major Isaacson, believing that the "nibbling" might be caused by a malfunctioning starter-generator, asked Lieutenant Farley to check his load meter. After Lieutenant Farley replied that the load meter was indicating a normal output of 28 volts Major Isaacson told Lieutenant Farley to switch his boost valve to BY-PASS position. The nibbling at the controls continued. The major then asked Lieutenant Farley to close his dive brakes which eliminated the nibbling.

Knowing that Lieutenant Farley would have a better chance of successfully landing the F-86 without the wing tanks attached, Major Isaacson told Farley that he would lead him out over the foothills where he could drop his wing tanks without damage to private property. Before Farley attempted to drop his wing tanks, the major told him that he would have a hard time controlling the Sabre if only one wing tank dropped, and for Farley to be prepared for any emergency.

After placing himself out to one side and slightly to the rear of Lieutenant Farley's plane, Major Isaacson told Farley to drop his wing tanks when he was ready. Farley pushed the salvo button and only the left tank came off. "As soon as I saw the one tank come off, I thought the other had turned on its shackle but later I decided that it was still in its proper position," Major Isaacson related.

As soon as the left tank dropped, the plane started a slow descending turn to the right. Lieutenant Farley was attempting to hold the plane level by placing both hands upon the stick and exerting all his strength. However, the plane continued in a turn and was starting a spiral to the right when Lieutenant Farley removed his hand from the stick to reach for the trim control. "As soon as I took my left hand off the stick, the plane snapped over onto its back and started a vertical dive or split-S," Farley said.

"As soon as I saw the F-86 in a vertical dive I knew that unless the right wing tank blew off Lieutenant Farley would never be able to recover from the dive, so I told him to bail out," Isaacson stated. "Since the plane had entered the vertical dive below

11,000 feet and the terrain was approximately 4,500 feet above sea level, I doubt if Farley could have recovered if the other tank had come off."

Lieutenant Farley stated that he had given no thought nor had he made any preparations for bailing out until Major Isaacson told him to do so. As soon as he heard the major yell for him to get out, Farley fired the canopy, placed his feet in the stirrups and ejected himself from the diving plane. "I saw that the hills around the valley I was landing in were on a level with me so I immediately released the seat and simultaneously pulled the rip cord," Farley stated. "I didn't have time to wait for the seat to separate from me and it tangled in the shroud lines of my parachute and came to rest upon my head and stayed there until I struck the ground. If I had been high enough so I could have waited for the seat to separate from me before I pulled the rip cord I wouldn't have gotten this cut on my cheek."

Farley estimated that he was traveling approximately 500 mph when he ejected himself from the diving Sabre. "I was probably at about a thousand feet when I fired the seat and I estimate the parachute opened when I was 500 to 600 feet above the ground," he said. When his parachute opened, Lieutenant Farley lost his shoes, dog-tags, watch, and, in his words, everything except his flying suit. His feet were injured when he contacted the ground and he received a four-inch laceration extending from the anterior portion of the left ear to the left cheek when the ejection seat slammed down upon his head. Approximately 40 sutures were required to close the cut on his face. The scar from the cut will be the only permanent mark Lieutenant Farley will retain as a result of the ejection.

Farley stated that without the ejection seat he would have died in the crash of the aircraft. Major Isaacson, operations officer of the 71st Fighter Squadron, who watched the entire operation and followed Lieutenant Farley in his descent, stated that he regretted that the Air Force lost the F-86 and the injuries to Lieutenant Farley, but that he believed the Air Force had profited by the accident since the morale of the F-86 pilots in the First Fighter Group had gone up 100 percent as a result of the ejection. "In the future there will be no hesitancy to use the ejection seat on the part of any of our pilots," is the way he put it.

When asked what he thought of the ejection seat as a means of escape from highspeed aircraft, Lieutenant Farley replied, "I'm sold on it, brother. Without it I would not be here talking to you. Pilots who are flying planes equipped with it should make certain they know how to use it in case an emergency arises. Having it and not knowing how to use it is the same as bailing out without your parachute so far as I'm concerned."

Lt. Farley practiced desert survival, built parachute sun shelter. Photo from Taylorcraft by Willis Photo Company

DO YOU KN

By 1st Lt. Hal J. Basham
Flying Safety Staff

Editor's Note: The author made two parachute jumps, one on land and one into the ocean at the parachute training school of Air Rescue Service to get first hand information for this article. Instructors at this school are the Air Force's number one authorities on parachute jumping.

Your answer to the title question may be more important than you think. Your chances of being killed or injured in an emergency bailout are one in two! That's not an estimate; records on file in the USAF Flying Safety Division show that an average of one out of every two emergency parachute jumps results in death or injury. One jump in every 10 is fatal. And according to the experts in the business that alarming figure stands because you and I simply don't know how to bail out.

Over the side . . . one, two, three . . . pull! That's the way the book I read somewhere back in training gave the bailout procedure. And that you just float lazily down and enjoy the ride. Nothing to it, so long as that chute opens. It took the ARS pararescue specialists at MacDill AFB, Florida only minutes to shatter that happy illusion that had ridden with me on every flight since primary. For years I'd been that tenth man just riding around waiting to become a statistic.

Of course any parachute jump begins with the people who pack the chutes. They have that down to a science now, and it is not a cause for worry, provided the chute gets proper care after it leaves the packer's hands. All aircrews are familiar with the rules of proper parachute handling—keeping the

Left. Example of good body position for back pack chute opening. *Right.* First Sergeant R. E. Enoch, ARS Pararescue School, demonstrates correct parachute landing fall. First picture shows proper body position for landing. First impact shock taken on balls of both feet. Body immediately twisted to side as fall continues taking up shock on side of calf and thigh, buttocks and finally on shoulder as roll is completed. This type landing fall prevents broken knee caps, elbows and shoulders which frequently resulted from the old head-over-heels tumblers roll.

OW HOW TO BAIL OUT?

chute clean and dry and straight—just as they know the importance of a tight fitting harness. It's what you do when that alarm bell rings that means life or death.

The first thing is to get clear of the plane. For the fighter boys the ejection seat has solved that problem. For the rest of us it means diving overboard. If you have to bail out through a bombay or floor hatch, go out facing the front of the plane if possible. The recommended procedure is to squat at the edge of the hatch and roll out head first. Ball up as tightly as you can as you start out, legs and arms drawn up against your body so that you will get all of your body into the slipstream as nearly at once as possible. In planes with side-door bailouts exits you can go out in any position.

Once clear of the plane straighten your body into a semi-rigid position with your legs together and arms in against your chest and start your count. The ARS parachute instructors recommend a count of five speaking in thousands—one thousand, two thousand, three thousand, etc. Don't jump with your hand on the ripcord. It's too easy to pull it inadvertently. When you are ready to pull, look at your chest to locate the handle and pull. A desperate yank is unnecessary. A good hard pull out to arm's length will always free the cord. Drop it. Get rid of it. That way you will know it is all the way out. In addition your hands will be free which is essential to a successful landing.

The speed and freedom with which your parachute opens depends in large measure upon the position of your body as you pull the ripcord. This is very important, according to the boys who jump for a living. No matter how fast you are tumbling, it is possible to make sure your body is in the best position for the type of chute you are wearing before you pull the ripcord. Here's the rule.

If you're wearing a back or seat pack chute pull when you can see the ground. This means your pilot chute will pop out above your body.

If you're wearing a chest pack pull when you can see the sky. Again your body will be below the pilot chute as it comes out.

