JUNE 1953

FLYING SAFETY

UNITED STATES AIR FORCE

Base Flying Safety and YOU

. . see page 10

WHAT'S WRONG HERE?

AFR 60-15 says, and we quote, "The landing gear will be actuated *only* by a rated pilot performing *first pilot* or *copilot* duties. The copilot will actuate the landing gear controls *only* when specifically directed to do so by the first pilot."

Too many landing gears have been prematurely retracted by a zealous crew chief, or by a copilot who failed to wait for the pilot's signal . . . which will be given *verbally* and by *hand signal* by the first pilot.

The regulation also states that the instructions given by the pilot will be repeated by the crew members receiving the command, before execution of the command is begun.

KNOW YOUR OPERATING REGULATIONS...PLAY IT SAFE!

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Deputy Inspector General

★ ★ ★

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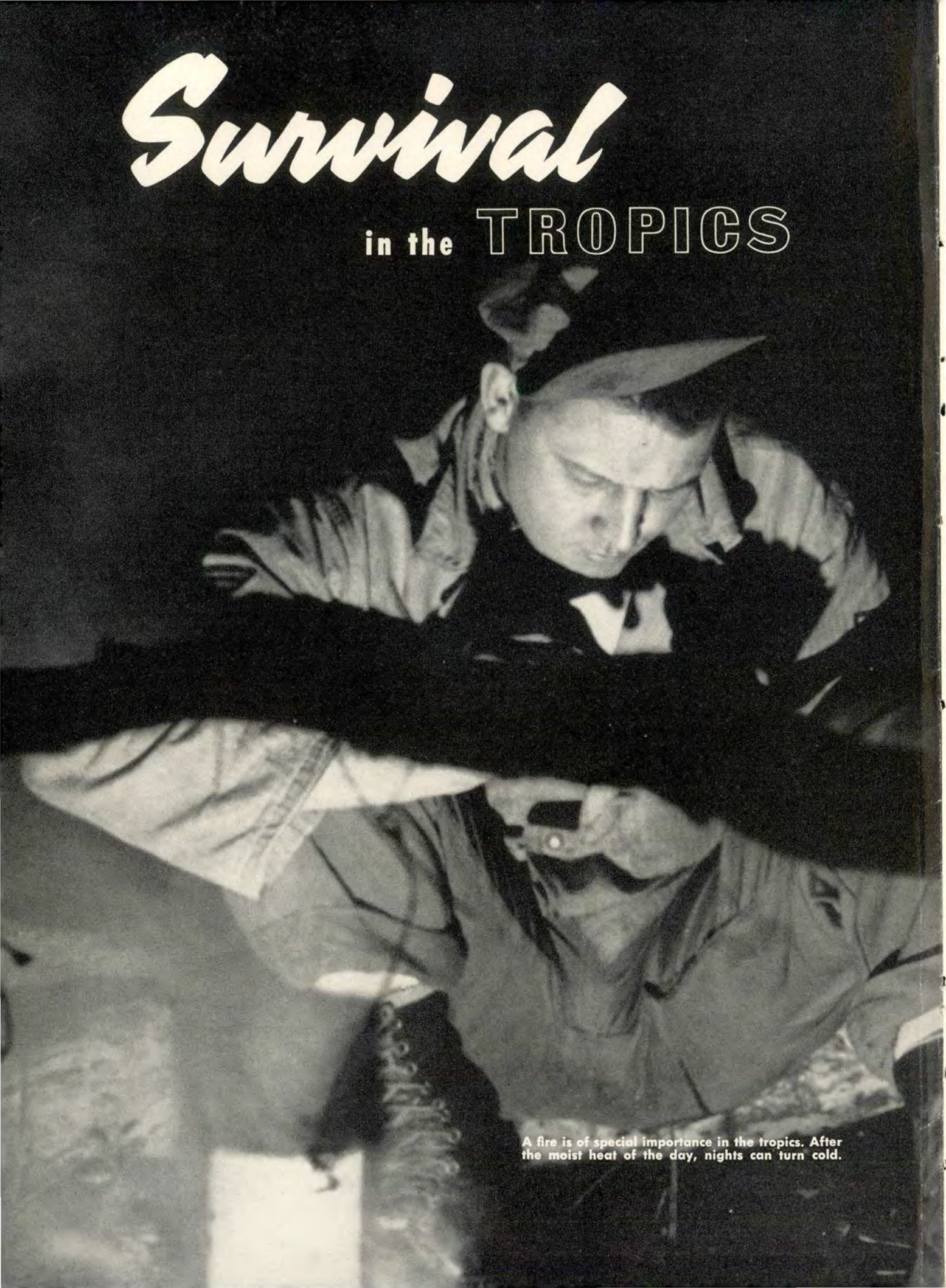


A fire is of special importance in the tropics. After the moist heat of the day, nights can turn cold.

By M. S. Maxwell, Ph.D., Research Specialist, Maxwell AFB, Alabama

ON global maps, the tropics appear as those areas which are shown on either side of the earth's equator. They are usually thought of as dense rain-forests, or more popularly as jungles, although they also include vast regions of grasslands and high mountain slopes.

The tropics of Africa, southern Asia and the western hemisphere have many individual differences, but in general they are characterized by a moist, hot climate. The average temperature of the coldest month does not fall below 68°F., and there is usually more than 38 inches of rainfall in a year. After the enervating muggy heat of the daytime, the evenings often seem cold.

Practically every afternoon, especially during the summer months, a torrential rain falls, and after an hour or so, stops suddenly, leaving jungle paths deep in mud and the vegetation soaked and dripping. The vegetation may be so dense with vines, aerial roots of trees and bamboo thickets that a traveler off the established trail must cut his way through. Or the thick vegetation may all be at the jungle ceiling 50 to 100 feet above the ground, leaving the surface blanked off from sunlight and almost bare of plants. There may be an abundance of wild animals or there may be relatively few. Even where small game is plentiful the animals may travel only at night and never be seen by the day-time hunter.

This is the environment in which an airman may suddenly find himself. He may be flying in comparative comfort above the green tropical rain-forest, and a few minutes later find himself in the middle of strange noises, myriads of biting, stinging insects, and a damp heat which makes his clothes stick to his body.

Nothing is more natural at this point than fear. The airman has had the emotional shock of bailing out, or of riding a crippled aircraft to a forced landing. If he is like 60 per cent of the men who have had survival experiences he is about to spend his first night alone in the forest. He doesn't quite know where he is or how to get home and all of his childhood fears of being lost in the woods start pressing in on him. This is the critical point in any survival experience. The next few minutes may make all the difference between life and death. He must remember that at this moment he is very prone toward irrational behavior. He must remember to keep his hand off the panic button.

A tragic example of this irrational behavior comes from the Burmese jungle during World War II. A pilot, after bailing out over the rain-forest, found his parachute caught in the trees and his feet suspended about five feet above the ground. In releasing himself he first unbuckled his chest strap and one leg strap. He slipped, caught his left leg in the harness and hung head-down with his head touching an ant hill.

Immediately, biting ants swarmed over him. In desperation and panic he pulled his gun and fired five rounds into the webbing holding his foot. Unable to break the harness, he put the sixth round through his head. A short distance behind him were aerial tree roots with which he could easily have pulled himself up to release his harness. Fear, coupled with the pain from the biting ants, had led him to completely irrational behavior and the loss of his life.

What can the downed airman do to conquer this normal reaction to fear? Three important steps will help.

• Before flying over jungle areas, make up your mind that *it can happen to you.* Be mentally prepared for an emergency landing. Then if it comes, it will not be such a shock.

• Get all of the survival training you can. Records of survival experiences show that the man trained in survival techniques is less likely to go thorugh initial panic in the actual survival emergency.

• When you are on the ground, sit still for a few minutes. Don't rush into action. Analyze your situation and plan your first moves. When you are able to put your energy to constructive use, keep busy.

The airman who lands unexpectedly in the jungle has three things that determine his chances. First, and according to survivors' accounts, the most important, is his physical condition. Physical fitness cannot be stressed too often. It may be a long walk back.

Second is the equipment he carries and the clothing he wears.

Third is the knowledge he has of how to make the best use of this equipment and how to improvise equipment which he does not have. It is for the purpose of providing this information that survival training schools have been established. This training is supplemented by such written materials as the recently issued Air Force Manual 64-5 SURVIVAL, and publications of the Arctic, Desert, Tropic Information Center.

While you are waiting for your emotions to calm down, give first-aid treatment to any wounds and cuts you may have. Scratches and breaks in the skin quickly become infected in the warm moist tropics and they should be cleaned or disinfected as promptly as possible.

Some of the principles of survival advocated by such sources may be used under any emergency situation; some are pertinent only in the tropics. One survival problem which is particularly acute in jungle rain-forests is the one of indicating position to planes flying overhead. Often the top of the jungle may be one to two hundred feet above the jungle floor, and a plane or parachute may slip through this canopy without disturbing the foliage to any extent.

In a jungle emergency signaling should be one of your first considerations. If you have a usable radio, try to make contact with it, but do not use your available power supply aimlessly. If the forest cover above you is dense and you are not making

ABOUT THE AUTHOR—Dr. Maxwell, now a staff member of the Arctic, Desert, Tropic Information Center, is particularly suited to write an article on jungle survival. He is a doctor of anthropology and has done field work in the Pacific, Mexico and Central and South America.

During World War II he served as a Navy pilot in the South Pacific, where he gained first hand knowledge of the jungle covered islands of that area.

Much of the material used in the article is taken from the new survival manual, AFM 64-5, which was compiled and written by the ADTIC Staff at the Air University. Staff members also collaborated in collecting other information used in the article, under the direction of Dr. Paul H. Nesbitt, Chief of the Information Center.

radio contact, try to find a clearing or stream bed. Do everything possible to change the natural appearance of the clearing. Burn or cut the grass, lay out your parachute and signal panel, build a large fire and cover it with green leaves to provide a smoke signal and, when possible, use your signal mirror. If you establish contact with a plane, use the emergency ground-air code and panel signals.

From this point on the steps to be taken in any survival experience may differ according to the immediate situation and the terrain in which the survivor finds himself. However, it should be kept in mind that shelter in the tropics is nearly as essential as shelter in the Arctic. A carefully built shelter will keep most, if not all of the rain from you and help to protect you from the insects. Furthermore, it is a constructive and time-consuming job that will help you to make the mental adjustment to your new situation. A fire burning in a reasonably dry shelter is one of the best possible morale builders. If you have landed with the plane and a portion of the fuselage is intact, use it as a shelter, covering the openings with a single layer of parachute cloth to keep out the insects. If you have bailed out, make a simple tent or lean-to with your chute.

Above all else, in the tropics, hang on to your chute. It is one of the most important single items for your survival. Do not try to sleep on the bare ground. If there is time in the day, make a sleeping platform with four corner posts high enough to support parachute cloth for a mosquito netting. Or use the chute to make a sleeping hammock which can be slung underneath your parachute tent. If there are fairly straight poles available, and you intend to remain at one camp site for a few days, it is worthwhile to make a paratepee shelter from six panels of your chute. It provides a dry shelter with good circulation, and if you make your sleeping platform close to the ground, a smudge fire can be kept burning inside the tepee to keep out insects. Be careful in using a fire, that you don't fuse the nylon chute.

In the arctic and desert it is wise, unless briefed to the contrary, to remain near your plane. In the tropics where dense foliage may hide you and your plane from the air, it is sometimes wiser to walk out. However, travel in a tropical rain-forest is often difficult. Five items of equipment are virtually essential:

- A compass which should be consulted frequently.
- Stout shoes.
- A machete to help cut your way, find food or build a raft.
- A first-aid kit.
- A parachute cloth hammock.

If you can, follow a trail, or go downhill until you find a stream; only cut your way through as a last resort. Walk around swamps and very dense thickets. Wherever pos-

Left, good survival techniques can be learned best through training in field.

●

Below. Care and transportation of injured crewmembers should be emphasized as a part of survival training.

Top, crews are briefed by a survival expert prior to a training mission.

