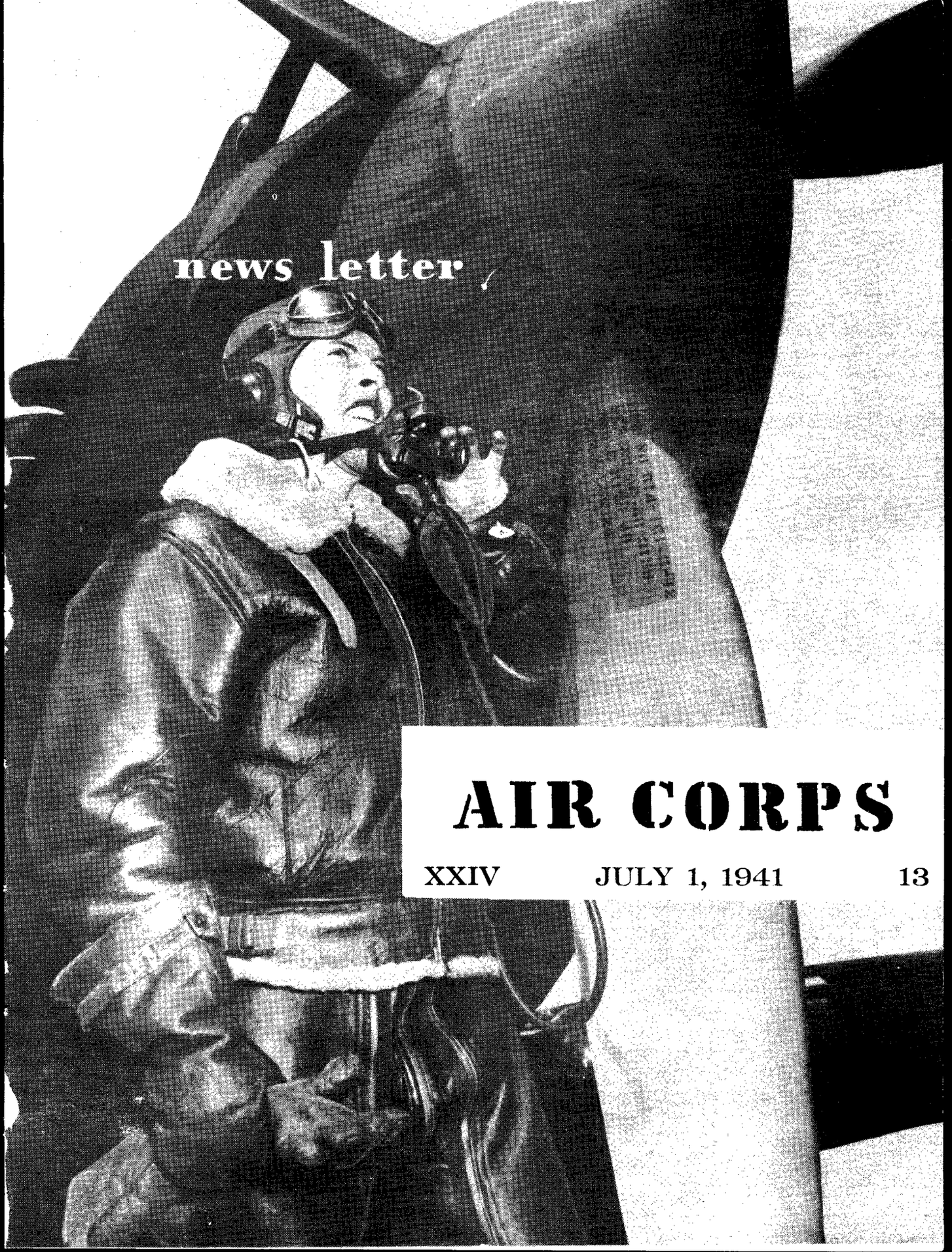

AIR CORPS

XXIV JULY 1, 1941 13

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DISTINGUISHING MILITARY AIRCRAFT

Thousands of civilians are learning to distinguish latest Army Air Forces and Navy aircraft through the cooperation of the newspapers with the Aviation News Committee of the Aeronautical Chamber of Commerce of America.

In each issue of Aviation News Features, published by the Committee, there is available to the newspapers silhouettes of a late model military airplane. One of the recent ones is that of the Martin B-26 "flying torpedo" bomber, which is reproduced on the back cover of this issue of THE AIR CORPS NEWS LETTER.