This is so important that the jump instructors practically make the pararescue students eat it, drink it, and smoke it in their pipes. If your body is below the chute as it starts from the pack you won't have to worry about getting shroud lines tangled with your arms or legs or your pilot chute catching somewhere on you or your harness. According to the ARS jump instructors you cannot be tumbling too fast to watch the ground or sky come around and pull while your body is facing the proper direction.

Don't hesitate when you decide to pull. That's the other rule on pulling the ripcord. When you see the sky or ground, which ever you are looking for, pull then. If you hesitate a second you may turn on over and be in the wrong position by the time you do make up your mind.

If you realize you are revolving sideways as you turn head over feet in your fall you can stop this turning quickly by holding your arms out sideways. When you have stopped this turning it is easy to watch for the ground or sky as you continue to tumble head over feet.

When your parachute opens, the first thing to do is check your canopy. Reach up and spread the risers and make sure your chute has blossomed out full and round. It is possible that you might have one or more shroud lines over the top of the canopy which will increase your rate of descent dangerously. If

you see your canopy is not full blown and round, you will be able to tell at once which lines are over the canopy. Jiggle the riser leading to those lines. If this does not cause them to slip off pull yourself up the riser until you can reach the offending lines and pull up and down on them until they work off.

If you can't get the lines off your canopy and you have a knife you can cut as many as six lines in a row to free them without appreciably increasing your rate of descent. How to cope with shroud lines over a canopy is included here merely for information since your chances of encountering this difficulty are remote, especially if you pull the ripcord with your body facing the right way for your type of pack.

After you have checked your canopy look down and around to see where you are going. Not that you can do anything about it except look. While you descend note the location of roads, railroads, power lines or settlements and the general layout of the terrain below. It will be very helpful after you land.

Turn your parachute in the direction you are drifting. You can do this by pulling down on any of the risers and holding the riser until you have turned in the desired direction. Your chute will turn very slowly. Release the riser and you will stop turning.

As you near the ground prepare for your landing. It is by far the most critical part of any parachute jump and the place where the majority of injuries are received, injuries usually caused by lack of knowledge of how to land.

Lift your arms overhead along the risers. Hold your legs together, knees slightly flexed, toes pointed down at about a 45 degree angle, body completely relaxed. When you think you've reached an altitude of 100 to 200 feet up *look away from the ground*. This is the most important single safety precaution you can take. Get your eyes off the ground!

Either look straight out at the horizon or if you find your eyes starting to go back to the ground look up at your canopy. Keep your legs together, knees bent, toes pointed down and body relaxed. Force yourself to remain relaxed. You cannot possibly relax if you look at the ground. Even the most experienced jumpers tighten up if they watch the place they are about to hit.

The moment your feet hit try to turn your body either right or left as you fall. Make no attempt to remain on your feet as it is practically impossible with parachutes currently in use. Twist your body right or left distributing the shock of the fall along your leg, thigh and shoulder. (Tests are currently being run on a parachute which actually permits the user to land and stay on his feet, but until this new chute is accepted and put into general use a proper landing fall is necessary to avoid injury.)

No matter what you may have been told in the past or seen in movies, don't attempt to head over tea kettle tumblers roll in which the shock is taken largely on the back of the shoulder. This roll is obsolete and is no longer taught USAF jumpers. The correct parachute landing fall incorporates the turning fall illustrated in the series of photographs which can be approximated by staying relaxed and turning your body one way or the other as you hit the ground. If you maintain your proper body position right into the ground and fall in this manner your chances of receiving any injury are very greatly reduced.

Unless the wind is blowing enough to keep your chute inflated don't be in any hurry about getting on your feet. Make sure you haven't broken anything before you get up. If the wind is blowing, roll over on your stomach and pull on the bottom risers to collapse your chute.

When you get on your feet roll up your parachute and keep it with you. If you happen to be in an unsettled area it will be useful to you in many ways as FLYING SAFETY pointed out in the recent series of articles on survival. Look up and around you. If you see some of the other crew members coming down yell at them to get the proper landing attitude and to relax. It will help a lot.

Watch where other crew members land if you can. It is always a good idea to get the whole crew together if possible after a bailout.

The ARS para-rescue and survival instructors had a bit of advice to offer anyone bailing out above 15,000 feet. Let yourself fall free until you reach that altitude or lower before you pull the ripcord. Your opening shock will be less and you won't suffer from the cold if you delay your opening to a lower altitude. If you know approximately what your bailout altitude was you can judge your opening altitude by counting. You will fall approximately a thousand feet each time you count to 10 thousand by thousands.

Anyone who tells you a parachute landing on the ground is a soft one is either a liar or just plain ignorant. You hit so hard your teeth will rattle, but you won't suffer any other ill effects if you land in the proper fashion.

A parachute landing in the water is something entirely different. It is actually delightful. Provided, of course, you know a boat is handy to pick you up.

The water landing problem is a little different from that posed by a landing on terra firma. All you have to worry about on the landing is not getting fouled up in your parachute. This is the correct water landing procedure for the quick-release type chute.

While you are coming down work yourself well back in the saddle of the chute. Reach under your legs and grasp the seat webbing and pull yourself as far back into the seat as you can. When you reach an altitude of a hundred feet or so above the water hold your arms right against your sides and press the quick release. Still holding your arms against your sides pull the leg straps free. You are then holding yourself in the harness with your arms alone. Watch the water and the moment you hit straighten your arms over your head. Your harness will slide right off over your head leaving you free in the water. Come to the top and inflate your Mae West.

The procedure with regular snap-on harness is essentially the same. Work back in the saddle as you approach the water and unfasten your leg snaps. Hold your arms against your sides and unsnap the chest strap. At about 50 feet slide out of the saddle, still holding your arms at your sides. Straighten your arms as you hit the water and you will slide out of the chute. If your chute has a one-man raft attached try to hold onto the harness with one hand.

These are the fundamentals of bail-out as they are currently taught and practiced by the Air Force authorities on the subject. Remember them, go through them frequently in your mind, and your chances of being injured in an emergency bail out will be reduced a hundred fold.

Landing position—knees flexed, body relaxed, eyes off the ground

all **AVIATION** *neec*

WITH JET AND ROCKET planes flying faster than sound and people thinking about making trips to the moon, there are those who still have their doubts about the safety and practicability of high-speed air travel.

But this doesn't surprise an old-timer I know.

"I can recollect the times when people were saying aeroplanes were nothing but a flash in the pan," this man who has been an aviation fan for 40 years told me.

"Take the time back around 1910-15, not so long after the Wright Brothers had popped the lid off the barrel. Even with aviation moving right along, people were still saying that the thing wouldn't last."

The old-timer hunted through his desk and found an assortment of clippings which he proceeded to chuckle over.

"Get a load of this one—it was written by some editorial writer for *The Engineering Magazine* in New York in December 1911."

It read:

"We do not query the interest or excellence of the Wrights' mechanical achievement. There is no reason apparently why they should not vastly better any recorded performance—fly thousands of feet high, or hundreds of miles in distance. Our skepticism is only as to the utilitarian value of any present or possible achievement of the aeroplane. We do not believe it will ever be a commercial vehicle at all. We do not believe it will find any very large place in the world of sport. We do not believe its military importance is as great as is commonly supposed, or will extend except accidentally beyond the range of scouting and courier service. Even here it remains wholly indeterminate how much except mutual destruction can actually be accomplished by men in flying-machines, if other men in other flying-machines are trying to prevent the accomplishment."

