Med Plans & Operations Dir

JUNE-JULY 1958

UNITED STATES ARMY AVIATION DIGEST

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Manuscripts, photographs, and other illustrations pertaining to the above subjects of interest to personnel concerned with Army Aviation are invited. Direct communication is authorized to: Editor-in-Chief, U. S. ARMY AVIATION DIGEST, U. S. Army Aviation School, Fort Rucker, Alabama.

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NG: State AG.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

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COVER

This high oblique photo shows one of the latest additions to the growing list of new facilities at Fort Rucker. Lowe AAF was dedicated in September, 1957, and is now the site of all fixed wing training at the U. S. Army Aviation School, with the exception of the instrument flights which still utilize Ozark AAF. Future plans call for extension of the runways 500 feet and additional ramp space. Lowe is located about two miles northwest of the hospital in the cantonment area.

Budgetary limitations necessitate the combining of the June and July issues of the UNITED STATES ARMY AVIATION DIGEST into this 16-page issue. The next regular issue of the magazine will be published in August.—The Editor

Notes from the Pentagon

Boy Scouts of America

THE EXPLORER MEDALION — This badge is worn by all Explorers. The medalion is a composite of the Boy Scouts' first class badge, the Air Explorers' wings, and the Sea Explorers' anchor.

Brigadier General Ernest F. Easterbrook, *USA*
Director of Army Aviation, *ODCSOPS*

FOR MANY YEARS the Armed Services have been doing a fine job in sponsorship of Boy and Girl Scout units. With few exceptions, however, the Army has made no attempt to sponsor air or sea scouts. This was to be expected since the Army did not have the necessary aircraft and water-borne equipment to support such units until recently. As a result only those young men living near Air Force or Navy installations had the opportunity to participate in the air and sea scout programs.

With the present worldwide distribution of Army Aviation units, it appears that the Army has a fine opportunity to put new life into its scout program. The majority of our military installations now have sufficient aircraft, allied equipment, and training aids to sponsor Air Scout squadrons. There is not a single Army Aviator who is not qualified to teach at least one aviation subject in furtherance of this program.

The Secretary of the Army and the Army Chief of Staff have published several letters over the past five years encouraging Army personnel to take a more active part in scout activities. One such letter was DA TAG letter, file AGAM-P (M), subject: "Army Cooperation with the Boy Scouts of America," dated 28 March 1955. Another was DA TAG letter, same file number and subject, dated 28 October 1956. As these letters point out, it will require no great diversion of effort to work with these youth groups and it would be of immeasurable benefit to the young men. Inclosure 2 to the 28 October 1956 letter also designates the Chief of Information, Department of the Army, as responsible for staff supervision of the Army's pro-

gram in support of the Boy Scouts of America.

In discussing the Air and Sea Scout program, we are dealing with scouts in the "Explorer" age group. It should be understood that the Department of the Army has expressed a desire to support each division of the scout program — Cubs, Boy Scouts, Girl Scouts, and Explorers. This article is directed toward the Explorer Scouts, since they are of an age group which will more fully appreciate the precepts of citizenship training, character building, and physical fitness. This group may also be most concerned with the implications of the Reserve Forces Act of 1955. Therefore, assistance to Explorer Scouts may be given in broader fields of activities than is appropriate with the younger groups. Army efforts in scout programs should take that form which will afford the greatest benefit to the program and, at the same time, afford the individual Boy Scout the opportunity for friendly and enjoyable contact with the Army.

Unfortunately, the Army must depend upon volunteer scoutmasters since no funds are authorized for such purposes. Further, good scout work requires a great deal of time and effort on the part of the officer who volunteers to administer a unit. For these reasons, the success of our scout program rests with officers who are genuinely interested in helping the youth of our nation to better citizenship.

Interested? A call to the Boy Scout Field Director of your local area will get you started—your local PIO will support you through his information program.

Sixteenth Anniversary of Army Aviation

Speaking for all the members of the Army, I extend congratulations and best wishes on the occasion of the sixteenth anniversary of Army Aviation.

From its inception, Army Aviation has been characterized by the skill, the initiative, the imagination, and the courage of its personnel. Through these valuable qualities, Army Aviation has rendered services which have continuously expanded in scope and extent and which have made significant contributions to the effectiveness of the Army. Today, with its growing capabilities, Army Aviation may look forward to even greater achievements in providing the Army with that form of mobility better permitting it to transcend the traditional barriers of terrain.