"Described by its designers as faster than most of the Pursuit ships now fighting in Europe," says the accompanying text, "the B-26 is the U.S. Air Corps' newest and most advanced bomber. This product of the Glenn L. Martin Company is striking proof of the American aircraft industry's ability to produce the most modern combat airplanes, for the B-26 has armor plate, self-sealing fuel tanks, a power driven gun turret and a tail turret.

"You'd be able to recognize this medium bomber by its tricycle landing gear, large tail structure, four-bladed propellers, all-plastic nose and the sleek nacelles housing the two Pratt and Whitney engines."

Many civilians are collecting the silhouettes, making up easily read booklets for use in spotting aircraft should they be called upon to aid in the national defense.

---oOo---

NEW OFFICERS FOR AIR CORPS, REGULAR ARMY

The following-named 37 Air Corps Reserve officers were appointed 2nd Lieutenants in the Air Corps, Regular Army, and assigned to stations, as follows:

Henry John Amen, Randolph Field, Texas.
James Carlton Barham, Fort Sill, Okla.
Arthur Louis Birleffi, Pierce Field, Trinidad
Russell Keith Brock, Ontario, Calif.
Grover Cleveland Brown, Barksdale Field, La.
Robert Wiygul Burns, Quarry Heights, Canal Zone.
Carver Thaxton Bussey, Gunter Field, Ala.
Marshall Pyron Camp, Phoenix, Arizona.
Robert Brown Coen, Fort Shafter, T.H.
William Allen Daniel, Fort Knox, Ky.
Robert Gabel Emmens, McChord Field, Wash.
Quinter Paul Gerhart, Quarry Heights, Canal Zone
James William Guthrie, Quarry Heights, Canal Zone
David Warren Hassmer, Fort Shafter, T.H.
John Bailey Henry, Jr., Quarry Heights, Canal Zone
Nathan Bourne Hays, Quarry Heights, Canal Zone
Louis Henry Hansman, Patterson Field, Ohio
William John Kennedy, McClellan Field, Calif.
James Raymond Lyons, Olmstead Field, Pa.
Franklin H. MacNaughton, Selfridge Field, Mich.
Robert Haynes McCutcheon, Langley Field, Va.
Jack Gillespie Milne, San Juan, Puerto Rico
Albert James Moye, Langley Field, Va.
James Wyatt Newsome, Lawson Field, Ga.
Frank Leslie Nims, Gray Field, Wash.
Kenneth Walter Northamer, Fort Richardson, Alaska
Arthur Clark Perry, Aberdeen Proving Ground, Md.
Harry MacCulloch Pike, Mitchel Field, N.Y.
Luther Henry Richmond, Randolph Field, Texas
Harry James Sands, Jr., Patterson Field, Ohio
William Frank Savoie, Fort Shafter, T.H.
Charles David Sonnkalb, Randolph Field, Texas
Harry Hunt Towler, Jr., Gray Field, Wash.
Lindsey Hartford Vereen, Barksdale Field, La.
Edward Raymond Woolsey, Manila, P.I.
William Elmer Zins, Tallahassee, Fla.

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Brigadier General Martin F. Scanlon was relieved from duty as Military Air Attache to England, London, and assigned to Hqrs. Army Air Forces, Washington.

THE PURPOSE OF THIS PUBLICATION IS TO DISTRIBUTE INFORMATION ON AERONAUTICS TO THE FLYING PERSONNEL IN THE REGULAR ARMY, RESERVE CORPS, NATIONAL GUARD, AND OTHERS CONNECTED WITH AVIATION.

The Air Corps News Letter

INTELLIGENCE DIVISION
U. S. ARMY AIR CORPS

MUNITIONS BUILDING
WASHINGTON, D. C.

VOL. XXIV | JULY 1, 1941 | NO. 13

REORGANIZATION OF THE ARMY AIR CORPS

P-40 Wing is Changed in Field

The first known instance of a P-40 wing assembly being changed in the field, under simulated war conditions, occurred recently in Michigan during a ten-day maneuver undertaken by the Fortieth Pursuit Squadron, of Selfridge Field.

Need for the work arose when one P-40 was ground-looped in a landing at Grayling, Mich. The right wing, center section and propeller were damaged, and both landing gear legs were broken off. Damage to the propeller also made necessary an engine change. Despite the seriousness of the damage to the ship, however, a complete repair job was done in the field and the airplane went back into service in the maneuver.