That writer wasn't the only one. Some authoritative commentator in a French magazine called the *Soleil* said:

"We are told that the aeroplane is likely to be a means of comfortable and rapid if not economical transportation. Already we should expect to see some fine morning a gigantic aerobus—what an elegant word!—sweeping through the interplanetary spaces. But there is nothing in all this. . . . We can not, we ought not, to dream of viewing the aeroplane as a vehicle of travel and rapid transit. And the rea-

AN AVIATOR'S COLLISION WITH A RAILROAD TRAIN, NEAR PARIS.

In this dispute with steam locomotion M. Vedrine came out second best, and had to spend several days in the hospital.

...ds now is SAFETY

son is plain. There are too many risks, and too much expense involved."

"Doesn't that make you want to laugh up your sleeve knowing what we know now," the old-timer asked. "Those know-it-all boys who were saying the aeroplane wouldn't make success like trains and busses! Why, man, last year alone the scheduled planes in this country flew the likes of the entire population of Cleveland, Ohio, the equivalent of two round trips out to Los Angeles. Yes sir, things have sure grown up instead of going under, like those skeptics predicted," my friend continued.

"Now just take plain old common air. Never bothers an airmen too much these days, but people didn't know much about it back then. There was a Mr. Charles G. Grey who edited a little spread called *Aero*. He wrote this article back in 1911."

It was called *"How the Fickle Air Tricks the Airman,"* and read in part:

"The flying man is far worse off than the sailor; for one can always see a wave of water coming, and handle the boat accordingly, whereas with an air-wave one cannot tell, 'till it has struck the machine, just when it is coming, or how big and strong it is going to be. It is one of the troubles of flying men that the people who come to see them fly do not know about these wind waves, and so expect them to fly in weather that is really dangerous, altho it may appear fine."

"It is easy to understand that such a heavy thing as an aeroplane will not change its speed very quickly. Even a light monoplane will weigh 400 to 500 pounds, and one of the big biplanes may weigh anything between 800 pounds and a ton, and of course when they are flying they have great momentum. Therefore, suppose a machine to be flying at a speed of 35 miles an hour over the ground in a gentle wind, and suppose a gust to meet it that is traveling 10 miles an hour faster than the wind in which it was originally flying. What is the effect? The machine cannot at once slow down; but simply charges into that gust at 35 miles an hour. Consequently, the pressure on the wings is increased and the machine promptly rises.

"But consider the effect of opposite conditions. Suppose the machine had slowed down in relation to the earth, so as to get to its proper flying speed in relation to that gust of wind. Presently it gets right through the gust and into the lull the other side, just as a boat will ride over a wave and fall

From "The Aero Club of America Bulletin."

A NEW PNEUMATIC HELMET.

BUSSON WEARING A SAFETY-HELMET.

FRAME OF PNEUMATIC HELMET.

In eight accidents out of ten the aviator lands on his head, a fact that shows why a good safety-helmet is of value.

Courtesy of "The Aero Club of America Bulletin."

THE W. I. TWOMBLY SAFETY-HARNESS

This harness will hold the aviator to his seat in the roughest kind of weather, but will release him instantly when he pulls the cotter-pin.

into the trough between the waves. This time the effect is that it is flying too slowly for the path of slow wind that follows the gust, and consequently the pressure under the planes is decreased, and the machine drops 'till it either hits the ground, when it may or may not be broken, according to the pilot's skill in landing, or else picks up its speed again, and produces the necessary pressure.

"The sudden drop is most disconcerting, and is the cause of many accidents, especially to those who are comparative novices as aviators, and so do not fly high enough to leave room for a sudden drop of this sort. This is what is known to aviators as "falling into a pocket," or into a hole in the wind. . . ."

On top of that, that writer in *The Engineering Magazine* summed up old man air and his tricks like this:

"As we once before suggested in these pages, the problem of navigating the air under conditions which may at any time surround the navigator is closely parallel to the problem of navigating the rapids of Niagara in a submarine, and will be about as easily solved."

Times surely have changed, except that capricious winds are still blamed for some landings short of the runway.

Probably, the reason for all the despair about the gusty air was the fact that so many pilots were busting their noggins in those new-fangled machines. But not everyone demanded flying be given up. There were some with an eye to progress who started looking around for solutions to the problem.

One such was Lt. Col. Paul Renard, of France. In October 1912 he wrote an article for the *Revue Scientifique* which started out by saying "All aviation needs now is safety." He was obviously a few years ahead of his time, as the following evidences:

"It is important to seek information regarding the causes of the accidents and the means of preventing them. It is not always easy to obtain such information. When we are looking at an aeroplane smashed to bits, as the result of a fall, it is often impossible to determine the causes, especially as there are always persons who believe it is to their interest to prevent the truth from coming out. Constructors have a natural tendency to assert that their aeroplanes are irreproachable, and that the pilots are imprudent, while aviators seek to prove that their comrades are not open to criticism and that the machines are defective. And everyone is accustomed to accuse the wind, the caprices of the atmosphere, and 'holes in the air.'

HARRIET QUIMBY'S LAST FLIGHT.

Actual photograph of the Blcriot monoplane starting on its terrific downward plunge. Mr. W. A. P. Willard, manager of the Squantum Aviation Meet, can be seen in the rear of the machine. The photograph was taken just a few seconds before both Willard and Miss Harriet Quimby, the aviatrix, fell from the monoplane into Boston Harbor, July 1, both being instantly killed.

"I have been told that when Renault was a professor at the Ecole Polytechnique, at a time when our ideas of physics were far from possessing the harmonious generality of today, when people talked of the caloric 'fluid,' the magnetic 'fluid,' the luminous 'fluid,' the electric 'fluid,' etc., he was accustomed to say: 'We call this a fluid because nobody knows what it is.' It is somewhat the same with aviation accidents that are attributed to 'holes in the air' when we are ignorant of their causes. But, just as the 'fluids' have disappeared, one after another, with the progress of physics, so, with the development of our knowledge of aviation, we see the influence of the 'holes' diminishing in the accidents of which the aviators are victims. Several years ago they alone were held responsible: today they play a restricted part, and perhaps they will end by disappearing altogether. As we know better what is really taking place, we shall attribute to known causes accidents that in our ignorance we were tempted to ascribe to atmospheric caprice.

"To make this more definite, here are some results of a statistical investigation of a limited number of accidents, which will probably lead to a wider and more serious study. According to this investigation, 44 per cent of accidents may be attributed to pilots, 32 per cent to the machines, 12 per cent to caprices of the atmosphere and 12 per cent to doubtful or complex causes.

"It is possible to analyze these figures further. Among the 44 per cent of accidents due to the pilots themselves, 25 per cent relate to defects in natural skill, and 19 per cent to insufficient instruction."

Colonel Renard was pretty good at predicting too. Said he, "At this moment the aeroplane, which after being a toy has now become almost exclusively a military engine, will see its role increase in importance, and will become the ideal mode of locomotion."

Some of the people went right to work on this safety angle. As early as 1912 one researcher reported that "In eight accidents out of 10 the aviator lands on his head." That was the time of the development of a pneumatic safety-helmet. It wasn't nearly as slick looking as the hard-hats jet pilots use today, but pictures indicate it could have helped save skulls.

A Mr. W. I. Twombley invented a safety shoulder harness that had lateral stability. That was in 1912. People are still experimenting with lateral stability in shoulder harness today.

Another interesting item, the old-timer showed me appeared in the *Aero Club of America Bulletin* 37 years ago and was written by Mr. Henry Woodhouse.

"But more significant than anything else in the wide-spread interest is automatic stability and the efforts being made to effect its wide adoption.

"The automatic stabilizer, by minimizing the human factor in maintaining stability, ought to do more to prevent fatalities than any improvement suggested or made hitherto.