It is a pleasure to join with other American soldiers in expressing pride in the past accomplishments of Army Aviation and confidence in its future success.

MAXWELL D. TAYLOR
General, United States Army
Chief of Staff

Although not the final answer to this perplexing problem, here's another reminder about the difficulties of

Carburetor Icing

John S. Maltrotti

SOMEHOW, YOU DOZED for a moment. And, somehow, you've fallen off on one wing at reduced power. Now, suddenly tense, you straighten her up, add a little power and apply carburetor heat. It changes nothing at all. Close to panic, you figure you've had it and begin searching for a place to set your plane down.

Then you remember one last, dangerous remedy. You return carburetor heat to full cold, push up your power setting, and gradually lean out the mixture until you hear a sudden backfiring. Two or three times you let it fire this way; the engine sputters and now, miraculously, the props pick up a few rpm and you quickly enrich the mixture and reduce throttle. Then you relax, cold and wet with sweat but relieved and thankful you escaped this time. You fervently promise yourself you'll stay wide awake in the future to any condition that might lead to—CARBURETOR ICING.

On a dry day you can dispense with this worry. Or when the temperature is below 15° fahrenheit, the air won't hold enough water to cause you trouble. Exception: you may even cause icing by applying carburetor heat in very low temperatures. In this case the carburetor is working well below freezing. If you pull on carburetor heat, the temperature will rise in the carburetor to just above freezing. Melting water can then run to colder areas and freeze. So, take care in applying heat in cold (0 to -10° fahrenheit) unless you are well acquainted with the way your particular engine operates.

In the middle ranges through 70°, you must take special care. Icing is even possible at a steamy 90, and doubly possible when the humidity is high or when it's rainy or overcast. Keep that throttle in mind, too. Decrease its setting, as in a closed throttle spin or long glide, and your carburetor will make ice as easily as an electric refrigerator—and a lot quicker.

Remember that preheat is essentially an ice preventive. Ice won't form in a carburetor when the temperature of fuel and air is kept above the freezing point. One way to assure this is to keep the intake air at least 80°, measuring it with the carburetor air temperature gauge if your aircraft has one. Let it go lower and you must keep your eye on the rpm or manifold pressure gauge. When power begins to fall off, assume you have carburetor ice no matter what the gauges say—they may be off.

In some aircraft, the Bird Dog for example, you may not have a carburetor air temperature indicator. The answer is to fly with the carburetor heat full on at critical temperatures even though it does not necessarily mean ice. Use of full heat usually increases fuel consumption.

Naturally, you will take off

Mr. Maltrotti is a former staff member of the U. S. ARMY AVIATION DIGEST. The views expressed in this article are the author's and are not necessarily those of the Department of the Army or of the U. S. Army Aviation School.—The Editor

"full cold" for full power. On most Army aircraft use of heat on the ground is not desirable because an alternate source of air is used and is not filtered. But when idling or warming up, or after you have enough altitude, turn the carburetor heat back on. One final item, don't try to estimate the correct amount of heat if you have no carburetor air temperature indicator; this may be dangerous. Rather, apply full carburetor heat. Any other position may not raise the temperature to an effective point.

DETECTING ICE

Now how do you detect carburetor ice? What are the symptoms? Either too rich or too lean a mixture will provide a drop in engine power with the former usually accompanied by torching and the latter by backfiring. Or you may note a reduction in rpm, assuming your engine is equipped with a fixed-pitch prop. Or your manifold pressure may begin to drop off, even though all other factors, such as throttle settings, airplane attitude, and pressure altitude, remain the same. Finally, engine roughness or surging and, ultimately, engine stoppage should notify you of carburetor ice.

Whenever ice accumulates, it will seem as if an unseen hand is very slowly closing the throttle. Your manifold pressure will fall, although unevenly, because of ice deposits breaking away now and then.

Carburetor ice may form almost instantaneously, but under most conditions it is a gradual process. If unwary, you may note a drop in rpm and gradually open the throttle, unaware that ice is about to choke off the heartbeat of your engine. For one icing test, apply full heat for a few moments and return to cold. If manifold pressure increases, you've had carburetor ice.

If ice forms near the jet or in the venturi, you may get either enriching or leaning of the mixture, depending on the specific shape or location. For example, if the fuel flow remains constant but the position of the ice is such as to restrict the venturi area, then the mixture might become too rich. And, incidentally, the carburetor would be further cooled because of the cooling effect of increased air velocity. In any case, whether the mixture is too rich or too lean, the result is loss in power.