Selfridge Field sent a crew from Base Engineering, under Tech. Sgt. Branzell, by convoy with a new wing and landing gear assembly, obtained by removal from other ships in aero-repair at Selfridge. A new engine and propeller also were brought to the scene by truck.

Sgt. Branzell's crew had to work out the technique of suspending and placing the new wing into position for installation on the spot, since they had never before encountered a similar situation. A technique was developed successfully without delay, however, and the entire job was done under the most adverse conditions within three days. The airplane was not back into the air within that period, however, since some minor work was delayed by a shortage of parts.

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GENERAL ANDREWS TO BUENOS AIRES

Maj. General Frank M. Andrews, Commander of the Caribbean Air Force, has flown to Buenos Aires to represent the United States Army at the celebration this month of the anniversary of Argentine independence.

Gen. Andrews substituted for Gen. George C. Marshall, the Chief of Staff, who received the original invitation from the Argentine Government, but was unable to leave the United States at this time.

Arnold is "Chief of The Army Air Forces"

The creation of an autonomous branch of the War Department to be known as "The Army Air Forces" has been effected in one of the few major revisions of air organization in the Army since military aviation was removed from the Signal Corps and made a separate branch.

Maj. General H.H. Arnold was selected to be the first Chief of the Army Air Forces. Apart from his appointment, however, the most important single feature of the reorganization was the removal of the GHQ Air Force from the jurisdiction of General Headquarters and placing it under the general supervision and control of the Chief of the Army Air Forces.

Lieut. General Delos C. Emmons will continue to command the old GHQ Air Force, which has been rechristened and henceforth will be known as the Air Force Combat Command. The Chief of the Air Corps continues to be Maj. General George H. Brett. The functions of both branches of the new Army Air Forces remain virtually unchanged.

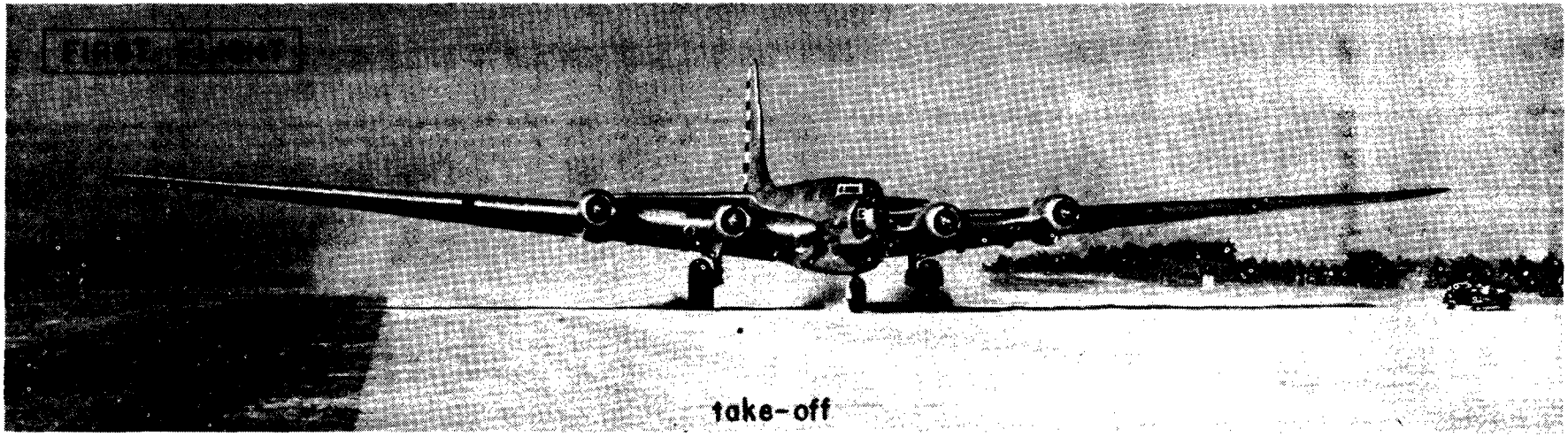
The major difference is that all elements of air power now are unified in the Army, with their control centered in a veteran air officer. As Chief of the Army Air Forces, Gen. Arnold will be responsible only to the Chief of Staff, and Gens. Emmons and Brett only to the Chief of the Army Air Forces. Gen. Arnold will retain his post as Deputy Chief of Staff for Air, and in that capacity will pass on air matters brought up by sections of the War Department General Staff and of the new Air Staff.