"So far the pilots in general have opposed the application of the stabilizers, objecting that it is a mollycoddle's aid and that flying is easy and requires only a little care to make it absolutely safe. The authorities have accepted their objection more to avoid a seeming humiliation to the pilots.

"Now, however, that the public is demanding additional safety, regardless of how it is obtained, the stabilizer may be made a regular part of the aeroplane's equipment. If that is done the fatalities will, no doubt, be greatly minimized."

Other speculation as to automatic stability appeared in the October 1910 issue of *Engineering*:

"In considering the question of automatic stability, when maintained by any mechanical contrivance, it must always be remembered that there is the possibility of its going wrong, and in many cases the probability of this is at least as great as the probability of the human being failing . . . In fact, there is a great deal of truth in the old saying that the best automatic machine is a well-trained man. This may not, of course be universally true, and there are undoubtedly cases where really automatic devices work well—e.g., the ordinary safety valve. There are, however, a very large number of cases where it is found best to rely on the man in control and it is not found that in practise this entails any serious risk. The fact that a serious accident would occur if a man did not do the right thing is no reason in itself why he should not do the right thing. Signalmen, engine-drivers, motor-car drivers, and a very large number of other men are all in positions where a false move would cause a bad accident; but there is no reason why they should make false moves, and they very seldom do so. . . . Any one who has seen a skilled man steering a small boat in a heavy sea will realize that there is no possibility of making any automatic device which would take his place."

Yet someone came along and invented an autopilot.

To read an article in *The American Machinist* (New York, July 15, 1909) you'd think the pilot had it pretty tough. It went something like this:

"It is a serious question—if the enthusiasts have considered, or in any true degree realize the difficulties of the aviator's task, or are intelligently planning for suitable instruction in aviation. Such instruction must be forthcoming before any very large number of the human family can feel at home in the air.

"Glance backward a few years to the days of bicycle popularity, recall your troubles in learning to balance on the narrow tread of the wheels; remember the bruises and bumps that you carefully nursed on your own body and smiled as if they showed on a friend's. Yet you were only a few inches higher in the air than if you were walking and had no obstacles to consider except uneven places in the street. And these uneven places were plainly in sight.

"How different is the condition of the aviator! His pathway is beset with eddies, swirls, cross-currents, waves, billows, puffs and gusts of wind that he cannot see, that can only be known when he feels them and yet one and all must be carefully reckoned with if he hopes to make a successful flight. All of these things are met at a speed of translation through the air of from 25 to 45 miles per hour. While beset with these unknown difficulties, balance must be maintained in a position at a considerable height above the ground and under conditions intrinsically far more trying than on a bicycle, and with life the possible price of failure. Again, the successful operation of a highly organized gasoline motor must be attended to under the conditions of air disturbances, high speed, elevation, and sensitive balancing. Does not aviation call for a high degree of physical courage combined with excellent self control and cool judgment? Apparently the doing wrong of any one of many things invites disaster."

"The aviator's task is much more difficult than that of the chauffeur. With a chauffeur, while it is true that it requires his constant attention to guide his machine, yet he is traveling on a roadway where he can have due warning through sight of the turns and irregularities of the course. The fundamental difference between operating the aeroplane and the automobile is that the former is traveling along on an aerial highway which has manifold humps and ridges, eddies and gusts, and since the air is invisible he cannot see these irregularities and inequalities of his path and consequently cannot provide for them until he has actually encountered them. He must feel the road since he cannot see it."

Conditions alter rapidly with a new and growing art, and those who are earnestly striving to make flying safer can take fresh courage from the fact that those early objections were resolved. Today the pilot can even see the road.

SGT. E. P. MAGAHA
Flying Safety Staff

WELL DONE

TO

1st LT. JACK BATTY

2150th RESCUE UNIT, MARCH AFB, CALIF.

LANDING an H-5G helicopter on a rocky mountainside at an elevation of 4200 feet in 130-degree temperature and 40-knot winds is a test of a pilot's skill and courage. But there is even more to the feat accomplished recently by 1st Lt. Jack Batty of Flight B, 2150th Rescue Unit, March AFB, California.

An F-86 pilot from March AFB was flying over the California desert when he lost boost control. A series of events followed which caused the pilot of the F-86 to bail out over the mountains near Indio, California. (See story on page 8.)

The F-86 pilot was injured in the bailout and landing and it was imperative that he be rescued as soon as possible. It was estimated that rescue of the injured pilot by a ground party would require 48 to 72 hours, and it was decided that an attempt would be made to effect rescue by helicopter.

Lieutenant Batty departed March AFB at approximately 1200 hours and flew in the H-5G to the scene of the accident. The mountains were covered with rocks, and brush and the rough sandy slopes afforded few suitable places for landing a helicopter. Lieutenant Batty made several attempts to land near the injured pilot but, fearing his tail rotor would strike obstacles on the ground, finally decided to land at a higher elevation.

Unable to locate a level area large enough to land the helicopter, Lieutenant Batty decided to place the wheel on the down-slope side in a bush that he believed was strong enough to allow the helicopter to come to rest in a level attitude. Then, for additional power reserve in case of an emergency during the landing, Lieutenant Batty overspeeded his main rotor. He eased the helicopter down, the right wheel on the bush, the left wheel on the ground. The bush held the weight of the helicopter and the landing was successful.

Lieutenant Batty proceeded down the mountain and assisted the injured F-86 pilot back to the helicopter. A jump takeoff was made and the Sabre pilot was in a hospital at nearby Indio one hour and 15 minutes after Lieutenant Batty had departed from March AFB.

A well-earned WELL DONE to Lieutenant Batty for his ingenuity, skill, and courage, plus a hearty thanks from the disabled F-86 pilot.

THE GRANDSTANDER

By COL. JOHN M. SCHWEIZER, JR.

IF ALL THE PILOTS, crew members and innocent bystanders who have been killed and incapacitated, and who are going to be killed or incapacitated, as a result of the inane tactics of the "grandstander" were laid end to end, it would be gruesome.

The monetary value of all the airplanes demolished and damaged, and yet to be demolished and damaged, as a result of the misguided efforts of "grandstand" pilots would probably be more than adequate to finance the recent pay increase for several years.

It is not possible to place a price tag on the irreparable damage done to Air Force prestige. Likewise, tears, heartaches and sorrow cannot be measured in dollars and cents.

The "grandstander" is the pilot (if a definition is required) who violates the letter and the spirit of paragraph 3 of Air Force Regulation No. 60-16, dated 11 July 1949. This paragraph, which states, "No Air Force aircraft will be operated in a careless or reckless manner," has, in one form or another, been Air Force policy for as long as I can remember.

The "grandstander" violates this regulation in front of people—never off to one side where no one can see him. It is apparent that his capers are performed with the idea in mind of impressing someone.

There are pilots who apparently have never read the regulation. Or, if they have, they either ignore it or fail to grasp its meaning.

Showing off, "grandstanding" for the benefit of the bystander can be effectively accomplished in a great many ways. For example:

Taxiing recklessly down the ramp at an excessive rate of speed.

Slow-rolling over the hangar line.

Doing a tight overhead approach.

Buzzing the crowd on the beach, or wherever else people are apt to congregate.

"Jazzing" the old home town, the alma-mater, the village depot.

Acrobatics over a congested area or below 1,500 feet.

Feathering all four engines and flying on the A.P.U.

Tipping over sail boats by violently skidding the airplane as you whiz by.

Knocking the cupola off a caboose on a freight train.

Flying under bridges.

Flying between two tall smokestacks.