WHAT TO DO

Once icing has begun, then what? Leaning the fuel and backfiring was mentioned as an ultimate measure. If you haven't reached that emergency, apply heat to cause a further decrease in rpm and gradually increase power. If rpm becomes critical after heat is applied, remove carburetor heat for a few seconds and let the rpm increase. Repeat this procedure until all the ice is dissipated. *Then, full heat.* Doing it this way, instead of applying full heat at once, will prevent ice from melting too rapidly and let the carburetor handle any water or chunks of ice that result.

But if you have no carburetor air temperature gauge, immediately apply heat—all the heat available — for if the engine

fails, the very source of your carburetor heat disappears. Then, move to the full cold position for a moment to determine if original power has returned.

One final tip to remember: Although it is not too likely in today's aircraft, occasionally jiggle the carburetor heat control to prevent the door from freezing in one position. To sum it up: Be alert for the conditions that make for carburetor ice or indications that it is forming. Know the idiosyncrasies of the airplane you are flying and memorize the proper technique for removing ice once formed.

YOU ARE ON A routine cross-country in a Beaver. Present weather conditions are: thin scattered cirrus at 20,000 feet, temperature 73, dewpoint 46, winds at 4,000 feet (your cruising altitude) 10° at 15 knots. The forecast for your destination, 250 nautical miles south, indicates that the weather there will be about the same.

After flying on course for 45 minutes, you note your next reporting point is just 18 minutes away. You are enjoying the wooded scenery below when suddenly there is a large increase in manifold pressure and a large decrease in rpm. Engine oil pressure indicates low. You catch sight of a small field off your left wing and immediately diagnose the trouble as:

1. Select the best answer or answers.

- ☐ **Carburetor ice.**
- ☐ **Cruising fuel mixture too lean.**
- ☐ **Propeller failure.**
- ☐ **Blown cylinder head.**

2. Your immediate corrective action is to:

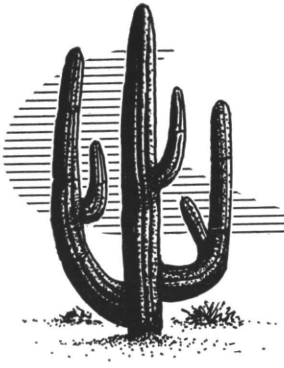
- ☐ **Increase mixture control to FULL RICH and use hand operated wobble pump to maintain fuel pressure until engine is operating properly.**
- ☐ **Apply carburetor heat.**
- ☐ **Move propeller control lever LOW PITCH, ignition switch OFF, throttle CLOSED.**
- ☐ **Move propeller control HIGH PITCH, throttle back and maintain sufficient airspeed to continue flight.**

3. Next you should:

- ☐ **Nursing the engine, proceed to the nearest suitable airfield and make an emergency landing.**
- ☐ **Attempt a forced landing in the field you noticed.**
- ☐ **Adjust carburetor heat control to keep carburetor temperature "in the green" and continue the flight.**
- ☐ **Switch to the fullest tank and proceed on your route.**

References: TO 1L-20A-1.

The correct solution to the PUZZLER may be found on page 10.



helicopter desert operations

Captain Edwin O. Carr, *Arty*

DESERT EMPLOYMENT OF the helicopter presents problems peculiar only to sandy waste areas. A thorough understanding of the difficulties involved will give the pilot and mechanic the knowledge necessary to combat adverse effects of wind, heat and dust. Remedies described herein are mostly field expedients and should not be considered cure-alls. They have been found effective under most conditions encountered in the desert.

Problems found in desert operations can generally be divided into two categories, maintenance difficulties and flying hazards.

Maintenance difficulties are caused by dust and heat and their effect on the machine. At a hover, for example, the helicopter is virtually engulfed in a cloud of dust. With each revolution of the blade, fine sand, acting as an abrasive, is ground into the hundreds of moving parts of the machine.

This damage can be minimized to a great extent by proper pilot technique and sound judgment. For example, takeoffs should be made from the ground, going directly into translational lift; whereas in landing, pitch should be reduced as soon as possible after positive ground contact is established. This cuts exposure time and also shows consideration for people on the ground.