●

Right, proper equipment and knowing how to use it can lessen the hardships during a jungle survival experience.

sible use light wood or bamboo rafts to go downstream. Don't try to make the maximum distance each day. Don't start to travel until there is plenty of light, and stop long enough before sunset to select a good camp site and to make a shelter and fire. Adequate rest and sleep are essential, and you will get neither if you have not protected yourself sufficiently from the night dampness and insects.

A fire is of special importance in the tropics. Surprisingly, after the moist heat of the day, it often seems bitter cold at night, especially on mountain slopes or plateaus a few hundred feet above sea level. Clothes stay damp and clammy unless they are dried out before a fire, and in wet clothing a temperature of 70° is chilling.

Green leaves thrown on a fire provide a smoke smudge to keep insects away and provide one of the best signaling devices in the dense forest. Therefore it is a good practice to carry extra matches, covered with melted paraffin and kept in a waterproof container, on all over-jungle flights. It takes extra preparation to lay a fire in the rain-forest. Select dry, dead limbs still attached to the trunk, or sticks caught in the tangle of aerial vines. Split as many of the sticks as possible, and make a bed of thin shavings before wasting a match. In carrying fire on the trail fill a dry coconut husk with live coals, or put live coals and dry punk in a segment of green bamboo.

Purify Water

Water is often a problem in the tropics, and there are regions, especially in limestone country, where surface water is very scarce. All surface water in the tropics must be purified, either by boiling it for at least one minute, or by adding eight drops of 2½ per cent solution of iodine to a quart of water and letting it stand for 10 minutes, or by using the water purification tablets in your first aid kit according to instructions. A refreshing substitute, requiring no purification, can be gotten from the green coconut. Many of the jungle vines contain a water sap. Cut off a three to six-foot segment of vine and let it drain into a container. Never drink from a vine that has milky sap. Old, cracked segments of bamboo may contain rainwater. Shake the stems until you hear one gurgle, then cut a small notch in the base of each node.

Rainwater can be gathered in a number of ways and need not be purified. The method most commonly used by jungle survivors has been to catch the water in a hole lined with a poncho or tarpaulin.

Food is often more of a problem, but in some tropic areas there is a wide diversity of wild foods. Most moving things in the rain-forest are edible, although they may not appear appetizing at first. Grubs, insects, bats and snakes will not take the place of sirloin steak, but they have kept many survivors alive until they could reach help.

Plant food is generally more readily accessible to the survivor in the tropics than is animal food. Look for plant food in forest clearings, along the coast and margins of streams and in swamps. The natives clear garden areas in the forest, plant crops for two or three years and then abandon the garden clearing. Often food plants will persist around the edges of these clearings long after they have been reclaimed by the jungle.

Learn to identify as many potential sources of food as you can before operating over tropic areas. If you are in doubt about a plant, remember these rules of edibility:

- Never eat large quantities of a strange food without first testing it.
- Prepare a cooked sample, then take a small mouthful, chew it and hold it in your mouth for five minutes.
- If it still tastes good, go ahead and eat it. If the taste is disagreeable, don't eat it.
- A burning, nauseating, or bitter taste is a warning of danger. Except for poisonous mushrooms, a small quantity of even a poisonous plant food is not likely to prove fatal or even dangerous, whereas a large quantity may be deadly.

Health and sanitation must be attended to with more care in the tropics than we are accustomed to use in the temperate zones. Wash your clothing and body frequently. At regular intervals throughout the day, inspect your body for ticks and leeches. Remove them carefully and paint the bites with disinfectant. In removing ticks it is very important that you do not leave tick mouth parts inside the wound. One of the best ways to remove a tick is to slip a thin knife blade between the tick and the skin, pinch the tick against the knife blade with the forefinger and withdraw the tick slowly and carefully. Disinfect all cuts and blisters. Above all else, get plenty of sleep and rest. With rest, drinking water, and self-confidence a surprising number of survivors have made their way through the tropic jungle with no lasting ill-effects.

Like other more technical aspects of air operations, confidence gained through adequate information and training makes the difference between a successful survival experience and a gruelling nightmare. The following survival account, experienced by a fighter pilot early in World War II, could stand as a model of what *not* to do in the tropics. True, hindsight criticism is easy to make. Many of the errors committed here were not the result of poor judgment, but of the inadequate information available to airmen in the early days of the

Downed crews able to get the word out are virtually assured of a quick rescue.

South Pacific. With what we now know about tropic survival, no airman should make the same mistake today.

The pilot had taken off at dawn to provide fighter support for a bombing mission in the Solomon Islands. With little warning, the oil pressure dropped, the engine began to run rough, and finally quit. At a low altitude he bailed out over the water. A loose leg strap which he had neglected to check before takeoff dug deeply into his left thigh as the chute popped. In the water he freed himself from the chute and let it drift off as he tried to inflate his Mae West. It was faulty and would not inflate. Fortunately, his seat-type rubber raft inflated normally.

Once in the raft he removed his jungle back pack and checked the contents, spreading them on the sides of the raft to dry. His flares, matches and compass were soaked and useless. He took off his shoes and put them in the bottom of the raft. Two planes from his element approached him, flying 500 yards apart, 100 feet above the water. They passed on either side of him but he could not signal them.

Squall Strikes

Preoccupied with the planes, he failed to notice the approach of a squall. It struck before he could make any preparations and the raft capsized. Loose gear spread around the raft was immediately lost. When he righted the raft he found that all he had left were his clothes, minus shoes, a knife, a .45 pistol attached to his web belt, a poncho, sail and mosquito head net. His pistol soon became rusty and inoperative and he threw it and 14 rounds of ammunition away, believing that they could be of no further use to him.

All that day and the next, with only his hands for paddles, he tried to reach an island which appeared to be less than three miles away. He had discarded his helmet and goggles and his face, eyes and lips were becoming badly burned.

Toward sundown of the second day he reached a small island, pulled his raft on shore and camouflaged it with palm branches. He found two coconuts, husked them, punched out the eyes and drank the fluid, then cracked the nuts and ate the meat. For protection from swarms of mosquitoes, he moved down to the beach for the night. He used his inflated raft for a bed, wrapped his feet in the sail, covered his head with his undershirt and mosquito net and kept his hands in his pockets, but the buzzing of mosquitoes and the rattling walk of land crabs kept him from sleeping very soundly.

The next day he explored his small island. Much of the coast was mangrove swamp and there were no signs of human life. He then decided to move on to the next island. He was afraid that wooden paddles might puncture his raft so again he used his hands to paddle.

He found abundant wild life on the next island. There were pigs, chickens, pigeons and fruit bats, but he made no attempt to catch any of them in traps or snares. Day after day he paddled from island to island, subsisting only on coconuts and spending each night on the beach of a different island. One night he felt a heavy animal walking over his bed. Terrified, he threw it off and dashed with his boat into the water. Looking back, he saw a large iguana lizard.

He was shaken, and pushed on immediately for the next island. Rats and mice were plentiful on most of the beaches. They ran across his poncho as he tried to sleep, and occasionally nibbled at his fingers. On the seventh day of his survival experience he used his knife to open a coconut as he was proceeding from one island to the next. The knife slipped from his hands and punctured the rubber raft. From then on he was forced to limit his raft trips, and he had to wad a sock into the puncture and hold it in place with his foot whenever he used the raft.

In the tropics, a machete can be used to get firewood, build a shelter or improvise a trap to obtain needed food.

By this time his bare feet were badly infected by many coral cuts, and his hands, immersed daily in salt water, were cracked and bleeding. His head ached constantly from the glare of the sun on the water. He had eaten nothing but coconuts since coming down in the water. At one point in his journey, he was isolated on an island for five days by violent storms. The island had no coconut palms, so for five days he ate nothing, hiding from the storm under a narrow ledge on the side of a hill. On this island there were many wild pigs, bush rats and fruit bats (flying foxes), but he did not know how to catch them. He did not know any of the native fruits or vegetables, and he did not dare to

experiment with the ones he found.

After 15 days of survival he arrived at a coconut plantation. Physically, he was exhausted. He had diarrhea, his hands and feet were infected, his leg and arm joints were swollen and ached.

He approached the plantation house carefully. It was deserted, but he found some limes which he ate, and in the back of the house he found a dozen eggs, all over-ripe, but he rationed himself to two a day and choked them down with fresh water.

After three days at the house he put some limes and the rest of the eggs in his pockets and set out to find the original island on which he had first landed.

At sea a violent storm tossed him back on the beach. In a state of exhaustion he tried to set out again but collapsed; delirious, raving and screaming. Here he was found by a Bogotu native, nursed, fed and eventually returned to his organization where he was brought back to health.

Let us check this survival experience error by error. The pilot had failed to track his formation and was not at all sure of his position when he went down. He had not made certain of a good fit in his parachute harness, and the resulting injury to his thigh pained him for the full 32 days of his survival ordeal. In the water he threw away his chute, one of the most valuable survival items available in the tropics. (See AF Manual 64-15, Emergency Uses of the Parachute, which is packed with the parachute log record in each chute.) His Mae West had not been inspected and tested prior to takeoff, and it failed when he needed it most. Even though it was inoperative as a life preserver, he could have saved it and made sandals from the heavy rubberized fabric. When he was finally settled in his inflated raft he spread out his gear to dry, without taking the precaution essential in dinghy and raft operation of lashing everything securely to the raft.

His matches and compass presumably were soaked and worthless and he threw them away, although there was a chance that he might have been able to dry them successfully. He had taken off his shoes and neglected to lash them to the raft—a mistake which was nearly fatal. Since his gun was rusted he assumed that his ammunition was worthless and threw it away. However, there is a chance that had he saved a few shells the powder would have been of assistance in starting a fire.

He arrived on a small island with a sunburned face and lips. There were plenty of coconuts, and the oil from these would have eased the pain from sunburn and salt water sores. It is true that the coconut oil can be rendered more easily with fire, but it is possible to get a usable amount of oil by shredding the meat and placing it in an empty shell in the heat of the sun.

In anticipation of further injury from the sun, and for protection from glare on the water he might have woven a simple head shade out of coconut palm leaves. The short time necessary to make a sun shade would have been worthwhile in view of his severe headaches.

From a description of his ailments it is apparent that his diet of coconuts was not adequate for his long survival period. In this light it is tragic to note that the central Solo-

Use a small, hot fire for cooking.

Tarpaulins or parachutes can be substituted for the standard jungle hammock.

Six panels of a chute provide a dry shelter with good air circulation.

mons are one of the richest areas of wild foods in the South Pacific. Some of the more common vegetables are the palm cabbage, papaya, and wild plantain. Many of the shellfish are edible raw as well as cooked, and the iguana lizard which so terrified him provides a delicious meat similar to breast of chicken.

Each airman stationed in the tropics should make it his own responsibility to learn to identify as many of the native foods as possible.

Probably the greatest error in judgment displayed in this account is the pilot's decision to keep on wandering from island to island with no planned course. His wanderings took him in a large circle, nearly returning to his original starting point, and at no time was he prepared to signal passing friendly planes. The island on which he originally landed, closest to his bailout point, was the logical place for friendly forces to locate him. Had he remained here for several days he might have made a more comfortable shelter, dug signal trenches on the beach, made sandals to protect his feet from coral, and set traps and snares for the birds and animals on the island. Instead, his endless wandering, burning up his available energy, so exhausted him that he probably would not have survived had he not been found by a native on the 23rd day of his survival experience.

A little training plus some self-confidence in his ability to survive would have spared this pilot most of his ordeal. A case in point showing how training when combined with confidence can virtually eliminate hardship is that of two airmen forced down in the Burmese jungle, during the war.

The surrounding terrain was covered by dense rain-forest, but fortunately the pilot was able to pick out a small clearing when his engine started to miss. He glided into this field and plowed into a growth of elephant grass which nearly covered his plane.

After evacuating the damaged plane the two men made an inventory of their equipment. They had a flare pistol with eight flares, two chutes with jungle kits and two .45 pistols with a total of 23 rounds of ammunition. Each jungle kit contained a machete, a pocket compass, a first-aid kit, a bottle of insect repellent, and a Type B-4 frying pan insert containing atabrine tablets, boric acid, fish line and hooks, band-aids, sulphadiazine and a bottle of halazone tablets. One man wore only his khaki uniform, while the other had a leather jacket in addition to his khakis. Their rations consisted of one-half canteen of water and three bars of D ration chocolate.