A Headquarters Army Air Forces was created with the reorganization. It includes a Chief of the Air Staff, the Air Staff, the Air Inspector and the Air Adjutant General. The Chief of the Air Staff will be Brig. General Carl Spaatz. The Air Inspector will be Brig. General Herbert A. Dargue and the Air Adjutant General is Lieut. Colonel William W. Dick. The Secretary of the Air Staff is Lieut. Colonel Muir S. Fairchild, with Lieut. Colonel Claude Duncan and Maj. E.P. Curtis.

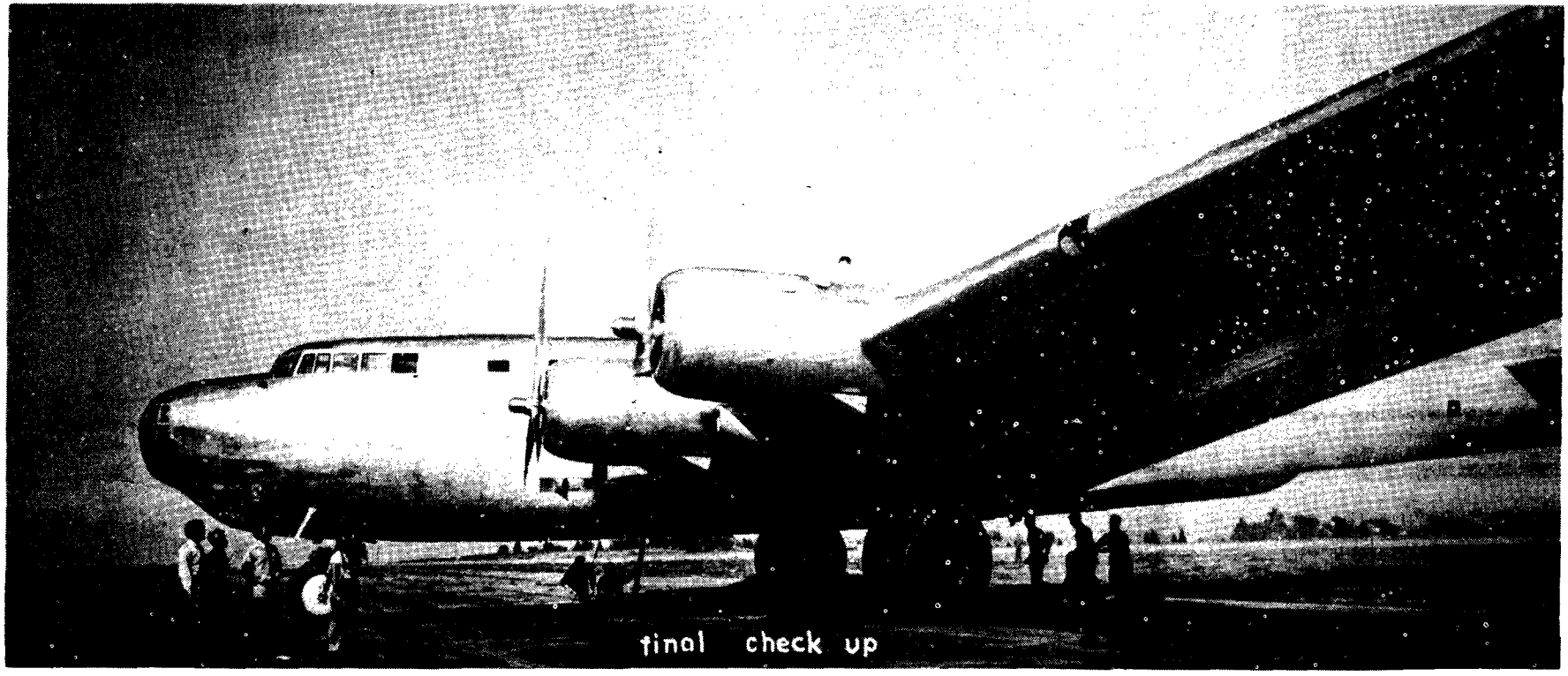
Members of the Air Staff, and the divisions which they will head, are:

A-1 Division (Personnel)--Col. Ralph Cous-

(Continued on page 8)



take-off



final check up

THE BIG BABY SOLOED

B-19 Test Flights Under Way

Lieut. Col. James G. Taylor on this page describes the first flight of the B-19, the world's largest bomber, and gives a history of its development as he personally sees it. While Chief of the Aircraft Branch of the Materiel Division, at Wright Field, Colonel Taylor played an important role in the work which led to the huge Army Air Forces bombers of today - in the development of which the United States has led the world. The B-19, latest record-breaking product of the Army Air Forces, was his particular "baby," since he was head of the board of officers which gave final consideration to and approval of its construction.