Peeling (literally) the top off an automobile.

Making a pass at another airplane, especially when it is obvious that the pilot in the other airplane doesn't know you are in the vicinity. Commercial aircraft are especially tempting.

These are a few methods of "grandstanding" I have actually witnessed. Someone ought to write a book on "One Thousand and One Ways of Making an Ass of Yourself."

There are several types of pilots who ignore the good rules of common sense and sound judgment and the written Air Force law.

The "JUVENILE." The young pilot who has just sprouted his wings—has pretty fair technique but not much sense. Not content to stay up where he belongs, he must roar down over the heads of

earth-bound mortals to demonstrate his new-found talents. He "grandstands" in sheer youthful exhuberance—the "Look Ma—I'm flyin!" sort of thing.

The "HERO." The type who has the misconceived conception that by "grandstanding" he is earning the adulation and the applause of the multitude, including his fellow pilots. He's the lad who played football without a helmet on—it caused the girls to twitter. He always tried to make himself look good—at the expense of his teammates. There is one on every team.

The "BALL OF FIRE." The "hot" pilot—the self-styled natural-born aviator. He can't resist showing the boys just how it can be done if you've got the natural talent and a lot of guts. Of course, he doesn't expect the other pilots to quite come up to his standards of grace and nonchalance while upside down at 50 feet—but he wants to make sure that all concerned know he has plenty on the ball.

The "COMPLEX." The pilot with an inferiority complex. He tries to overcome a feeling of being not quite as good as the "Ball-of-Fire" by exaggerated aggressiveness. He's concerned, quite sincerely, about being called timid if he doesn't do something wild and reckless once in a while to boost his ego. Although he knows better, he'll go out and peel the paint off the roof tops—always where someone can observe him, you understand, so he'll be accepted as one of the boys. He's scared half to death whenever he does it but he doesn't realize that it takes more guts and brains to stay away from that sort of thing than it does to do it.

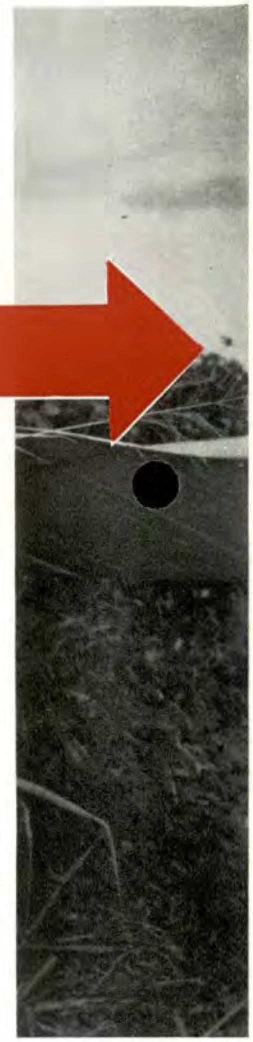
The "SADIST." He has an abnormal tendency to inflict pain. As a little boy he'd catch frogs and impale them on a stick to watch them squirm. He takes particular delight in running automobiles off the road—scaring hell out of the occupants. One of his specialties is making passes at commercial airliners—he knows they have no parachutes aboard—utterly helpless in event of a collision.

The "OUTLAW." He has never outgrown the cute little habits he had as a boy; such as throwing a rock through the church window and then running like the dickens. He had defied authority and got away with it. He put something over on someone. He's a bit hostile toward most everything and everyone.

The "IDIOT." He never was quite bright in school but managed to get by. Slipped through flying school somehow. His instructor thought about eliminating him several times but, "he's such a good-natured guy," although always a bit bewildered about it all. Sees Joe do it so he tries it too. Remembers vaguely about some sort of regulation against it but hadn't given it too much thought.

No matter how smooth he is, how precise he is, how quick his reflexes, how keen his eyesight and depth perception; no matter how skillfully and calmly he reacts in an emergency; no matter how many hours he has to his credit; no matter what the color of his instrument card, it takes an intelligent, level-headed pilot of sound and seasoned judgment to subdue the temptation to show-off—to "grandstand."

In final analysis, every pilot has his limitations. I will be the first to admit, however, that it would be difficult to convince some pilots I have seen and *HEARD* that the foregoing statement applies to them. In the "grandstand" pilot the limitation lies between the ears.



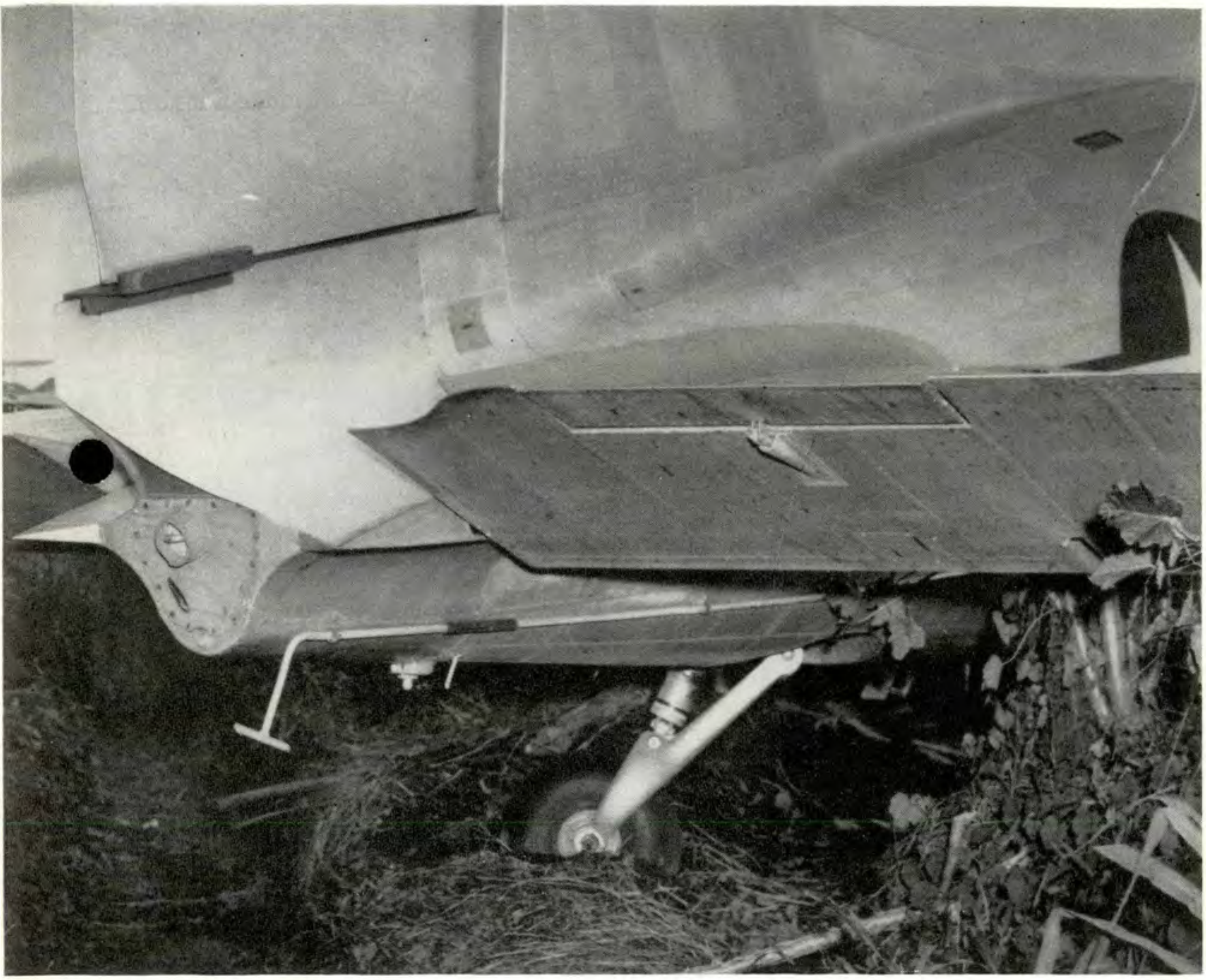
how GROSS *can you get?*

CONSIDERABLE typewriter wear and tear would be avoided if accident investigating officers could requisition a few rubber stamps reading: "Realizing the controls were locked, the pilot chopped the throttles and ordered the copilot to cut all switches," and "The pilot later testified that he overlooked the rudder—elevator—aileron (strike out words not applicable) lock" because he was in a big hurry to; "Beat the weather—get off before dark—get home in time for dinner—just in a hurry (strike out non-applicable phrases)."