After eating a square of chocolate apiece, they set about making their landing site more readily observable from the air. They opened one of the chutes and spread it out in the clearing. Then, with their machetes they cleared the grass from a large area around the plane to make it more easily seen. They removed the engine cowling panels, cleaned them with gasoline to make them as bright as possible, and spread them on the wings. By that time it was getting dark, so they retrieved their signal chute. Each man wrapped up in one half of it, and after liberally dousing themselves with repellent, lay down in the plane to sleep.

Search for Water

In the morning they set out to increase their scanty water supply. By standing on the wings of the plane they could see what appeared to be deserted native huts in the distance. They hacked their way through the grass, making a clearly marked trail from the plane and found a native house in a fairly good state of preservation with a small, muddy well nearby. Having made certain that water was available, they returned to the aircraft to be ready to signal in case planes should come over. Numerous transports droned overhead, but failed to spot the crashed plane or the small smoke flares. The two men fervently wished for a signal mirror. (It has been demonstrated time and again that the sighting mirror is one of the best possible ground-to-air visual signaling devices.

Toward dusk they returned to the deserted native hut for the night. They took all of their equipment with them, intending to strike out for a known road the next morning. The aircraft emergency had occurred so rapidly and at so low an altitude that they were not certain of their position, but they felt sure that the road was southwest of them approximately 10 miles away. Before leaving the plane they checked their pocket compasses and found that they compared favorably with the aircraft compass.

In the native hut they built a fire, boiled the muddy water from the adjacent well, and strained it through several layers of parachute cloth. Then they rigged a parachute shelter inside the hut to keep out insects, put down a double layer of cloth for a mattress, a double layer for blankets, used the chute cushions for pillows, soaked parachute cloth in insect repellent, tied it about their heads and necks and settled down for the night.

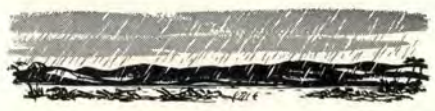
The next morning they were certain they would hit the road during the day. But to be on the safe side they packed up their indispensable parachute cloth and other equipment and lashed it to an improvised pack made from a parachute harness. Previously, in exploring around, they had discovered a game trail bearing in a general southwesterly direction, and they set out on this. It was soon apparent that a number of buffalo, tiger and elephant were using the same trail, but the men had no intention of tackling such game with .45's until hunger drove them to it. The trail meandered through the forest, but at frequent intervals they checked their progress with the two compasses.

At one point they came to a deserted native village and an orange tree which they stripped of ripe fruit. They found small game, such as barking deer, wild turkeys and a partridge-like bird to be plentiful, especially around the forest clearings. Leeches were a nuisance, even though they had wrapped strips of parachute cloth around their legs, and they made frequent de-leeching stops. During one of these stops they heard the hum of a truck on the highway, and 20 minutes later had hitched a ride back to their outfit.

The survival experience of these two men was short, and not particularly eventful, but the value of its retelling lies in the words of one of the survivors:

"Although our experience in the jungle was in no way a harrowing one, we did pick up a few pointers, and *gained considerable confidence* in our ability.

"With gun, machete, compass, canteen, halazone tablets, matches, enough clothing, sound training and plenty of *good common sense*, the jungle need not be a nightmare to anyone." ●



THE WEATHERMAN'S BATTING AVERAGE

By John D. Rugg, Hqs. Air Weather Service

IT IS COMMON PRACTICE for most of us to think of the weatherman as "that idiot" who promised a fine day for the picnic that was completely rained out.

Pilots may remember a comparable example of inaccurate weather forecasting for a flight, such as the time he was briefed for good weather all the way and then ran into a blizzard over Pittsburgh and had to turn back.

Remember? Of course, you remember those times when the weatherman turned out to be a bad prophet. But jog your memory a little harder and bring to mind the many times his forecasts came through right on schedule. Then draw a quick comparison between the numbers of good and bad forecasts. What's his batting average?

For the past several years, the USAF Air Weather Service unit at Tinker Air Force Base in Oklahoma has been conducting a survey into the accuracy of weather forecasts. Believing that forecast is best which best serves the need of the pilot who receives it, the AWS unit at Tinker carried on its survey by a pilot comment card system. Each pilot who received a weather briefing was given a post card on which he was asked to indicate his opinion of various aspects of the weather service furnished him.

The latest compilation of results from the Tinker AFB survey, covering four weeks in winter, when forecasts are most likely to go wrong, showed the following:

- Promptness and Efficiency of Weather Briefing (3,117 pilots reporting): 98.95 per cent reported "good", 0.06 per cent reported "fair", 0.99 per cent reported "poor".
- Weather Forecast (3,011 pilots reporting): 97.1 per cent reported "satisfactory", 2.9 per cent reported "unsatisfactory".
- Wind Forecast (2,997 pilots reporting): 95.1 per cent reported "satisfactory".
- Landing Weather from Tower (3,048 pilots reporting): 99.2 per cent rated it "accurate".

This is an over-all batting average of .976 for all factors of the weather forecast. Ty Cobb at his best for Detroit in 1911 reached a batting average of only .420, and the great Rogers Hornsby batted the highest recorded average in 1924 at .424. ●

Base Flying Safety and YOU

You may never be assigned as a flying safety officer, but if you fly you should know how the program works . . . for your own good!

IF you see a senior pilot with a harried look on his face, skimming along the ramp in a jeep to the scene of a taxi accident, the chances are eight to five that he's the base flying safety officer. He's one of the busiest men on the base, for he's a Man with a Mission . . . that of keeping the USAF aircraft accident rate at its all-time low.

However, as base flying safety officer, he is just one cog, albeit an important one, in the machinery of the USAF flying safety program. This story endeavors to show you how a base flying safety program is planned, organized, and carried out, for YOUR ultimate safety.

Like the sign in the saloon that read, "Don't Shoot the Piano Player, He's Doing the Best He Can," we entreat you, don't be too hard on your FSO because chances are that he, too, is doing the best he can with a difficult and oftimes complicated assignment.

Flight Safety Council

The foundation of the base flying safety program is the flight safety council. This council acts as an advisory group to the Commander in all things pertaining to base flight safety. The flight safety council usually consists of the flying safety officer, the flight surgeon, the chaplain, the operations officer and the engineering or maintenance officer.

This council is a group of men with exceptionally broad experience with not only the flying machine, but also with the human beings who fly them, from both the spiritual and physical viewpoint. Of particular value to the base commander are the knowledge and thinking of the surgeon and the chaplain, especially in the consideration of the human factors in aircraft accidents.

The flight safety council reviews, evaluates and recommends base flight safety policies and actions, both in the planning stage, and in the accident investigation stage. The formation of a base flight safety council is strongly recommended by the Directorate of Flight Safety Research. Base commanders who use the council to its utmost capabilities are usually rewarded with low accident rates.

All of us who tool airplanes along the fleecy sky lanes have attended, or slept through, flying safety meetings. If you are the sleeper type, chances are you have had or are going to have an accident, although it is evident that if your flying safety meeting invokes a state of dormancy, the fault may be with the flying safety officer's planning. Concerted and piercing screams directed to this gentleman will usually bring about a new flavor to flying safety meetings.

The smart flying safety officer has a trace of showmanship about him. which is reflected in his meetings. At one base in Florida, the meeting often takes the form of a playlet acted out by base personnel, in which various points of flying safety are stressed.

This method means a great deal of work on the part of the FSO and his staff, but it pays off in the long run because it impresses indelibly on the audience the basic facts of safety in flight. It never hurts to have a laugh or two in every meeting, particularly if it drives home a point.

Other flying safety officers bring in experts on various phases of flight operation at each meeting. Pilots and crewmen like to meet the men and women who work with them on the ground. It is surprising to many pilots that weather forecasters, tower operators, and GCA crews are human beings like themselves. By bringing together the flying and non-flying personnel at these meetings a better understanding is created among all concerned. The pilot begins to understand the problems that constantly come up in the control tower cab and in the GCA shack.

Another source of program material is the Civil Aeronautics personnel in the region. These are the men who run INSAC (communications), the Approach Control and the nearby civilian airport operations. Here

Comprehensive, up-to-date navigational aids, a few laughs at the Flying Safety Meeting, and some interesting discussions can pay off some big dividends.

again, knowing the problems of the CAA in relation to military traffic is a safety factor that cannot be overlooked.

Your flying safety officer should always expose you to any changes in Air Force Regulations and T.O.'s that affect you. Good old AFR 60-16 cannot be too deeply stressed, and the Dash-Ones for the aircraft you fly should be reviewed constantly. If there are any changes in airfield layout, airfield lighting, or if new obstructions have appeared in the area, these should be stressed at meetings.

Meetings Mandatory

At most bases the flying safety meetings are mandatory for your own good. The ingenious excuses people can think up to avoid attending a base flying safety meeting are amazing. At Elmendorf Air Force Base in the Alaskan Air Command, flying safety meetings are held twice a month. This allows personnel to attend either one or the other, but attendance of at least one meeting a month is mandatory. Attendance is carefully recorded and sent to the base commander. Failure to attend brings an RBI.

Strategic Air Command and other commands have found that the use of Incident and Near Accident Reports tends to keep the accident rate down. This report can be very simple in form, and should be put on a voluntary basis as far as the signature of the man making the report is concerned. Near accident reports bring to light many situations at your base that would not normally be noticed until an accident occurs. These near accident reports cover inaccurate forecasting, crowded ramp conditions, careless tower control procedures, and faulty installations as well as poorly planned traffic patterns and other factors which can, and do, give you a close call now and then.

The idea is not to be a tattletale, but to eliminate the hazard for the man behind you . . . or maybe even you, the next time you're up in the blue!

Bottle and Throttle

Down at Reese Air Force Base there is a sign hanging in the operations office. It reads "Twenty-Four Hours Between Bottle and Throttle." It's a damn good rule to follow. You may think you're the he-man, but the aviation medicine men know differently. Your flight surgeon can tell you just how those three Martinis you had at the club the night before that long cross-country affect you, and it's not worth it . . . even if you did win those drinks at poker dice. Flying safety officers who are really on the ball have pushed through fair and workable rules for the use of alcohol before any flight. They have educated flying personnel to the reasons why it's better to be a teetotaller before any flight, not because of any moral reason, but because men and machines cost money. That no-drink-

An important phase of good flight planning is seeing that you have the maps and charts you'll need.

10,000 hours of safe flying merits congratulations and a special citation from the base commander.

A clean, well-planned operations office plus good dispatchers can help your program, and its a fact visual aids sell the "Message."

ing rule is for your own good, and not because anyone wants to be a spoil-sport.

Another phase of flying safety that ties in very closely with the "Bottle and Throttle" rule is in the domain of the chaplain. These Men of God who are usually very human and understanding of the troubles of the world, can be valuable assistants to the flying safety officer.

A man can't do a good job of flying if he has troubles on his mind. And a good way to get these troubles off your mind is to talk them over with the Sky Pilot of your outfit. It is quite possible that he can suggest a solution. If he can't, you at least have them out of your system, which tends to relieve that nervous tension. To put it bluntly, woman trouble is the cause of more than a few aircraft accidents and most of these situations have a solution.

Learn to rely on your chaplain. That's why he's a member of the flight safety council. You'd be surprised at how much he knows about what's going on around the base, and off the base, too, for that matter!

Safety Education

Each month the Directorate of Flight Safety Research mails out to every Air Force Base a series of safety education publications designed to help you increase your flying safety factor. Basically these are *Flying Safety Mazagine*, written for the aircrew; *Aircraft Accident & Maintenance Review*, designed for the engineering people; *Rex Riley* posters, just to remind you; *Flying Safety News Bulletin*, for the edification of flying safety officers; and *Letters to Commanders* which point up salient developments in the field of flight safety of particular interest to your base commander.

Big business has found that employee relations can be strengthened by various awards for achievement. Along this line, many base commanders have also found that flight safety consciousness can be strengthened by an award system, either to crewmembers or to individual pilots. At one Air Force Base, the outstanding pilot for the month is awarded a huge set of wings, on which is inscribed: "Flight Safety Monthly Award."

Other bases award citations to air crews who have flown together for a specified number of hours without an accident, and to the crew that passes the 10,000 hour mark on the base without an accident.