Although this technique helps considerably, it does not solve the problem of excessive wear from dust and sand. Certain additional precautions should be taken by the mechanic and

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Captain Edwin O. Carr is Flight Commander, H-34 Flight, Department of Rotary Wing Training, United States Army Aviation School, Fort Rucker, Ala. He was a battalion air officer in Korea and previous to his present assignment was Aviation Officer at Camp Irwin, Calif. He is dual and instrument qualified and has more than 2900 flight hours. Views expressed in this article are the author's and are not necessarily those of the Department of the Army or of the U. S. Army Aviation School.

maintenance officer to further reduce abrasion.

TAIL ROTOR ABRASION

The tail rotor is a primary victim of abrasive damage. The leading edges of the tail rotor blades can literally be worn away. Covering the leading edges of the blades with cloth-backed tape will help to overcome this. Two pieces cut the same length will assure proper balance.

Tail rotor pitch-change links may be covered with a chamois and secured with safety wire, with care so as not to impede the travel or normal movement of these parts. This same principle must be applied to other moving surfaces, especially exposed control linkages.

BLADE DAMAGE

The main rotor blades are primarily affected by heat. Close inspections should be made frequently, for sun tends to dry the wood excessively, causing cracks and internal dry rot.

Helicopters like the Sioux should be "hangared" when possible. If left standing in direct sunlight, the metal leading edge of the main rotor blade will expand. The wood portion will also expand, but not as much as the metal. This expansion will cause the paint to stretch. Later when the metal and wood have cooled and contracted, the paint will remain stretched, leaving a bead or bubble approximately one-eighth to one-fourth inch high on top of the blade where metal and wood join.

In flight this has the same effect as ice on a wing and considerable blade efficiency is lost. This could mean the difference between being airborne or staying on the ground under conditions where operation is critical.

This condition can be corrected. The entire rotor head is removed, the bead sanded out and finished with fine sandpaper. Dope should then be applied to keep moisture out of the wood. Finally, the rotor system is rebalanced and tracked. (Consult applicable T.O. for full procedure.) Extreme caution must be exercised not to "oversand" and unbalance the blades beyond tolerance limits. *The best and simplest solution is to keep the aircraft in the shade when it isn't being flown.*

OTHER PRECAUTIONS

Prolonging the life of the engine under desert conditions can be accomplished by keeping the engine clean. Daily "gunking" is not impractical and will be well worth the time and trouble taken.

Plexiglass is extremely susceptible to heat and sand. Bubbles should be cleaned often and kept out of the sun as much as practicable.

Only high points of desert preventative maintenance have been discussed. The best rule is to hangar the helicopter. Ingenuity and field expediency will go a long way toward keeping an aircraft flyable.

FLYING HAZARDS

Flying hazards are a pilot problem. Thin air and extreme turbulence reduce both pilot and aircraft efficiency. Running out of power while hovering is the most frequent problem an aviator will face and is not to be

confused with settling-with-power. Settling-with-power is settling into your own downwash and is the result of poor technique. Running out of power can usually be attributed to thin air, i.e., high density altitude. This condition can be described as attempting to hover with insufficient power to maintain rotor rpm.

Assume that upon completion of an approach, a hover is reached. Pitch is increased causing the rpm to fall off so that throttle must be added. Then the process repeats itself.

In running out of power this cycle progresses to the extreme. Power is not available to turn the blades at the necessary rpm to maintain hovering altitude.

Eventually, since rotor rpm is the primary concern in a helicopter, it is necessary to reduce pitch, and landing is made. The effect is very similar to a tall grass operation. The safest way is to hover only over areas where a safe landing can be effected. However, this is not always possible.

There *is* a solution to this condition. Most helicopters have an allowable overrev which, in this case, must be used. When hovering over terrain where a landing cannot be made, this extra rpm will give the pilot a second chance. If the additional rpm cannot be held at a hover, the best solution is an immediate takeoff. To avoid settling, it may be necessary to use up more of the flyable rpm. Most helicopters have a minimum allowable tolerance and once translational lift is attained the lost rpm can be regained with little difficulty.

Flares should be avoided. Usually the helicopter will fall through and ground contact will be hard, causing damage to the aircraft.

PRIMARY HAZARD

Severe updrafts and thermals present another problem — extreme turbulence. This can be overcome through smooth control technique. Although the helicopter is essentially unstable, it does have limited inherent stability. For lack of a better word, call this characteristic "pendulous stability." The rotor disk is always coned when the collective pitch is applied. The bulk of the machine hangs from the vortex of this cone.

The effect is similar to the dihedral of the wings on fixed wing aircraft and the helicopter will tend to right itself to some extent. This is mentioned because turbulence is not the main danger.