Yes it has been done again. In spite of the fact that this rather pitiful stunt has been given the huckster treatment in articles, stories and posters appearing in this and other flying safety publications, a junior birdman and a not too junior instructor pilot bought the farm at an overseas airfield while attempting to take off with the rudder lock still doing its job of not allowing the rudder to flap in the wind. How could that accident possibly happen, you'll ask? Well, here is the story.

While the pilot supervised the cargo loading, the instructor made a hurried exterior check of the plane but failed to notice that big red rudder lock which had been put in place after the landing. The crew boarded the airplane and the preflight check was performed while the airplane was still in the parked position. Before taxiing out to the hot runway, the pilot and instructor pilot chanted through the usually unreliable memory checklist.

When they thought they had covered everything inside and out, the pilot lined up and advanced the



throttles for takeoff. Immediately after the airplane started to roll, it had a tendency to turn to the right. (The offset rudder lock will cause that.) The pilot, believing that the tail wheel was locked but out of the neutral position, unlocked the tail wheel and attempted to regain directional control. Shortly thereafter school was out, and the airplane became airborne and continued to veer to the right off the runway. At this point the instructor saw the light, felt the touch, and heard the call. He figured that someone must have left the rudder lock in place so he retarded the throttles in an effort to get that someone back safely on the ground.

The C-47 touched down and rolled over 400 feet through high grass. Further proof that crime doesn't pay was borne out by the fact that just before coming to a stop, with no damage as yet, the plane struck a small irrigation ditch which caused it to nose up momentarily, creating the problem of explaining the whys and wherefors of a damaged right elevator, right horizontal stabilizer, radio antenna, both propellers, and the nose of the fuselage. None of the four crew members were injured. The instructor pilot and the pilot involved in this accident have been given a letter of reprimand from the commanding general of the command to which they are assigned. The pilot who used to be an instructor pilot and the pilot who was at the controls of the C-47 at the time of the accident will be given every opportunity to chop this one up with the flying evaluation board at their station.

MEDICAL SAFETY

This is the fourth of a series of articles on aeromedical aspects of jet-propelled aircraft. The material in these articles were prepared by the staff, Aero-Medical Laboratory, Engineering Division, Air Materiel Command.

WIND BLAST PROTECTION IN HIGH-SPEED FLIGHT

Adequate escape systems in high-performance aircraft necessitate protecting the escapee from high-velocity wind blasts. The problem is one of two-fold importance, for protection of the individual must be accompanied by protection against loss of oxygen mask and helmet in the wind stream. When a pilot leaves the cockpit he is subjected suddenly to the full blast of the slipstream. Within a five second period following emergence into the slipstream, his speed is reduced to terminal velocity (for the average human body, approximately 125 mph at sea level). The force of this blast has been estimated as being approximately 5,000 pounds on an upright man traveling 500 miles per hour at sea level. Such a force, combined with the aero-dynamic properties of existing helmets and oxygen masks, is sufficient to tear these devices from the head, leaving it fully exposed. Until recently protective helmet and mask combinations have failed to remain on the head during dummy ejections at velocities over 300 mph.

Experiments carried out in Germany in 1943 (reported by Lovelace in Memorandum Report TSEAL-3-696-74C) using first a wind tunnel and then a pressurized chamber to produce an air blast, indicated that subjects with faces unprotected could successfully withstand blasts up to 531 mph velocity lasting for 1.5 to 2.0 seconds, if the blast did not occur unexpectedly. The mouth had to be held firmly shut and extreme effort was used in an attempt to hold the eyelids together. In spite of the action of the palpebral muscles, the eyelids were seen to balloon but with no damage to the eyeballs. The U. S. Navy and NACA conducted similar experiments in a wind tunnel at Langley AFB in 1945, where several subjects successfully withstood blasts up to 420 mph. It has been calculated that in the upper limits of sonic speed at sea level, deceleration to 400 mph following ejection occurs in from .5 to .75 seconds and at 40,000 feet, it occurs in about 2 seconds. In recent live ejection tests at 555 mph TAS at 10,000 the pilot experienced no ill effects from wind blast.

To assist in overcoming hazards due to wind blast, the RAF and the U. S. Navy tried a hand-held curtain on their ejection seats. This curtain had its main advantage in its action as a restraint for the oxygen mask and helmet. There are further protective actions in preventing forward movement of the subject's head during ejection and in preventing some vibrations and waves in facial tissues; however, blast pressures will be transmitted directly through the curtain. Under high G-forces or violent changes of altitude of the aircraft prior to ejection, the escapee might encounter serious difficulty in being able to reach above his head to grasp the wind curtain. The use of the curtain also precludes the weight sparing effect of arm rests. Arm rests will support from 25 to 50 percent of the weight of the head, arms, and upper trunk, thus sparing the lumbar spine during ejection.

The Air Force is at present interested in all types of wind blast protection, but attention and energies are directed more towards the development of an adequate oxygen mask, helmet, and visor combination. Such a combination must be of a design which will enable it to withstand pressures up to 1200 pounds per square foot and at the same time present a reacting surface to the windstream, which will contribute as little as possible to aero-dynamic forces tending to wrench equipment from the head. Such a helmet-visor-mask combination was used successfully in the 555 mph live ejection test. The ultimate design for future use may be a protective helmet unit in which oxygen supply, protective pressures, temperature regulation, and complete facial coverage will be incorporated.

VISION

The high speeds and altitudes attained in jet aircraft in a number of ways increase the demands placed upon the pilot's vision. The G-forces in turns and pullouts are more intense, longer in duration, or both. As a consequence, the pilot must pay greater attention to the avoidance of excessive G-forces in order to prevent partial or complete visual blackout. Any loss of vision must be avoided, if possible, because of the great reliance the jet pilot places upon vision for avoiding dangerous aircraft attitudes and flight obstacles.

The reduced turning or maneuvering radius and higher closing rates associated with the speeds of jet aircraft force the pilot to pick up and identify his targets at much greater distances. Unless a target is picked up at considerable distance or happens to be directly in his path, the jet pilot will not be able to make the necessary turn required to bring the aircraft into firing position. Flight obstacles must likewise be detected at greater distances in order to be avoided. This need for split-second vision at greater distances places a premium upon high visual acuity, and emphasizes the need for clear windshields without optical distortion. It emphasizes also the need for the pilot to be thoroughly trained and briefed concerning the location and appearance of his targets and any flight obstacles which he might encounter.