Awards of this kind should be made in behalf of the crew's organization, and every man on the base must be made to feel that he is a member of the team and partly responsible for the record. Air Force-wide, flying safety plaques are awarded twice a year to bases having the lowest accident rates and plans are in progress for similar awards to be made by the aircraft industries to USAF individuals, crews, or commands having made outstanding contributions to flight safety.

Accident Investigation

Not the least of the flying safety officer's duties lie in the field of accident investigation. He must be thoroughly familiar with AFR 62-14, and be able to carry out an aircraft accident investigation efficiently from the scene of the crash to the final Form 14 report.

In order to train flying safety officers in the proper procedures of aircraft accident investigation, the USAF, through the Directorate of Flight Safety Research, has set up a school for flying safety officers at the University of Southern California that will turn out trained, professional flying safety officers.

Getting right down to it, the flying safety officer has to be quite a man. He must be a rated pilot and should be current in all types of aircraft flown at his base. Most FSO's are instructor pilots and instrument instructor pilots, and those that are really on the ball, usually set up spot checks for base pilots and even IP's to be sure that aircraft qualification standards are high.

In addition to his flying duties, he must be an organizer and an educator. He must be able to analyze an aircraft accident, and to write a complete and coherent report on the accident. He must know operations, facilities and installations as well as men and machines. He usually works with a minimum of assisting personnel, and oft-times must type his own reports.

He is on call twenty-four hours a day, and must eat, sleep and live flying safety. His rewards are not material, for he is usually a company grade officer, but his satisfaction is great when he knows that his flying safety program has saved an airplane or, more important, the crew of that airplane. Wanna volunteer? ●

AFR 60-16 —The Pilot's Good Book

It's the one regulation that you have to live with and the one regulation that's most often violated!

AIR FORCE REGULATION 60-16, officially known to the trade as "*Flying . . . Air Traffic, Clearance and General Flight Regulations,*" might well be hung around the neck of many pilots, like the albatross on the Ancient Mariner.

It's the one regulation that every flying man has to live with, and it's the one regulation that is violated most . . . intentionally or unintentionally. It's the one regulation that is stressed in the written instrument examination, yet with the exception of certain paragraphs, the average pilot knows less about AFR 60-16 than he does about the telephone directory.

Most of you know by this time that there is a new version of AFR 60-16 extant, with certain changes. These changes make many study guides, to say nothing of the current written instrument examination, obsolete. That's why we want to run over a few of the highlights of AFR 60-16, lest we forget.

For instance, we find that the regulation says that all aircraft operating along civil airways will be flown on the center line of the airway, unless specifically designated by Air Traffic Control. This does not mean that when you file and fly airways you can cruise down the lane five or ten miles to the right or left. It means the center. How many do it?

And here's the word on navigation lights. You don't wait until it's black as the inside of a P-1 helmet before you look around and switch on the wing lights. You do it 30 minutes before sundown, and keep them on until 30 minutes after sunrise . . . or at any time when the flight visibility is less than one mile.

Another thing, you don't taxi within 100 feet of any aircraft parking area or within the parking area itself, without at least one man on your wingtip, or ahead of your airplane far enough for you to see him at all times. The Form 14 files are full of tales of aircraft damaged because of the absence of a wingwalker or a "follow-me", and an impatient pilot.

This brings up a moot point. You are to keep your earphones on, and your radio tuned to the tower frequency, not only while taxiing, but until you have parked the beast and the switches have been cut.

One of the most important parts of the regulation, and one that is violated daily, sometimes to the detriment of the crew, airplane, and passengers, is Paragraph 19, "Use of Oxygen." It says that crewmembers will use oxygen when the cabin pressure altitude is 10,000 feet or higher. It *encourages* aircrews to use oxygen on prolonged flights when cabin pressure altitude is 8000 feet or above, and makes use of oxygen mandatory above 14,000 feet.

This brings us to the part about parachutes. It is the responsibility of the *pilot* to see that not only his crew, but his passengers have their parachutes correctly fitted, and that they know how to use them. Don't leave this checkup to the crew chief.

There are some aircraft commanders who insist, even in a Gooney, that the crew, as well as the passengers, wear their parachutes during the flight, comfort to the contrary. It is also the *pilot's* responsibility to see that passengers use safety belts, and that each passenger is adequately briefed on bailout and survival procedures. It's awfully easy to tell the Sergeant, "G'wan back and see that they're all fastened in, Sarge!"

VFR Rules

In the section on visual flight rules, there has been a change. Now over-the-top flight above an overcast is excepted from VFR. This means that when you file OT, over an overcast, you must file IFR. There has been a slight change in fuel reserve, also, on IFR. Now the fuel reserve for IFR flights will not be less than 20 minutes, nor more than two hours (Par. 39).

Landing minimums have also been changed. Now no pilot, white or green card holder, will make a landing when the weather is below published minimums listed in the *Pilot's Handbook* (PHACUS, East-West.), for range or ILAS letdowns. Where there is a GCA, and a designated holding point, no pilot will make a landing when the field is below published GCA minimums listed in the Radio Facilities Chart.

The purpose of this article is not to analyze AFR 60-16, or to brief it paragraph by paragraph. It points out only those paragraphs which seem to be most constantly violated, according to accident reports. How often AFR 60-16 is violated without noticeable results, no one will ever know.

Commanders cannot stress too highly the worth of this regulation, and flying safety officers cannot repeat too often the rules set forth in this, the Pilot's "Good Book." ●

The FIRST TWENTY..

USC graduates the initial class from USAF's Flight Safety

ON the 24th of April, 1953, the University of Southern California graduated the first twenty flying safety officers from its newly instituted course in Flight Safety Engineering.

Certificates of completion were presented to the class, followed by a luncheon. Brig. Gen. Richard J. O'Keefe, Director of Flight Safety Research, addressed the class in a short statement after introduction by Dr. Carl Hancey, Dean of the University College, USC.

The General, in greeting the class as pioneers in a program that is believed to be the first of its kind at university level in this country or abroad, said:

"I would like to take this opportunity to commend the University of Southern California for its pioneer spirit in opening up a new field of aviation education. As in all pioneering efforts, first attempts are subject to some criticism, but I am sure that your constructive criticism will contribute a great deal to the effort of the University professors in their demonstrated enthusiasm for safety of flight.

"The development of this course was the culmination of a long-time dream to give aircraft accident prevention its proper place in the Air Force educational system. Our allies —the Air Forces of the NATO countries—have expressed their desires for a place in this program. The CAA and other civilian aviation government agencies are inquiring if they can participate also.

"Our contacts with the aircraft industry show a definite interest on the part of airplane manufacturers. We have hopes that this effort at the University of Southern California will be expanded to a point where it will receive the recognition that it deserves.

"As you know, all of our aircraft manufacturing engineer organizations are now staffed with designers who have a great interest in designing out of our airplanes, those features that have caused accidents. We who are living very close to accidents, have no doubt that our designers can design an airplane of such performance that it is beyond the capability of the human to fly it.

"The pilotless airplane or guided missile has not yet replaced human operation of the airplane as a weapon. Until the long-range objective of pilotless aircraft is attained, we must accept the limited airplane performance that is based on the capability of the man. The human engineering aspects are becoming more important as our designers provide us with higher performance aircraft.

"I would like to point out that my Directorate's investigative capabilities in the field are limited to approximately eight per cent of all Air Force accidents—where we obtain first-hand information on accident causes. It is impossible for us to investigate directly—all accidents experienced. Therefore, we are greatly dependent upon the base investigation board and the approving commander to give us the majority of our source information and their action to eliminate accidents.

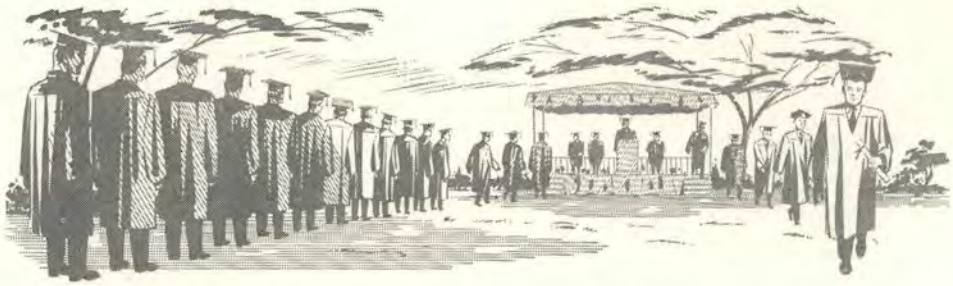
"You will shortly return to your home stations and I am sure you will be warmly welcomed by your commanders. All of our commanders are concerned with the impact that accident losses have on their capability to perform the air mission.

"You should make every effort to convince your commander that you must be responsible to him—and him only—in the command organization.

"To accomplish your mission, you must be critical of all his staff agencies through operations—personnel — maintenance — supply — and even staff agencies responsible for living conditions. In the military structure, to include its housekeeping there is no dividing line in accident

Below, USAF students of the first class in Safety Engineering at USC take a break and a breather between periods. Class number two began May 11, with a total of nineteen men. Class number three is expected to begin around June 29, 1953. From the field standpoint the impact of the school is already being felt. Indications are that ARDC is reorganizing their flying safety program at command level, and MATS is placing trained flying safety men directly under the commanding officers.

Engineering Course.



causes that directly or indirectly contribute to disasters. Inadequate living conditions and recreational facilities can add to the tensions inherent in the flying activity and will in themselves be a factor in pilot error accidents.

"Primary cause factors are strikingly similar from year to year with the chief offenders—pilot error—materiel failure—and maintenance error contributing to nearly 85 per cent of all accidents. I would like to emphasize that the predominant percentage charged to pilot error is not the true picture.

"We know that many accident investigation boards have attributed the accident to pilot error when in reality, there are other hidden causes: such as — poor pilot orientation — poor supervision—poor weather forecasting — and undetermined design and materiel malfunction factors—that are either unknown or passed over lightly by board members and should have been identified as the prime accident cause.

"You will be remiss in your duty if you do not make every effort to ferret out these conditions and fix the responsibility for the accident in its proper category. I reiterate, that to accomplish your mission, you must report directly to the commander—and, of course, you must have his complete support.

"We constantly look for the unseen, the unknown and the undetermined factors that cause accidents. It is our experience that the simplest and most ridiculous unsafe acts and conditions are often the cause. Very few of them are acceptable because, for the great part, they are avoidable and can be eliminated by exercise of good sense and sound judgement.

"The base accident investigation board is our right arm in the field. Your base boards can influence the design of future aircraft and defective materiel by disclosing unsafe conditions in the base board proceedings and by submission of unsatisfactory reports. The prompt and accurate reporting of deficiency design features and unsatisfactory equipment plays a large role in insuring safe flight. You must carefully evaluate your operations—pilot and aircrew training techniques—maintenance and inspection procedures—quality of supervision in all echelons—and the indoctrination of all operational personnel in safety concepts, with the objective of correcting the human factor.

"We find on our visits to bases that a great many of our educational publications and special studies are not displayed or used. They find their way into dead files or, are destroyed when the desk drawer becomes overloaded. Dissemination and proper use of these materials and the subjects contained in special studies will, in the long run, pay you a large dividend in the elimination of time you must spend on accident investigations and the tremendous administrative effort that accompanies each accident. Prevention is still the best cure.

"You have covered a great deal of ground in these past six weeks. We realize, and I am certain that you realize, that the course could be much longer. It is imperative that we train, even in a limited way, a large number of specialists in the accident prevention program because there has been great dearth of that talent in all command levels.

"In the short time that you have attended this course, no attempt was made to make you an expert in any specialized field. It was intended that you be given an appreciation of particular subjects related to a flight safety program. Your indoctrination in the various subjects will help you to identify accident causes and has at least exposed you to possible techniques that should be employed to solve the acident problem.

"I have been indentified with the accident prevention program for over two years and learn something new each day. You will also learn with experience. The assistance that you give your commander in accomplishing his air mission will be directly proportional to your industry, initiative, and imagination.