The effect of turbulence on the pilot is the primary hazard. But pilot fatigue can be greatly reduced with common sense measures. Cyclic friction should be tightened. The aviator should rest his cyclic arm on his leg whenever possible, thereby reducing control movements.

The aircraft should be allowed to right itself, if it will, before a correction is applied; then the correction should be as small as possible. Strain on man and machine is thus reduced and the control touch of the pilot becomes smoother.

Airspeed should be reduced when flying in gusty, turbulent winds. This increases the margin of safety against retreating blade stall and reduces overall

strain on the helicopter.

What you don't see may hurt you at times! Dust devils or "twisters" are common to desert country. You can spot them in the distance as they spiral upward with a characteristic column of sand, dust, and debris. The birds nonchalantly ride these currents of air to great heights—but that's strictly for the birds. When you see these "twisters," give them a wide berth.

HOVERING HAZARD

For safety's sake, all takeoffs and landings should be made directly to and from the ground. This is especially true of open sandy areas. At a hover, zero visibility is not uncommon. If normal takeoff from a hover is attempted, it is similar to an instrument takeoff. Visibility in a dust cloud is the same as flying in fog. Vertigo is not improbable. Since helicopters of the Sioux variety are not equipped with instruments, a serious accident can result. Again, common sense measures will prevent much trouble.

On the personal comfort side, veteran desert aviators recommend carrying water on all flights in event of a forced landing in remote areas. Lip chapsticks, zinc ointment, a cap with sun visor, and dark glasses are considered necessities.

Desert helicopter flying has its better side. It can be pleasurable and safe. On clear days, visibility is phenomenal and in early morning the air is unbelievably smooth. However, pilot and mechanic must be aware of desert difficulties and remember their own limitations.

Solution to PUZZLER

On the basis of the factual information contained in the PUZZLER on page 6, the recommended solution is as follows:

Question Number One:

Propeller failure. (A sudden increase in manifold pressure and a large decrease in rpm are the general indications of this.)

Question Number Two:

Move propeller control to HIGH PITCH, throttle back and maintain sufficient airspeed to continue flight. (These actions should be taken immediately to avoid damage to the engine and a total loss of power.)

Question Number Three:

Nursing the engine, proceed to the nearest suitable airfield and make an emergency landing. (Even with low oil pressure, it is possible to maintain minimum rpm and make an emergency landing with limited power. (One caution: NO GO-AROUNDS!)

You are encouraged to submit comments on the contents of the problem to the U. S. ARMY AVIATION DIGEST.—The Editor

CIVIL AERONAUTICS ADMINISTRATION

THIS YEAR THE Civil Aeronautics Administration celebrates its 20th anniversary. Its growth reflects the rapid expansion of aviation, both civilian and military, in the United States. Most Army Aviators are familiar with the operation of this organization and its subsidiary offices; they daily come in contact with the CAA through one means or another. But very few Army Aviators are familiar with the history of this complex regulatory agency, which has amazingly paralleled the advancing design and technology of aircraft.

If your airplane flies on the civil airways of this country, you'll come in direct contact with the CAA. You are given traffic clearances by CAA employees and directional guidance by CAA radio facilities. When you land at a civilian field, chances are that the airport was built or improved with CAA aid.

Roughly half of CAA's 23,600 employees are engaged in maintaining and operating the federal airways. This network of "air highways" totals about 106,000 miles.

A brief history will help you understand CAA. The first navigational aids to pilots were designed and operated by the Lighthouse Service, an agency under the supervision of the Department of Commerce. Calling on their previous experience with ships that ply the ocean, the men of this service naturally favored lights for night flying. At the time, aeronautical adaptations of the radio were just beginning to show promise.

In 1926, the Aeronautics Branch of the Department of Commerce was created by Congress, and men with extensive aviation experience were employed.

In 1928 the four-course, low-frequency, radio range was accepted as part of the airways system. Since then, there has been continuous improvement; and now these range stations are being replaced by VOR.