Less serious than the increased emphasis on visual acuity is the general reduction in use of lateral vision. When near the ground in strafing attacks, objects move by with such high relative velocity that only those directly forward are seen clearly. At altitude, although ground objects at the side can be seen clearly, the increased speeds force the pilot to concentrate more on the visual area directly ahead.

At the very high altitudes where jets perform best the visual surroundings are considerably changed. With increase in altitude, there is less haze, and the sky becomes much darker, while the direct rays of the sun become more intense and contain a higher proportion of ultra-violet rays. As protection against the ultra-violet radiation and the intense sunlight, the wearing of sunglasses becomes more essential. Because of the darkened sky, the contrasts between sunlit areas and shadows are increased. The shaded corners of the cockpit are darker and harder to see into, while the sunlit areas are more glaring. Other aircraft, instead of appearing as dark shadows against a light sky, are more likely to appear as bright spots, depending upon the direction from the observer in relation to the sun. Because of the changed visual conditions, judgment of distance is often erroneous

WHAT'S NEW?

TYPE G-4A ANTI-G SUIT

The maneuverability of fighter aircraft is limited by the tolerance of its pilot to acceleration. The pilot who can withstand higher acceleration with a clearer vision and brain than his adversary has the advantage in combat.

A pilot can raise his g-tolerance by muscular straining and crouching but this is fatiguing and distracting. AMC has developed a new anti-G suit, type G-4A, which helps to raise the pilot's tolerance to acceleration and to decrease his fatigue from repeated exposures to accelerative forces, thus increasing his combat efficiency.

The G-4A anti-G suit consists of a coverall incorporating five interconnecting bladders which exert pressure over the thigh, calf, and abdominal regions. The G-4A suit gives an average protection of 2.2 G's as compared with the 1G protection afforded by the older G-3A suit.

Incorporated in the valve system of the new suit is a manual control button that provides the pilot with a means of actuating the valve during level flight. This will enable a pilot on a long flight to use the suit for reducing fatigue by periodically stimulating the circulation of blood in the lower body.

According to AMC, the new G-4A suit is being made a standard item and will be available in the near future in 12 sizes comparable to the standard USAF summer flying suit.

NON-SKID BRAKE

A brake attachment has been developed which automatically prevents skidding.

The new attachment has been operated successfully on an XB-47 Strato Jet Bomber and on a YC-97 Strato Freighter.

The airplane's normal hydraulic brake actuates an electronically-controlled valving unit which keeps braking pressure at all times just below the skidding point. Controlled automatically, it gives the pilot the advantage of maximum runway friction regardless of the nature of the landing strip.

Another advantage of the new brake device is its potential for lengthening the life of tires.

JOINT MILITARY AND CIVILIAN AIRPORT LIGHTING TESTS

The USAF, Navy, CAA and CAB recently participated in evaluation and research flight tests on airport lighting and visual aids to pilots. The All-Weather Flying Division of AMC provided two airplanes, a C-54 and a B-25, and crews for participation in these tests. These two USAF airplanes completed approximately 30 approaches. Fifteen of the approaches were flown in the C-54 using ILS and alternating between manual and automatic approach techniques. The B-25 was used on the remainder of the landing tests with all approaches being made on ILS using the zero reader. GCA was used during all tests as a monitor to insure an adequate safety margain because the approaches were made with ceilings varying between zero and 200 feet and forward visibility of 500 to 1600 feet.

The approach lights under test consisted of a modified slope line system in the approach zone and fixed wide beam runway marker lights on the runway. These lights were of different color in the first and last third of the runway enabling the pilots to determine, under very low visibility conditions, the amount of runway available for landing.

ULTRA AUTO PILOT

The development of a high-performance autopilot is under way. This development includes automatic airspeed control, precision reference control in all three axes, and improved stability for use in control of high-speed aircraft up to airspeeds of Mach 1. The design of this new plane brain will include provisions for operation in polar regions with auxiliary navigation equipment now under development.

FASTER REFUELING

A NEW single point fueling system for multi-engine aircraft is under development. The new system would permit a B-50 Superfort to be fueled by a single truck from one inlet point in slightly more than 15 minutes. Under existing conditions, it takes two trucks over an hour to fuel the B-50 from six separate points.

Basis for the new system is forced feeding—cramming the gas from a single point throughout the entire system. Biggest problem of the prospective system is to insure that the present fuel lines and their components will function under forced feeding without excessive pressure loss or internal drag.

Repeated tests of the mock-up of the proposed system have been completed with satisfactory results. However, no word has been given or when it is expected to be ready for operational use.

H-2 EMERGENCY OXYGEN CYLINDER

The Aero-Med Lab at Wright-Patterson AFB is now working on a method of installing the H-2 Oxygen cylinder assembly on the ejection type seat. It is planned that the oxygen supply will be automatically released simultaneously with the firing of the seat from the aircraft.

When this development is completed the Aero-Med Lab proposes to change the bailout procedures to require pilots to remain with the ejection seat as long as oxygen is no longer required. When an altitude is reached where oxygen is no longer required, the seat will be automatically released and the parachute opened. However, until this project is completed and the kits are available for installation of the H-2 assembly on all ejection seats, AMC is revising Technical Order 03-50C-5, dated 20 October 1944, and revised 10 March 1945 (which requires that the H-2 emergency oxygen cylinder assembly be sewn or tied on at the thigh of pilots flying suits), to permit attaching the emergency cylinder to the Type B-10 parachute.

Users of the H-2 oxygen assembly complained that when the assembly was attached to the flying suit at the thigh it had a tendency to rotate downward on the leg causing an uncomfortable binding. This problem was especially bad in jet organizations because the oxygen bottle had to be worn on nearly all flights. There were other complaints concerning the attachment of the cylinder to the thigh; such as the problem of cleaning the flying suits with the cylinder case attached. When a flying suit is dry-cleaned with the case attached, the case shrinks, making it virtually impossible to get the cylinder into it. Furthermore, if the carrier case is tied to the leg loose enough to be comfortable in flight it is too loose for walking to and from the aircraft.

To attach the H-2 oxygen cylinder to the Type B-10 parachute requires no modification of the carrier case or the parachute since the canvas tie straps on the carrier case are merely wrapped around the cylinder and passed through two holes already in the parachute pack assembly.

VOICE RECORDERS IN CONTROL TOWERS

A project is underway at AMC to develop equipment which will record continuously all conversations between tower operators and pilots. Voice relay operation which is not available at present will be provided. Clarity will be such that voices will be recognizable. Be careful of your conversation with tower operators, or the play-back may be embarrassing! Witty remarks may not sound nearly so funny when played back in your presence before the old man.

SMOOTHER RIDE

An automatic stabilizer device for high-speed jet aircraft which allows smoother flight in rough or gusty air has been developed. The new control device, nicknamed "Little Herbert," automatically compensates for "Dutch Roll" or changes in direction and yawning effects induced in high-speed aircraft by gusty air.

Completely separate from the usual automatic pilot controls Little Herbert, with no help from the pilot, applies suitable rudder movement to prevent oscillation of the tail. Technically it consists of a gyroscope, electronic amplifiers, and a small electric motor. The gyro measures the rate-of-change of direction in the airplanes compass, the amplifier sends these rate-of-change signals to a small electric motor, which instantaneously pushes or pulls the rudder into proper position to offset the effect of the gust.

Little Herbie has cut down yaw and roll to less than one-tenth of one degree, but tests are being continued to perfect the new stabilizer further.