One Precaution

"I would like to leave one precautionary thought with you upon return to your home stations. In all of your efforts toward accident prevention, do not permit your thinking to evolve about the words, 'Flight Safety.' That statement might appear contradictory, but I would like to point out that as a military organization, the safest Air Force is not necessarily the best Air Force. To make a ridiculous statement — we could stop all accidents by not flying —but if we did, our country would not have an Air Force that must be ready to defend it.

"The military flying activity is in itself hazardous—due to the air mission. Rather than permit our thoughts and decisions to stem from flight safety, I would prefer to express it as 'Accomplishment of the air mission with minimum loss of personnel and equipment.' We must first accomplish our air mission and I believe that we can accomplish the United States Air Force mission with minimum losses. That is my job—and it is yours.

"In your accident prevention activities, I would suggest that you ask yourselves these two questions: Does my effort detract from the accomplishment of the Air Mission? Does my effort inhibit the personnel who fly the combat mission?

"If you are satisfied that the answers to these two questions are 'No,' then your effort is healthy and you have contributed to the combat capability of your Air Force." ●

HOODED for PRACTICE

Everyone is agreed that all pilots need to practice instrument flying. The questions are: "How to go about it; what's the best method?

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Above and to the left this pilot shows his choice of a hood that was developed from a welder's helmet. Below, Lt. Spencer and Capt. Swisher compare their "kite" hood with panels of the two-color system.

BUILD a better mouse trap, they say, and the world will beat a path to your door. But don't be taken in by this mossy bromide if you're kicking around an idea for a revolutionary hood system for simulated instrument flying. Chances are your system has already seen its day and, if you would know the truth, one pilot's hood method often turns out to be another man's frustration.

Everyone is agreed that all pilots need to practice instrument flying. The only question is: "How should the pilot go about it and what methods are the best to use?"

The direct approach is to fly in instrument weather. But there are several reasons why this is not always the best approach. For one thing, instrument weather does not come as often or last as long as it may sometimes seem. For another, just stooging around in instrument weather may be dangerous . . . especially near airfields.

Simulated instrument flying offers an opportunity to practice instrument flying without the danger and distractions of actual instrument weather. The knowledge and skill gained in simulated instrument flight can and should be combined later with experience in all weather conditions.

The chief function of simulated instrument flying equipment is to prevent distraction from the primary job of instrument practice. It should be second nature for pilots to interpret the gages and react promptly with correct control action. If the instrument hood equipment helps the pilot to achieve and maintain proficiency, it serves its function well.

Many systems and gadgets have and are being used to put the pilot on the gages. And considerable research has gone on to determine the merit of each system; research that evaluated the various systems both from the point of view of pilots' experiences and needs, and from more technical points of view in the laboratory.

Although a great many variations are found in the USAF systems of simulated instrument flying, the majority of the methods used can be reduced to about four basic systems.

Loosely, these are what might popularly be termed as the two-stage system, and the hood, helmet, and louvre systems.

The two-stage technique refers to all of those methods which employ two different filters to bring about selective visibility. The hood system includes any method by which the students' vision outside the cockpit is blocked by screening material. The helmet, or "beak" type bonnet technique is worn by the pilot, whose vision is then limited to the instrument panel when the head shield is correctly adjusted.

The louvre, or slat-type method creates selective visibility by means of successive slats or cards attached to the windshield at angles to form a screen for the student, but presents only edges to the check-pilot.

According to some pilots the helmet-type system permits good instrument flying practice without the use of goggles and is comfortable, adaptable and convenient besides being easy to carry around.

An informal survey shows different systems and hood styles for various types of USAF aircraft. In the jet fighter type, for instance, when it was found that the instrument flying hood for F-86A aircraft was unsatisfactory for use in his fighter outfit, Lt. Col. Frank J. Keller, executive officer of the 81st Fighter-Interceptor Group, decided there was ample room for improvement. After weeks of trial and error, he finally produced a design for a new type hood which left the group pilots and maintenance personnel pleased as punch with the improvements.

Here, the "kite" hood inventors have installed their instrument practice system in a B-29 and are checking the visibility features.

Col. Keller then submitted a U.R., incorporating the design and construction of the new hood, and recommending that a hood of similar design be adopted for use in the F-86.

One of the first problems he faced, according to Col. Keller, was the time-consuming and difficult method of installation of the issued-type hood. This frequently required the crew chief to spend hours on his aircraft, rigging the hood for perhaps just one or two flights, and then dismantling and taking it out of the plane when the hood was no longer required. Also, the position of the hood when not in use restricted the pilot's visibility.

With Keller's modified hood, the pilot himself carries it to the aircraft and within a short time installs the unit and is ready for his mission.

Listed among the disadvantages of the original hood was the bulkiness and the difficulty in obtaining satisfactory hood operation. The changed version, made of mercerized cotton, incorporated three elastic strips sewn into the material to reduce size and bulk when not in use. Also added was a positive engaging-disengaging hook which enabled the pilot, with one hand, to open or close the hood

B-26 pilot's view from under a shutter-type hood.

This pilot prefers a variation of the helmet-hood.

with a minimum of time and effort.

Top selling point for Keller's hood with maintenance personnel was the fact that no modification of the aircraft was required. To test the effectiveness of his new design and to offer suggestions and criticism, numerous group pilots made many training flights under the new hood. Consensus was that the design was an improvement and as a result all of the tactical squadrons at both bases were equipped with the new rig.

In the multi-engine class, there is still another version of an instrument flying hood that has been recently developed by two Tactical Air Command flying safety officers.

This device, designed by Lt. Col. Legrand J. Mercure and Captain Albert H. Francis, is a shutter-type hood that prevents outside visibility for the pilot, while presenting no visibility restrictions for the instructor in the right seat.

Working on the principle that the pilot will see the flat side of a plywood panel while the instructor will see only the one-eighth inch edge, the new hood offers a simple, safe way of simulated instrument training, the designers say. The shutter-type hood may be used only in aircraft with side-by-side seat arrangements.

Depending on the type of airplane, the shutter-type hood normally consists of three plywood panels shaped and fastened to blot out the pilot's vision through the windshield and side windows. The panels, painted a dull black, are simple to install or remove, and eliminate the use of goggles, plexiglass headshields or other uncomfortable equipment for the pilot.

With any type of hood system, pilot comfort coupled with unlimited visibility for the instructor is an important safety factor. When the shutter-type hood panels are in place the pilot has full view of the instruments and controls in the cockpit, and the instructor can observe the pilot's technique and still maintain an unobstructed view ahead of the airplane.

In working on their particular version of the shutter-type hood, Col. Mercure and Capt. Francis kept in mind that a simple enough device was needed so that it could be made by units in the field from available materials. To make the job easy, the two TAC officers made full-scale models and patterns for the C-47, C-119, and B-26 type airplanes. The hood models were then made available on a loan basis to units.

Building Unit

Building a hood unit requires less than ten square feet of one-eighth inch plywood, a small quantity of sheet aluminum for brackets and about five catch fasteners. No modifications on the airplane are needed and once the panels are shaped and painted, it takes less than one minute to put them in place.

From Randolph Field comes still another variation in hood styles—this one of "box kite" design which represents the latest training aid for instrument flying devices. The box style hood, say these two designers, not only speeds instrument instruction but also makes B-29 hood flying inestimably safer.

The brain child of two Randolph pilots, Capt. Lyle W. Swisher and Lt. Loren J. Spencer of the 3513th Transition Squadron, the "kites" were developed in four months from the first cardboard-and-paper model and have now been placed in use on the B-29s at Randolph.

First work on the kite-canopy flight hood was begun by Capt. Swisher, instrument instructor, because of dissatisfaction with various aspects of the existing B-29 hood types. The standard B-29 hood equipment, it was pointed out, was time-consuming to install along with other disadvantages. It restricted the instructor's vision to the left of the aircraft, and it could not be removed quickly in the event of an emergency or for making a visual landing after GCA approach.

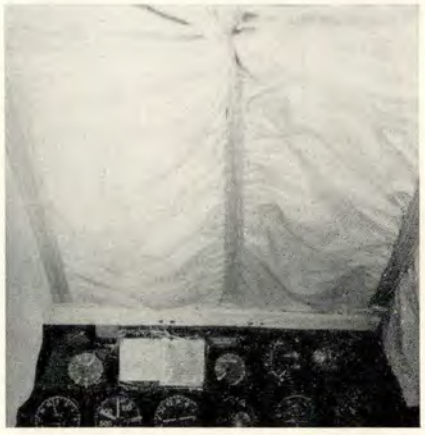
The new "kite" creation, a two-by-five foot tubular steel frame covered with linen is light and strong. In position, one end rests on the instrument panel and the other is tied above the pilot's head. Hanging curtains serve as blinders to right and left.

However, the "kite" hood does not improve the instructor's view to the left. In this direction scanners in the plane's nose and top turret keep watch. When the curtain is in place, a tug on pull-lines releases spring clips and instantly rolls the hood up like an awning to permit the student to land with full visibility. This feature was a refinement added to the original model by Lt. Spencer.

The inexpensive linen cloth covering of the hood canopy is opaque enough to block completely a student's outside view, while admitting sufficient glare-free daylight, the inventors declare.

As might be expected, the foregoing systems as well as all of the methods and variations currently in

Utilizing a canopy style hood developed by Lt. Col. Frank J. Keller for the F-86A, the pilot in the above series of photos shows the ease of "going under" the new hood. Last photo shows the neat fit around the top of the instrument panel.



use today will have some advantages and some limitations. But there is one simulated instrument technique that has seen the widest use and appears to have the fewest limitations; and to function more effectively than most as a positive aid to instrument practice. That system is the blue-amber filter set-up.

To use blue-amber panels properly, it is necessary to know the functioning of the system. If the equipment is used correctly, the pilot can get more out of his instrument flying practice.

Most varieties of blue-amber work pretty well. But they work well only when the blue and amber filters are correctly matched. Even if the materials come from the same source, occasional difficulties may be experienced. By chance, there may be very light amber panels in the airplane at the same time the pilot is equipped with very light blue goggles. With both panels being light, the pilot will be able to see through the combination. If the panels are very dark, the pilot will have to strain to see the instruments.

In using the combinations, if the pilot sees too little or too much, either the panels or goggles should be changed. Usually it is easier to change the goggles.

During the time of increasing light at dawn or of decreasing light at dusk, blue-amber equipment should not be used.