The CAA has been successfully controlling air traffic since 1936. Ten controllers comprised the original group. Now 10,000 persons are employed to perform air traffic control duties at 530 communications stations and 26 centers. These Air Route Traffic Control Centers (ARTCC) control all en route traffic operating under IFR conditions, delegating to airport control towers the control over traffic operating in a radius of approximately 20 miles around an airport. The Air Traffic Communications Station (ATCS), which links you to the controllers, forms a vital segment of the control system. These three facilities, the *centers, towers* and *stations*—linked by 130,933 miles of teletype and 135,764 miles of interphone lines—work

(Continued on page 16)

The views expressed in this article are not necessarily those of the Department of the Army or of the U. S. Army Aviation School.—The Editor

MASTER ARMY AVIATOR

Colonel Jack L. Marinelli, the Master Army Aviator above, is presently assigned as the Chief, Special Projects Branch, DCSLOG, DA, and is charged with the logistics monitorship of Army Aviation, Guided Missiles and Atomic Weapons. Upon entering the Army in 1940, he attended the Cavalry School, both horse and mechanized. After graduation he was assigned to the 113th Cavalry, and later joined the 4th Division as Aide-de-Camp to the Commanding General. After completion of the Field Artillery Pilots Course No. 12, he went to Europe as the Aviation Officer of the 71st Field Artillery Battalion, II Corps, and 5th Army. He was one of the first Army Liaison Pilots to be awarded the DFC.

Upon Colonel Marinelli's return to the U. S., he became the first Director of Army Aircraft Tests at AGF Board No. 1, now known as the Army Aviation Board. During the ensuing period he attended the Advanced Artillery Officers' Course, and became the Aviation Officer for the Office, Chief of Army Field Forces, DA; Headquarters, Far East Command; and Headquarters, Army Forces Far East.

Colonel Marinelli has held an instrument rating since 1951 and is currently rated in all Army rotary and fixed wing aircraft. In his 16 years with Army Aviation, he has accumulated over 3,800 hours of flight time.

LARGE AIRCRAFT and busy runways require an ever-increasing alertness on the part of all pilots. One of the more dangerous hazards this combination can produce is the lingering effect of wingtip vortices. Invisible, vicious and tenacious, these swirling masses of turbulent air can throw an aircraft out of control in a matter of seconds. When atmospheric conditions permit vortices to remain over the runway, even the cautious pilot may be taken by surprise. The following excerpt was taken from the report of a Bird Dog accident that happened recently:

"The pilot was taking off for a service flight to one of the unit's field parties. Just prior to his taking the runway, an Air Force C-119 had taken off. The C-119 was estimated at 500 feet altitude and had turned crosswind, which is normally considered a safe distance and altitude to allow wingtip vortices to dissipate. The pilot was cautious while taxiing and felt no effect of vortices. After receiving takeoff clearance, he checked the runway and added power for a normal takeoff. Just after becoming airborne, he experienced difficulty in maintaining

Wingtip vortex caused this accident

Bird Dog Classic—I

"FORSOOTH," SAYETH THE KNIGHT, and rose from the round table. "Mine IN basket hath emptied into the proper channels. Now is the time to mount the iron bird and soar forth. The month end approacheth and I am short the fourth hour."

So saying, the warrior arose from his desk, zipped into his nylon armor and left that place of cubicles. He traveleth to the place of the roaring birds, signeth the necessary forms and strappeth on a great brown canvas bag. Striding around the winged monster, he pulleth here and poketh there in a manner to checketh the firmness of the fowl's feathers.

Seemingly pleased with the condition of the beast, the knight mounted and did various things to the bird's interior which caused it to roar and shake. It waddled off to a stretch of black earth, took a running leap and soared upward with a rush of wind.

And there cometh a feeling of great joy to the knight. He zoometh around the sky with abandon until an hour had gone and it were time to returneth the bird. The warrior descended from high places and flew beside the black earth, causing the bird to cease its roar. He turneth it toward the lighting path and pulled down some feathers along the back of each wing. As the bird approached the ground, it was seen that one wing flew lower than its mate. Some said this was because the wind blew across the black earth.

The bird alit on one foot,

---

takeoff attitude.* The Bird Dog's left wing came up sharply, causing the aircraft to move to the right. The pilot's corrections had no effect and the left wing continued to rise until the right wing struck the ground. The pilot then recovered control of the aircraft and a safe landing was made without further damage."

PROJECT CONCLUSIONS

From a project to determine the effect of wingtip vortices on Army aircraft, the United States Army Aviation Board produced these conclusions:

a. In regard to duration, characteristics, and intensity of wingtip vortices:

(1) The duration is governed primarily by the atmospheric conditions existing. Any air disturbance has an immediate dispersing effect.

(2) The greatest disturbances produced by any aircraft occur when that aircraft is traveling at low airspeeds, such as in landing and takeoff patterns.