HIT RECORDER FOR GUNNERY PRACTICE

An automatic device for recording strikes on either ground or airborne targets has been adopted by the British Admiralty and the Air Ministry. The device uses a microphone attached to the body of the target, which must be of the solid type. The microphone is designed to record vibrations caused by direct hits on the target (near misses will also be recorded), but it is insensitive to vibrations caused by the air flow of falling debris. The microphone is sensitive to strikes up to the rate of 100 per second (with four Hispano 20-mm cannon the total rate of fire is about 40 per second.) Signals from the microphone caused by hits are transmitted to a recorder-receiver by a VHF transmitting set. For airborne use, the set is carried in the tug aircraft and signals from the microphone are transmitted to it via the towing cable. Indication of the number of hits is recorded on a calibrated dial.

YOU'D BETTER PAUSE AND PONDER PILOT

SGT. E. P. MAGAHA

Accidents caused by violations of flying regulations constitute an inexcusable portion of the Air Force accident toll.

To the perpetrators of such violations the following is dedicated—with disgust aforethought and no apologies intended:

When you're cruisin' true and steady
In that expanse of blue on high
And you get the foolish notion
There're more excitin' ways to fly
And you point the nose down yonder
Towards the houses and the hills
To go buzzin' 'cross the hedges
Fillin' people full o' chills.

You'd better pause and ponder pilot
Because the record books don't lie
And when you break a regulation
They say it's 1 to 2 you'll die.

If you disregard the checklist
When the plane is on the ground
Or fly through danger areas
Where shells go burstin' all around
Try to buck the clouded wasteland
With your clearance VFR,
Or take off with a grimace
When your health's not up to par.

You'd better pause and ponder pilot
The record prospects are not gay,
For when you break a regulation
The bet's six feet below you'll lay.

Oh, how oft' it's been repeated
By the men the C. O. ate
That printed words on paper
Could not have changed their fate.
And 'tis the most confusin' feature
Of men accredited with sense
That they resort to such excuses
When they are made to recompense.

You'd better pause and ponder pilot
Ere you join the ranks of fools,
For the regs aren't made by kiddies
'Twas experience that made the rules.

O ye serious and ye willful,
Forgetful, careless, uninformed
The odds are all against you
When your foolish plans are formed
You'll but perpetrate more stories
That the wiser men will tell
When you throw away your caution
And try to storm the gates of Hell.

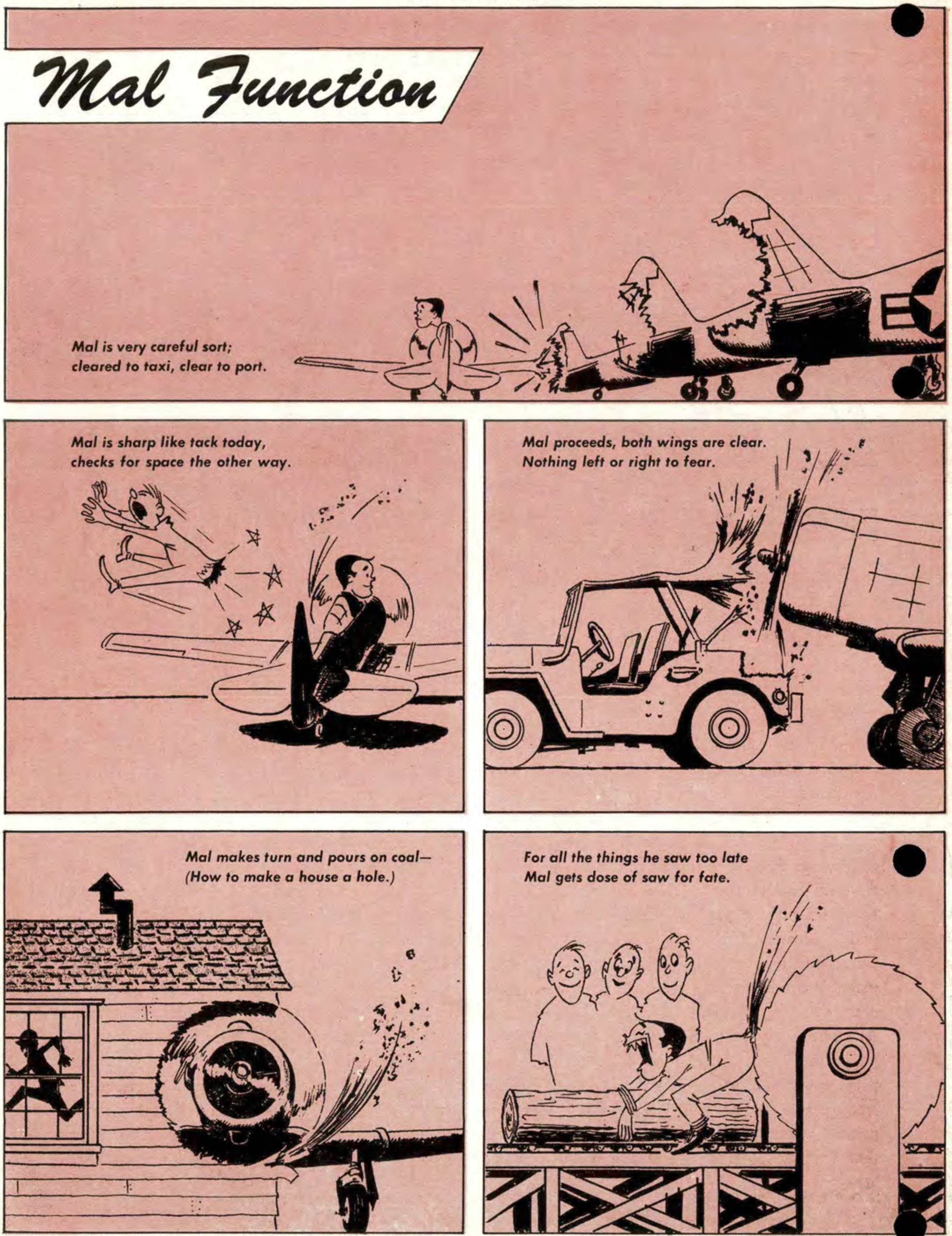
You'd better pause and ponder pilot
For if you persist in deeds unsound
We've naught but to consign you
To that last, long 'go-around.

SO LITTLE TIME . . .

AN OLD wise man once said, "A little learning is a very dangerous thing." This sad tale is proof indeed that the old wise man's mother didn't raise any stupid children.

An aviation cadet, with 21 hours of solo pilot time to his name decided that since he had spent nearly one full 24-hour day of his young life in mastering all of the basic fundamentals of flying, he was ready for graduate work in acrobatics. As he leveled off at 11000 feet in a T-6, he attempted a half roll and recovery. The half roll was completed but as he started to roll out, the nose dropped more than slightly. Our adolescent airman became somewhat wary as to the possible outcome of his plight, particularly since the plexiglass panels started popping out of the canopy by the numbers. The air speed needle, having passed the red line was now pointing about 180° from it. All this plus the fact that he was hanging against the belt and using both hands on the stick to avoid a collision with Texas, convinced this young man that if he made the grade this time, lazy eights and chandelles would be his meat until he was shown the light of acrobatic flying. Actually, in attempting to roll out, the student pilot only succeeded in doing a split "S". Finally, he got squared away and pulled out at 2500 feet with severe buffeting of the tail surfaces. Besides the blown-out canopy, the left horizontal stabilizer and elevator were bent and torn and the wheel fairings were buckled. The airplane was sold to the base shops for disassembly inspection.

The temptation to experiment with the unknown is what makes for good business in the undertaking profession. This experimenting youth was fortunate enough to live and learn his lesson. It will pay all young student pilots who read this story to share in the knowledge gained by another brother airman who almost got his wings months ahead of schedule.



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