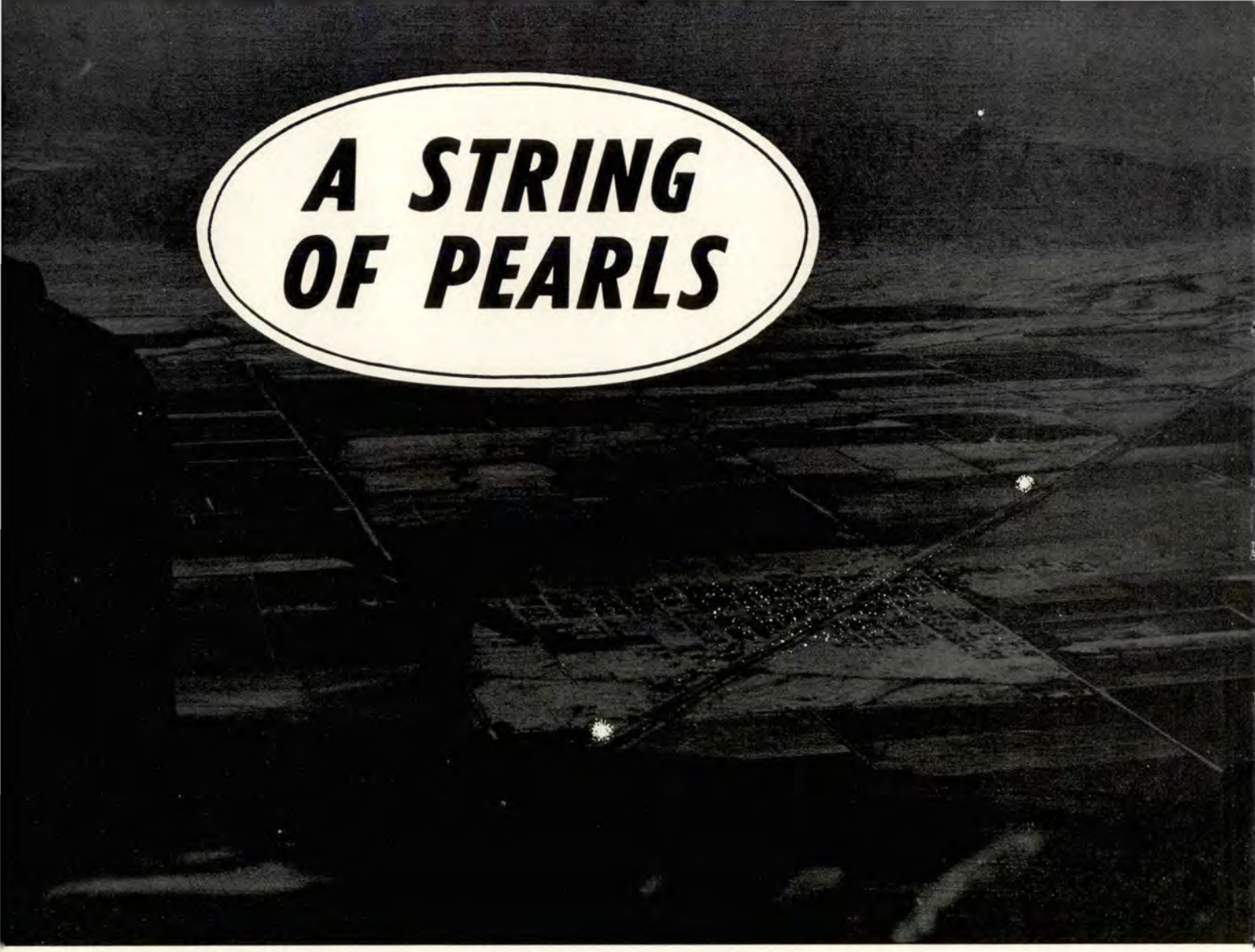
Even if the light *seems* to be sufficient, don't use the amber panels at dawn or dusk. It is hard to judge the light at these times. A mistake in judgment may result in one more demonstration that two bodies cannot occupy the same space at the same time. The same advice applies for an overcast day. Best rule of thumb is if in doubt, don't use it.

Most common trouble with amber panels is a scratched surface, or cracks. The scratches bend light rays and thus distort vision; if many scratches appear in a particular area, vision may be reduced below safety.

Probably the most neglected difficulty with the panel system is just plain dirt. A little work with a cleaning rag may double the efficiency of the system. The amber panels should be carefully inspected before being used.

In landing with the filter system installed, where the pilot has to estimate distances closely, vision should be through the amber of the clear sections only. It might be a better idea to have amber panels in all the cockpit windows.

A great many pilots do not like to land their plane with the panels installed, while some others make "amber-in" landings as a matter of routine. With a little practice, these pilots say, it is easy. But regardless of which system is used — helmet, hoods, louvres or filters, the pilot should be able to see, or transition, quickly to clear vision because some day he may have to do it without any warning. ●



A STRING OF PEARLS

The light line is a double check on night pilotage; every beacon tells its own story about your position.

ONE of the loneliest flights in the United States is the run from San Francisco to Salt Lake City. You're on Green Three, eastbound through the Donner Pass at 11,000 feet. You're in spirit only, the night that covers you is black as the inside of a hat, the horizon non-existent.

Under you, desolation, mountains and wasteland, are jeweled here and there with the neon rubies of desert outposts. The ADF needle is on Reno and you flick the jack box to "Range" to get the station signal. It comes through five by five...*RNO*...*RNO*.

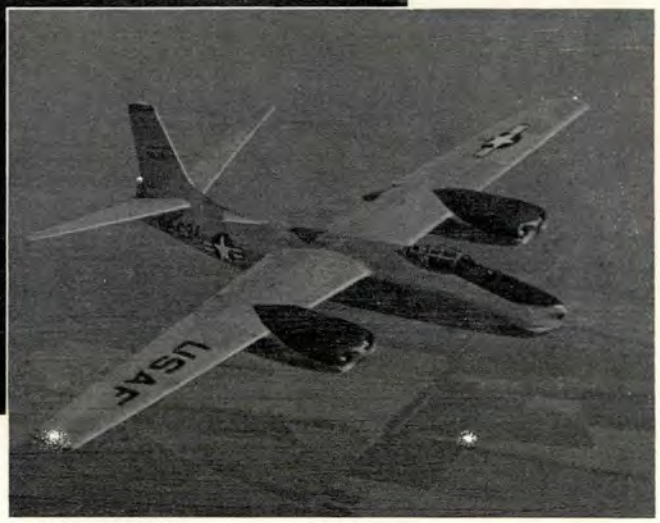
Out in front of your windshield, slightly to the left of course, stretches the reassuring light line, the life line of beacons that mark the airway, each flashing its code, each code telling a story to the pilot in terms of position and distance.

All civil airways are marked at night by these beacons, spaced at intervals of ten miles. From the air, they form an on-course light line normally seen from twenty to forty miles, depending on the visibility. You find these beacons marked on your aeronautical charts by a star with an open center. The little arrows on each side of the star indicate that the beacon has directional course lights, showing the direction of the light line. Although most pilots know that these beacons flash a code, only the savvy ones realize that each code is a message. The letter flashed in code shows the distance in miles from the origin of the airway.

Beacons are numbered from *west* to *east*, and from *south* to *north* between terminal cities. The number the beacon flashes, multiplied by ten gives the mileage from the airway origin. For example, beacon Number One is ten miles from the origin of the airway, and beacon Number Five is fifty miles from origin.

The beacon number is identified by a letter flashed in Morse code. The first letter of each word in the key sentence corresponds to the number given with it. The key sentence to remember is "*When* (1) *Undertaking* (2) *Very* (3) *Hard* (4) *Routes* (5) *Keep* (6) *Directions* (7) *By* (8) *Good* (9) *Methods* (10). Because only ten letters are used, it is necessary that the same letters represent the numbers of beacons more then 100 miles from the origin of the airway. The number of a beacon that is more than 100 miles and less than 1000

Navigators know the letter flashed in code by a beacon shows the distance in miles from origin of the airway.



Out in front stretches the light line that marks the airway, each beacon telling the pilot position, distance.

miles from the origin of an airway is a two-digit number. But the code letter flashed by the beacon represents only the last number of the mileage code. Thus the letter "W" is the code letter for beacons numbered 1, 11, 21; which are respectively ten miles, 110 miles and 210 miles from origin.

The series of code letters is repeated for each 100-mile section of the airway, and the only thing that you need to worry about is keeping in mind which section of the airway you are on. You normally do this anyway if you are in the habit of keeping your head out of the cockpit . . . literally and figuratively.

Airway beacons show six clear flashes per minute. These can be seen from any heading. But the identifying code signal, sent out between the clear (white flashes, can be seen only if you are on course. If the beacon is located on an airport, the code letter is flashed in green, if off an airport the signal is flashed in red. As a navigational double check, the corresponding code signal of the beacon, and the number of the beacon are printed on your aeronautical chart beside each beacon symbol. For daytime identification, the number of the beacon is painted on the roof of the little power shed close by each beacon structure.

These light lines, like other navigational aids, are established and maintained by the Civil Aeronautics Administration for the airline captain, the military pilot, and the civilian flyer. They form a network linking all important points in the country, and reduce navigation problems to standardized methods which work any time and any place, and under all weather conditions.

The catch is that too many pilots fail to use these navigational aids to the fullest extent. This all boils down to one thing . . . preflight planning. Plan your flight and fly your plan, and you'll never miss your ETA by too wide a margin. ●

★ ★ ★

As we go to press, word comes from the Civil Aeronautics Administration that of the 2400 airway beacons now being operated on airways, all but 900 are being phased out. Beacons will now be spaced 20 to 50 miles apart, and the primary purpose will be to denote passage through mountainous areas. No information is available on any code change.

REVIEW THE ILAS

By Maj. Robert Anderson, Communications and Navigation Lab, WADC, Air Research and Development Command

I'LL BET WHEN YOU SAW those letters at the top of this page, you said to yourself, "NO, not again!" and started on to the next article. The truth of the matter is, "Yes, Again!" and if you will put your feet on the desk, I'll try to break it to you easily.

You middle-aged fly-boys can vaguely remember a cross-pointer located on the old instrument panels which could be used to get the airplane close to a runway for landing if you were pretty sharp on the gages. You also remember that the instrument was half yellow and half blue.

If you flew away from the transmitter, blue was on the left, and if you flew in, blue was on the right, or vice versa. If the equipment was inoperative, the needle indicated that you were right on course, which caused more than one good jockey to clobber in.

Recently I noticed an advertisement in the *Saturday Evening Post* which almost made love to this system because of the number of commercial planes being landed safely with it.

OK, we all know that the airlines use it, but we also know that ILAS is the exception rather than the rule in the Air Force and that we are equipped for GCA, so why another batch of words on that antiquated approach system? Here is the reason—Oh, before going on, do you remember those roller coaster glide slopes and those mountain road localizers? How could you forget! If you don't remember this approach system, you had better get busy and learn. An article in the June, 1952, issue of FLYING SAFETY, describes this system very well.

USAF Schedules ILAS

The Air Force has ILAS equipment scheduled at most of its major bases; however, it is not the same old hardware mentioned in previous paragraphs. The official designation of the new localizer transmitter is AN/MRN-7, and it has taken the "mountain road" and changed it to a "bee line." Similarly, the new glide slope transmitter, the AN/MRN-8, has changed the "roller coaster" into a "chute-the-chute." Both units are in production.

So what! you say—they have a straight approach path in the sky but I still have to be an expert to fly it, and besides it's easier to call GCA.

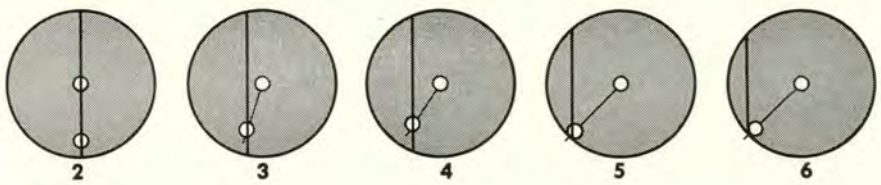
Now, I'll clue you again. By this time you all know about and have done much flying on the omni-ranges and the instrument you used may have been the ID-249, which is illustrated. This instrument, when fed information from an omni receiver, permits an aircraft to approach any chosen bearing to or from a station without overshooting. The same applies to a localizer for an ILAS approach. No overshoot, no bracketing. Not bad! This applies only to initial turn on course, but it is a big improvement.

Set Up Heading

All you do is set the runway heading on the course indicator and turn into the localizer in such a way that the circular pointer of the heading indicator remains under the course needle. Then you slide down the chute to a landing. You really don't have to be a brain to make this stuff work. You can find out more about the ID-249 and how to make it work for you in AN16-30, ARN14-3.

This is not a joke. If you love life and want to give yourself every chance to maintain it, you should do some serious practice on this system. As stated before, it will be installed in the near future at major bases and if you're smart, you'll be ready to use it. The sweat disappears from your brow when you are in the soup with the needles centered and at the same time GCA says you are right on course and glide path and then the GCA man compliments you for an excellent run. It is a terrific feeling of security when you have two

With the runway heading set in the course window, figures 2-3-4-5 show the pilot he's lined up for a good landing.



systems and can cross check their accuracy.

So much for the basic ILAS.

Now let's talk about a few frills—those of you who have flown them will never stop extolling their merits.

First, let's add a Flight Computer, which is the Air Force name for Zero Reader. This instrument thinks ahead of the pilot and is superhuman in its performance. Any beautiful blond secretary can fly a perfect approach to within 50 feet of touchdown without losing her nail polish, and a pilot can do the same, using only two fingers of one hand to control the aircraft simply by flying two needles. This sounds like hogwash and no amount of words can make the uninitiated believe it; however, one flight will convince anyone that *this is it!*

Two Flight Computers

There are actually two flight computers available. One is the common Zero Reader, and the other is called the Integrated Flight System. Both give nearly the same information but in different ways and each has its good points. The Integrated Flight System has an indicator in addition to the cross-pointers which draws a picture simple enough that even I can fly it.