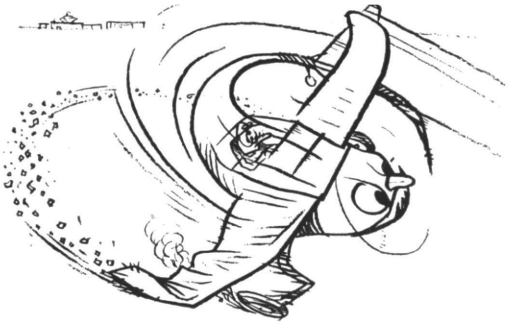
(3) No quantitative conclusions could be reached on intensity; however, the vortex effect can be of such intensity that a serious control problem will be created when light airplanes encounter the disturbance at low

*It appears that this should have been received as the signal to set the Bird Dog back on the runway. See "Careful! Tip Tornado Ahead," December 1957 DIGEST.—The Editor

whereupon it launched itself into the air again, turned its nose into the wind, and lit hard to the extent that its legs spreadeth on the hard ground. Its whirling nose bit angrily into the black earth and the beast cast one wing down and slid along on its belly. The iron monster came to a grinding halt and a great quiet descended upon that place. The knight dismounted and woefully regarded the crumpled bird.

And there came a troop of rolling cavalry calling themselves investigators, and they took measurements and did all manner of things to the broken bird. And all who witnessed the falling of the bird were called and spake long to them and they writeth in the book.

Then, he of the gray beard spaketh to the knight in this manner:



"Verily, verily, I say unto thee, thou hast lost all directional control and it were better that thou hadst taken this bird again around! It is written that he who bounceth shall encounter the crooked path. 'Tis far better to push the throttle than boot the rudder, for the spur is quicker than the rein.

"However, the records of thy form indicate thou hast only seven and a half hours of bird time in the last half-year. For this, thy supervisor shall be called to task.

"Go, and when thou comest again to the bird, bring the senior knight that he may instruct thee how to alight thy bird with safety."

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airspeeds.

b. Wingtip vortices can produce momentary loss of control of Army aircraft and could, under certain circumstances, produce structural damage to light aircraft.

What causes this hazard? Basically it is (a) the wingtip vortices and (b) the swirling propeller or jet wash of large aircraft that create a turbulence which can upset another aircraft.

What types of aircraft does this affect? The answer is: all types and all makes of aircraft from light two-seaters to heavy four-engine transports have been seriously affected by this turbulence.

What types of aircraft are reported to have caused this turbulence? Pilots have reported severe or dangerous turbulence caused by various types of aircraft during their landing or takeoff operation, but the most frequent and severe examples were reported behind the largest commercial airliners, such as DC-6s, Constellations, DC-4s and DC-3s.

Recommendations:

Allow plenty of space between aircraft in the traffic pattern. If there is any doubt, delay

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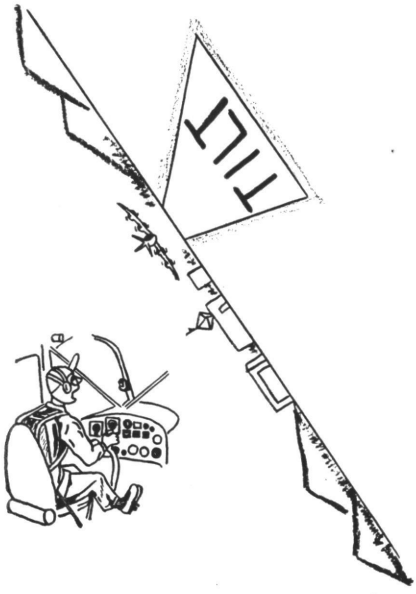
The Gray Hair Department is prepared by the U. S. Army Board for Aviation Accident Research staff with information from its files. Views expressed in this department are not necessarily those of the Department of the Army or of the U. S. Army Aviation School.—The Editor



your takeoff or your landing approach.

Make approaches and landings on the upwind side of the runway.

When entering an area just vacated by another aircraft, maintain adequate flying speed well above your aircraft's stalling speed.

Be alert and prepared for turbulence during landings, approaches and takeoffs.

CAA Anniversary— *continued from page 11*

closely with each other to maintain a safe and orderly flow of traffic.

Wherever you may fly, the CAA is there with an interest in your safety. Watching over you is a dedicated team, bringing you every available aid they can which has been developed and perfected in the 20-year history of this increasingly important agency.

Straight and Level

TO: Editor

The reason for this note concerns your March, 1958, issue of the DIGEST. On page 32 under the heading "Grade Structure," C2, SR 210-20-15 is listed as the regulation concerning "establishing a revised grade structure for aviators." I have checked the Index of Administrative Publications, dated January 1958, with changes, and cannot find this regulation listed. I did note that the 210 series applies to "installations" and not to grade structures. My question is—what is the correct number if by chance this one isn't correct?

My interest lies in the fact that I have National Guard pilots who have been in battalions as lieutenants for over ten years. Maybe this is the break they've been looking for all of these years.

Any assistance you could give me will certainly be appreciated.

HENRY R. MANGUM, JR.
Captain Arty
Army Aviation Advisor
West Virginia NG

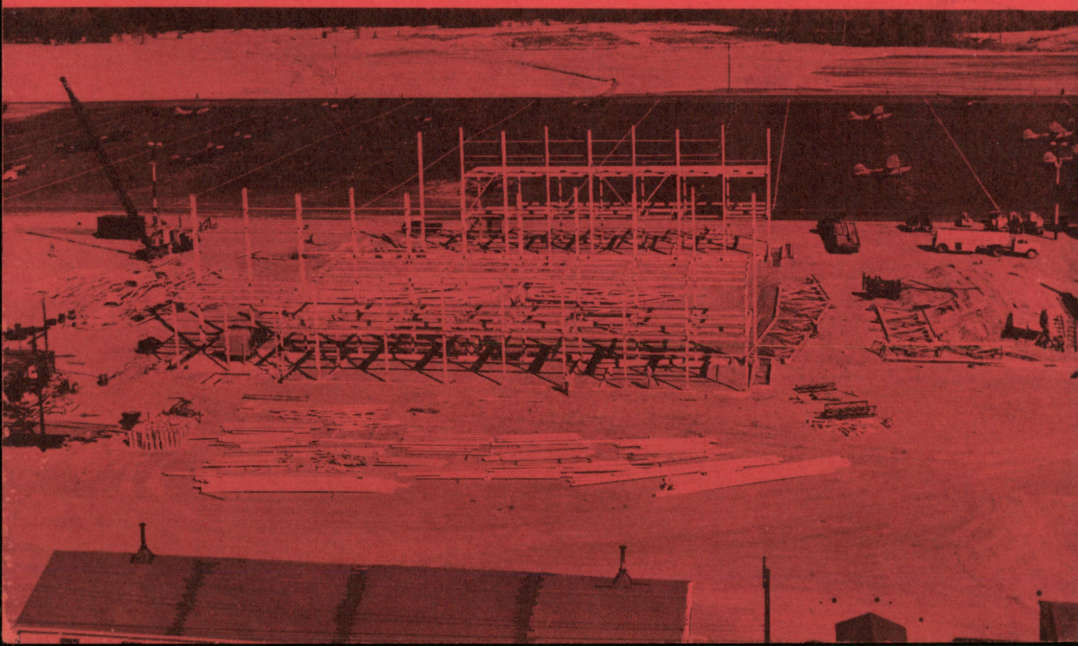
Careful study of the AR and SR index reveals no such SR. Apparently a typing error somewhere along the line went unnoticed and the reference should be C2, SR 310-30-15, dated 16 July 1957, entitled "Organization and Equipment Tables Personnel." If this doesn't fit the bill, let us know and we'll pursue it further.—The Editor

HISTORIC BIRD DOG RETIRED

RECOGNIZE THIS LITTLE BIRD? She occupies an especially warm spot in the heart of many an Army Aviator. Army 01327 is the first Bird Dog delivered to the Army on 20 December 1950 and is featured in your Dash-1 handbook.

Her long and exciting life includes duty with Army Aviators in this country and Korea. Army 01327 needn't take a back seat to orbiting Explorers or Sputniks — she has flown the equivalent of nearly one round trip to the moon.

In her prime, she transported many general officers. Perhaps her greatest claim to fame was carrying president-elect Dwight D. Eisenhower around Korea during his dramatic visit in 1951.

Prior to being retired to the U. S. Army Aviation School Museum in March, 1958, Army 01327 was used in student training at the school and has logged more than 2,300 hours.

The new operations building for Lowe AAF (top) is located at the south end of the tie-down area and commands a clear view of the double traffic pattern in use at the field. A snack bar is housed on the first floor. Two new hangars (one of which is under construction in the bottom photo), plus a third already in use, will greatly assist maintenance personnel to keep the proper number of aircraft available for training.