That is a very brief summary of the semi-automatic approach systems and now all we do is tie-in the autopilot and we have an automatic approach. Of course, you still have to jockey the throttle, but not much, and you have two free hands to use if you need them. Just sit back and watch the airplane land itself by using a sky beam for a guide.

It all boils down to this:

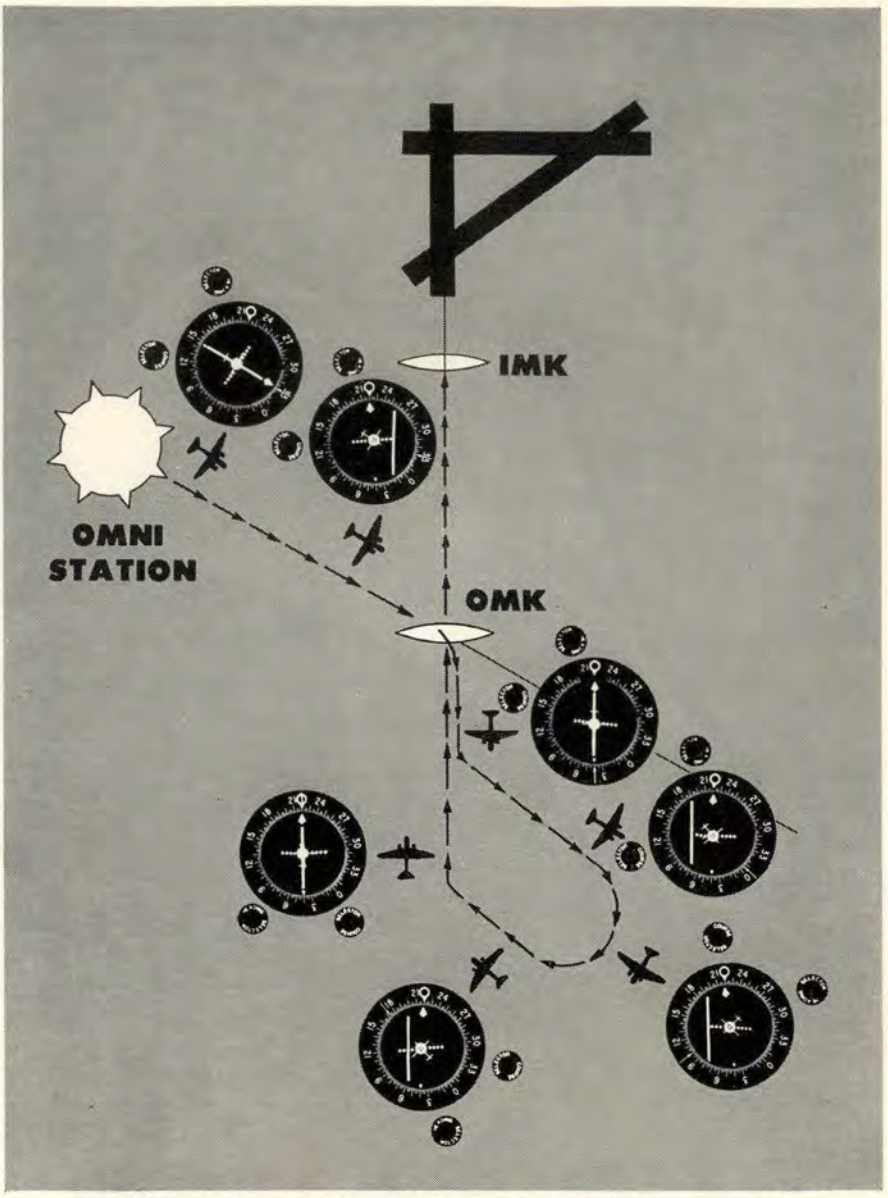
ILAS is not going—it is coming. So practice its use every chance you get and you will find that you will be so sold on this approach aid that you will call for it by brand name!

★ ★ ★

Editor's Note — FLYING SAFETY *contends that both ILAS and GCA are excellent approach aids, but that neither can be construed as landing aids. The limitations of both systems must be evaluated by the pilot.*

Many pilots contend that they prefer ILAS because it keeps control in the cockpit, yet the average run-of-the-mill pilot has a hard time keeping the needles centered unless he practices constantly. In addition, the pilot who attempts to fly the ILAS must have a thorough understanding of the system, and how it is laid out "on the ground." He must understand the marker system and the marker code, and he must interpolate the dots on the dial for proper orientation.

On the other hand, GCA requires only a minimum of radio receiving equipment, and a pilot need only know his proper power settings, and his correct attitude on the flight indicator to follow instructions from the GCA controllers.



The chart illustrates the flight system for interception of localizer course. The pilot has at all times a graphic indication of his position.

Those in the know, maintain that the perfect set-up is a combination of ILAS and GCA, one acting as a safety factor for the other.

Don't sell either system short. They are both excellent, and are both proven . . . and are continuing to improve every year.

For a review of both these systems, Air Force Manuals 51-37 and 51-38 are highly recommended. Read the manuals until you understand the theory, then go out and practice your ILAS every time you get a chance . . . and GCA, too, for that matter! ●

SLIPPERY WHEN *Wet*

DURING the summer months of the past two years there have been many major aircraft accidents in which the principal factor was a wet, slippery runway.

The discouraging part of this story is that in the majority of these instances, the accident could have been avoided by the use of good judgment on the part of the pilot. Every one of these accidents involved an element of sloppy planning, failure to go to an alternate, poor airspeed control or final, failure to obtain complete weather information, failure to heed tower advisories, or improper traffic separations.

Snow and ice are one thing, and under abnormal operating circumstances, much can be forgiven. But rain is something else again, specially when the pilot knows the landing roll minimum of his airplane, and still tries to luck in a landing without sliding into the mud on the shoulders or the overrun.

Looking over the imposing array of mishaps charged up to wet or slippery runways, we find the good B-26, like Abou Ben Adhem, leading all the rest. Except fighters, that is. The F-80 and F-84 divide top honors in this weight and class. In the cargo field, strangely enough, the C-54 takes the brass ring; with the Great Grey Gooney back in the field, running a weak second.

Let's look over some of these weird tales that drift in, via the Form 14.

Here is one of the leading contenders in the daffiness derby. It concerns a B-26 that was cleared out of Alpha AFB to Beta AFB on a ferry mission. In addition to the ferry crews whose mission it was to pick up aircraft at Beta, there was a navigator aboard, and this gentleman evidently strapped himself in the nose upon takeoff and remained there until the climax of the fiasco, taking with him a mighty crick in his back as a memento of the occasion.

Although all aboard had safety belts fastened, there were only two sets of shoulder harness (pilot and right seat), and these were not hooked up. In addition to these discrepancies, a goodly portion of the three-hour flight was made at 11,000 feet, yet at no time was the pilot or copilot on oxygen. This was not only a lapse in good operating procedures, but was in violation of AFR 60-16, which says that when the cabin pressure is above 10,000 feet, oxygen will be used. It also encourages the use of oxygen when the cabin pressure is 8,000 feet or above. Sure, we know *you're* a superman . . . but *maybe* a little oxygen would have sharpened the wits of this pilot. The entire flight was made at night.

Well, anyway, the pilot filed his clearance, supervised by an IP, was thoroughly briefed on the inflight and approach procedures from Alpha AFB to Beta AFB by the operations officer at Alpha, and took off.

When the pilot arrived over destination some three hours later, he called for a GCA, and was cleared down to 1500 feet. At this time, the pilot was advised that the runway was 7,000 feet long, 2,000 of which was pierced steel planking.

Under wet conditions, this offered the pilot 5,000 feet of "usable" runway, because pierced steel planking is famous for its poor braking qualities. He was advised that the surface of the entire runway was slick, and that he should use caution. The pilot let down through the stuff at 150 indicated, broke contact at 900 feet and after dropping full flaps, slowed to 135 indicated.

However, the touchdown was made approximately 1500 feet inside the boundary lights, which gave the pilot only 3,500 feet of runway that was not pierced steel planking. It doesn't take a red-hot B-26 pilot to calculate that this is a pretty short piece to slow up an airplane at 32,000 gross on a slick surface, pierced steel planking or anything else.

Before the pilot knew it, he was past the far-end threshold lights and on the pierced steel planking, which was slicker than a cat's back. Brakes

were applied judiciously, but before anyone could say Orville Wright, the beast was through the fence at the far end, and in the position of an abrupt stop.

A recording of the GCA transmission indicated that at one mile out the airplane was sixty feet high on the glide path, and the pilot was advised by the controller to go around. But, he elected to try and make it in.

Summing up this tale of woe, it is pointed out that in the first place, the mission was not of an urgent nature. His alternate was nearby, with good runway surfaces, and the ferry crew could have been easily transported from the alternate to Beta.

Secondly, the pilot (and the IP) elected to make a landing on a runway, the length of which would have been marginal under normal conditions for this type of aircraft, after having been advised that the runway surface was wet and slippery.

From a supervisory standpoint, there was no established S.O.P. for short, wet runway landings; and there was no Notam in the files covering runway conditions at Beta under inclement conditions. However, the crew was advised in good time of the slippery runway, and could have proceeded to an alternate. For training purposes, GCA could have been worked out a full-stop landing.

Under any circumstances, it is apparent that neither the pilot nor the IP were familiar with the Dash-One on minimum landing distances. The primary cause of this accident was chalked up to wet runways, but the accident could have been avoided with a slight fall of pride, and a detour to the known good alternate. There were no fatalities, and only one minor injury . . . but scratch one Baker Two-Six!

In still another instance, a gaggle of F-80's was taking off when the leader got into trouble and jettisoned his tiptanks on the runway. The tanks ruptured and fuel was spilled in quantity an the runway surface. The following aircraft tried to abort in time to miss the aircraft on the runway ahead of him, and slid into the oily fuel. Although there was some braking action, the aricraft slid very slowly over the shoulder of the runway into the sod.

Here is a case of an unavoidable accident, except for the fact that the leader might have aborted his takeoff, instead of trying to make the takeoff sans tiptanks. It proves one thing . . . fuel on the runway is *mighty* slippery!

Not long ago a fighter outfit was working a European airfield where no wind direction and velocity indicator were installed. Just after the flight took off, the tower reported a thunderstorm approaching the field, and advised the pilots to return. All but two of the pilots returned to the field. A few minutes later, feeling that discretion was the better part of valor, the remaining two decided to come in.

The tower operator had guessed at the wind direction and velocity and guessed wrong. However, the pilot of the last airplane in, instead of noticing the difficulty the preceding pilots had in landing, elected to make a normal approach, and came in hot. He made a go-around and came in hot again. He made another go-around, and finally made up his mind to land, which he did at some 150 knots. Although he hit on the "numbers," he used so much brake that his F-84 burned out the left tire, and slid the entire length of the runway plus 200 feet into the far over-run. This pilot did not use good judgment, evidently panicked a mite and certainly did not know his wet-runway landing procedures.

Round Robin

In still another instance, four F-84's were cleared from Dazzle AFB to Zuni AFB on a round robin. All four aircraft were serviced with full external fuel loads so as to make the round trip without refueling. When the flight came over Zuni Tower, the leader was advised by the tower that the surfaces of the runways were extremely slippery.

The leader flew around the area for a short time at 90 per cent power until his tiptanks were empty. His Number Three man then reported that he had 3000 pounds of fuel remaining. The flight leader entered traffic, made a wide power-on pattern, and touched down "on the numbers" at 140 knots indicated.

As the nosewheel touched down, the flight leader tested the braking action, but his ariplane only started to skid. At this point, although the tower had previously advised the entire flight, the flight leader informed the rest of his flock that the runway surface was slippery. The flight leader skidded off the far end of the runway, into the over-run . . . skidded the entire length of the runway. By this time the Number Two man had touched down, and he, too, was unable to stop his airplane in the length of the runway, colliding with the flight leader's tiptank.

The primary cause of this accident was lack of control of the aircraft due to slippery runways, causing the flight leader to lose directional control, and the wingman to slide into the flight leader.

At this time we should like to call to your attention a source of information on the subject of this piece. It is commonly known as the Dash-One. Back in the appendix, (Appendix I, to be exact) is a flight operating instruction chart, titled, "Takeoff, Climb, and Landing Chart." At the bottom, under "Landing Distance," is a chart showing the ground roll of your airplane under proper power settings at sea level, and 3000 feet and at 6000 feet under "wet or slippery" conditions.

For instance, on the Gooney, your ground roll with 26,000 pounds gross, at 75 knots, at sea level, will be 4000 feet. That means that on a 5000-foot runway, you've got to touch down before you hit the 1000-foot mark, or you'll be right at the far end when you stop rolling. Add to this the possibility of a tailwind, poor visibility, and mud, oil or fuel droppings on the runway, and you can easily see why it takes plenty of pre-planning to make it in safety on a wet, slippery runway.

The remedies for these accidents are not complex. The basic remedy is clear thinking. In addition the pilot must know the limitations of his aircraft when it comes to a landing roll, especially on wet runways. If in formation, spacing should be let out considerably. Supervisors should ascertain if the control tower has up-to-the-minute information of runway conditions, and NOTAMS must be kept up to date where known slippery runways exist under wet conditions. It's a manifestation of that wise saying, "The best safety device is between the pilot's ears." ●

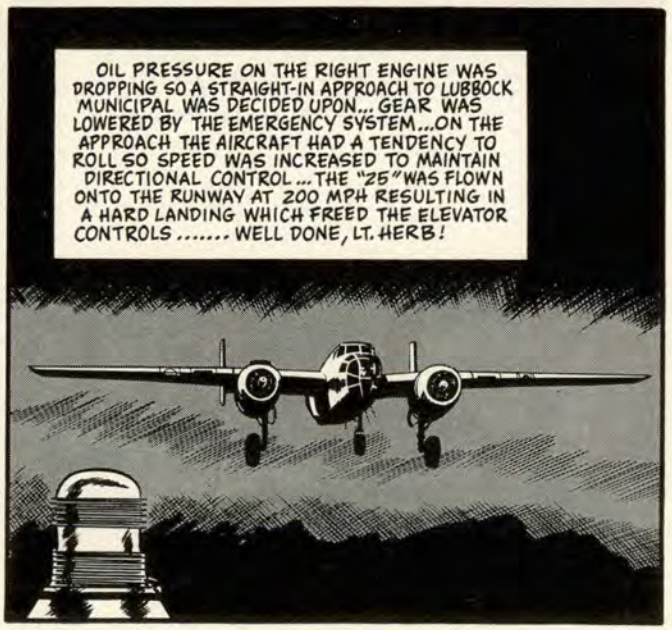
L'ENVOI

The approach was hot
The runway wet
If it wasn't for the fence
He'd be rolling yet!

WELL DONE!

to 1st Lt. Donald P. Herb, Jr.

After encountering severe turbulence which caused foreign particles to jam all controls of his TB-25L, Lt. Herb kept a cool head to make a successful landing with no damage to the aircraft. Later inspection of the plane showed numerous bolts, nuts, screws, rivets, etc., around control cables throughout the plane. The aileron cables had one-half wrap around each other, and the aileron trim tab cable was off the pulley in the right wing, all of which were contributing factors to bring about the emergency.



Keep Current

NEWS AND VIEWS

• **New Rocket Rack** — Launched from a rack that snaps back inside the fuselage a split second after firing each of the twenty-four Mighty Mouse 2.75 rockets of North American's F-86D is capable of knocking down the biggest enemy bomber. Each rocket's punch is that of a 75mm shell. This new version of the Sabre is the AF's only one-man, all-weather interceptor. The plane holds the world's speed record—698.5 mph. It has more electronic gear than an average TV station.

• **Slower Comedown**—A new non-oscillating parachute, with flaps to insure better stability, has been designed and tested by the Wright Air Development Center, Dayton, Ohio. The flaps, WADC explains, will also check a jumper's rate of descent and reduce opening shock. The chute, which can be used at speeds bettering 400 mph, will be manufactured by Pioneer Parachute Co., of Manchester, Conn.

• **Raft Hangup Incident**—Earlier this year, during the Netherlands floods, a C-119 was dropipng six-man life rafts to aid the victims below. Because of the lack of CO-2 bottles, the rafts were inflated before takeoff, and loaded into the cargo compartment.

The airplane was flying at about 150 feet off the deck, when a raft fouled the elevator stabilizer in the process of being jettisoned, and remained in a vertical position, facing the nose of the aircraft.

The C-119 vibrated violently, requiring both pilot and copilot to hang on to the controls. Repeated attempts failed to dislodge the raft. However, the pilot discovered that if he reduced his airspeed to 90 knots, he could fly the airplane, although there was a noticeable porpoising action. By maintaining this airspeed he was able to make a nearby base, and completed a safe landing.

• **Guard New Frequency**—Recently all CAA control towers and communications stations established a listening watch on 3023.5 kc, replacing the 3105 kc. Use of the new frequency will eliminate interference from tropical broadcasting stations and other sources that have made it difficult for CAA to give good service in many parts of the country.

CAA facilities will continue to guard 3105 kc for one year after implementation of the new channel. The present listening watch on military frequency 4495 kc. will be discontinued.

The change from 3105 kc. to 3023.5 is but one step in a world-wide program which involves rearrangement of almost the entire high frequency spectrum, as planned by the International Administrative Aeronautical Radio Conference and approved by the U. S. Government.

The program is designed to make use of all frequencies more effective by eliminating or reducing to a minimum interference from both co-channel and adjacent channel users. The overall plan will benefit aviation and pilots by providing for the first time in history, exclusive frequencies for aeronautical use.

• **B-2 Plotter Error Found**—Captain K. D. Bundy, Navigation Instructor in the 3640th Pilot Training Group, Laredo AFB, Texas, has eyesight that is sharper than somewhat. Captain Bundy has discovered an error in the B-2 plotter which could develop into a contributing aircraft accident factor if the B-2 was used as designed.

Says Bundy: "The scale on the B-2 plotter is identified as follows: 'Scale 1:3,000,000 nautical miles USAF long range navigation chart.' This is not a valid unit of measurement, as the Long Range Navigation Chart is on a Mercator projection, and the scale of miles on this chart is continuously variable with the latitude change."

An example of the error can be found by measuring distance on a rhumbline course from Paine AFB, Washington, to Hill AFB, Utah, using the long range navigation chart No. LR 10 (revised June, 1952). The correct distance measurement is 603 nautical miles, while the B-2 scale distance measurement is 541 nautical miles. In this particular case the error is 63 nautical miles, or 10.42 per cent. This percentage of error will decrease in lower altitudes, but will increase in higher latitudes.

• **Radar Trainer**—Development of a revolutionary new device for the bombardment and navigation training without actual flight of aircraft observers of Air Force aircrews has been announced by the Air Research and Development Command.

With this ultrasonic (above the speed of sound) radar trainer, identified as the AN/APQ-T1, future aircrews will be able to become familiar with flight problems, including targets, anywhere in the world while still on the ground in this country. It was designed and built for the U. S. Air Force by American Machine and Foundry Company's Electronics Division, Boston, under the supervision of equipment technicians at the Air Research and Development Command's Wright Air Development Center, Dayton, Ohio.

The equipment will provide the Air Force with the type of advanced training required to cope with the problem of providing skilled aircrew personnel for high performance aircraft operating at extreme speeds and altitudes. It offers advantages which will expedite Air Force training programs. These are: increased safety in training due to the reduction of required flight time; increased utilization of training time resulting from use of the device on a shift basis and for the simultaneous training of the students involved in the bombing problem; reducing training expenses by releasing aircraft and personnel for other duties, and increased effectiveness of personnel trained with this device.

Cross Feed

flying safety idea exchange

Looks Forward to Flying Safety

The editorial section of this bureau looks forward each month to seeing FLYING SAFETY . . . we glean ideas from it for . . . our publications.

1/Lt. William P. Kelly
Editorial Director, War Dept.
Recruiting Publicity Bureau

• • •

Cold Weather Aid

Matters pertaining to cold weather flying (appearing in FLYING SAFETY) were a great help to this section in preparing this Wing for the "Snowfall Maneuver."

Carl Mosely
Captain, USAF
435th Troop Carrier Wing

• • •

Privilege to Read

On numerous occasions I have had the opportunity to read . . . FLYING SAFETY. This magazine certainly contains a lot of interesting information for those of us who are in the flying business . . . We would consider it a privilege to receive regular copies of FLYING SAFETY.

R. W. Richardson
Assistant to the President
Goodyear Tire & Rubber Co.

• • •

Deserve Well Done

All of us here look forward to each new issue of FLYING SAFETY magazine. We feel that your staff deserves a Well Done!

C. B. Cosgrove
Colonel, USAF
Commanding
4860th Photo Group

• • •

From Chile

In the units and bases of the Chilean Air Force, the officers have read with great interest copies of FLYING SAFETY.

Gregorio B. Rubio
General de Brigada Aerea
Comandante Unidades Aereas
Santiago, Chile

Used in Training Program

"Flying Safety on The Airways" is considered to be the most complete and one of the most popular articles published by the Directorate of Flight Safety Research. It has been extensively used in our flight training program to improve techniques

Millard A. Libby
Colonel, USAF
Chief of Staff
Atlantic Div. MATS

• • •

Enthusiastically Received

I want to say that the FLYING SAFETY magazine is reviewed with much interest by this Command.

L. P. Whitten
Major General, USAF
Commanding
Northeast Air Command

• • •

Vital Information

I have been receiving your excellent magazine, FLYING SAFETY and want to express my appreciation . . . it is well done and contains much vital information for ground and flight personnel.

Norman H. Osbourne, R.N.
Aero Health & Safety Unit
Pratt & Whitney Aircraft

• • •

Outstanding

First and foremost your staff deserves plaudits for continually publishing the outstanding magazine in the aviation world. FLYING SAFETY has for many years been publishing timely articles in an easily remembered style.

Clyde G. Miller
Major, USAF
67th Tac Reconn Wing

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Use Techniques

We not only taught all our pilots and flight mechanics the procedures you've outlined . . . (How to Check an Engine) but we are now using them in our schools for the Transport Squadron, Imperial Iranian Air Force.

All flight crews await with eagerness the arrival of FLYING SAFETY.

Francis L. Grable
Col. USAF
Senior Air Advisor to Iran

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"Ol' Boreas"

Here at the 12th Air Rescue Group, FLYING SAFETY is read each month with interest in search of new methods to promote flying safety. We are proud of our record of no accidents since the activation of our unit, over a year ago.

In checking the story "Ol' Boreas" in the February issue, we think that the author forgot to lapse the temperature in the illustrations and used standard temperature at sea level instead of at the 10,000-foot level.

Lt. Col. John A. Carroll, Jr.
12th Air Rescue Group

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ED. NOTE: *Colonel Carroll is keerect. The author and the editors are guilty of a lapse of more than standard temperature.*

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One Borrowed Copy

Many of the problems discussed in your excellent magazine are common to both Air Force and Navy Squadrons . . . much benefit and great enthusiasm on the part of this squadron has resulted from one borrowed copy.

R. L. Werner
Commander, U. S. Navy
Fighter Squadron Eleven

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ERRATUM

Before we incur the wrath of some of the old Issoudoun gang, we hasten to apologize for the technical error on page 3 of May's "Flying a Flameout." In the days of the SPAD, we learn, this machine was equipped with a Hispana-Suiza mill, not a Gnome. The Gnome, that high-torquing little beast, graced the nose of the old Nieuport airplane.

The Editor

The Jungle is no Garden of Eden

If you're down in the tropics don't hit the panic button . . . those first few minutes you spend taking stock of your situation may mean the difference between getting out safely, or staying there forever.

From the moment you're on the ground, the steps to be taken in any survival experience may differ according to your particular condition and the terrain in which you find yourself. You've got it made, tropical hot or cold, if you keep your head and put your survival training into practice.

Use Your Common Sense and Survive!

TIMES HAVE CHANGED

NOWADAYS everything's moving so fast, especially in the blue yonder, that we can't afford to sit back and rest on last week's knowledge.

Regulations involving flight of aircraft are being constantly revised, as are operating instructions, procedures, and T. O.'s. Your best source of information is your Flying Safety Officer. The chances are better than 8 to 5 that he'll have the latest information . . . for *your* safety!

Look Ahead • Be Ahead • Stay Ahead with **FLYING SAFETY**

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