The Flight

After weeks of delay caused by difficulty in perfecting the brake system, all the multitude of detailed preparations for this long-awaited flight at last were complete. The new runway, 4,000 feet of concrete built especially for this moment, was finished and waiting. The day was clear and a rising sea breeze gave evidence that by noon a brisk wind, most favorable for a take-off, would be blowing.

Word had circulated by grapevine, telephone and personal contact that this day, June 27, 1941, was to be the day. A final check was completed and the airplane was searched thoroughly for evidence of subversive activities,-stowaways seeking a brief moment of fame, and any previously undiscovered defects or maladjustments.

Everything was reported in order. The Douglas Company, manufacturers of the huge ship, secured the final, complete approval of the Army inspectors. The crew was ready. The chief pilot, Major Stanley Umstead, and his crew were sure that they were now at the end of what had long since come to be considered an endless vigil.

At 11:30 a.m., the crew got aboard. Major Howard Bunker climbed into the co-pilot's seat. At their places were the other members of the crew - Jack Grant, flight engineer; Merle Steel, hydraulic engineer; Raoul Escallier, electrical engineer, all of the Douglas Company; Mark Koogler, civilian employee from Wright Field, who acted as crew chief, and the writer as Army observers. Equipment was checked and tons of air mail taken aboard.

Quickly the engines were started. Major Umstead taxied to the far end of the runway, pausing but a moment. The minute hand crept upward as it neared 12:00, the appointed hour. The brakes were set and the engines checked individually.

Here She Comes!

At 12:02 the engines were opened wide

(Continued on Page 20)

The History

In the late 1920's it was becoming apparent that unless new and more suitable designs could be worked out as prototypes, the Douhet theory regarding employment of aerial bombardment would prove to be a fallacy. The existing bombing airplanes were so slow and had such little range that many people were convinced that their employment in unassisted formations against fighter aircraft was hopeless.

To disprove this, the Materiel Division in 1929 worked out a new basic design for a light, fast bomber which was produced in two forms - as the B-9 by Boeing and the B-10 by Martin. When these two airplanes were type tested, the results startled the world, and everyone began to see that size was not important in airplane design, but that for a given horsepower a predetermined result could be secured provided real aerodynamic research had been completed prior to construction.

One could secure either a small fast plane or a large efficient weight carrier - both having a relatively high performance if the aerodynamic solutions were correct. Everyone began to incorporate the monoplane idea due to its now-proven high efficiency for any size of airplane. Large, high-speed wind tunnels became a necessity. Military people began to set up requirements for their national air forces, depending upon their geography, national policy, etc.

Germany elected to build many fast, high-flying airplanes, including light bombers which sacrificed range and defense for speed. This was due to the closeness of England and France, where it was thought short-range fighter craft could help their bombers drive their way to victory. The G.A.F. underestimated the ability of their airplanes to fight off attacking fighters when both their bombers and fighters lacked rear armament and, therefore, could not fight a position fight as is required of formation fighters. The value of a true escort fighter airplane was not yet realized.

(Continued on Page 19)

BREVITIES FROM HERE AND THERE

Three men who received the highest scholastic ratings in the class which recently graduated from the Air Corps Radio Communications School at Scott Field, Ill., were retained there as instructors.

This class, the largest one in radio communications in the history of the Air Corps, comprised 61 aviation cadets and 289 enlisted men.

The three outstanding students were Alexander M. Walker, Joseph N. Funk and Henry D. Robb, whose respective ratings were 95.4, 92.3 and 91.7.

Although 30 words per minute is a relatively high average in receiving code, one student, Charles F. West, achieved a record of 40 words per minute, while Pvt. Robb was runner-up with 35 words.

At Hickam Field, T.H., the Air Corps squadrons are endorsing a "March of Dimes" campaign for the purpose of providing cigarettes for R.A.F. pilots in England.

A courageous act in rescuing a ten-year-old girl from drowning brought to Sergeant Anthony Montville, of the 34th Bombardment Squadron, Westover Field, Mass., congratulations from all sides, especially from the 2,000 soldiers stationed at that field.

Off duty at the time of the incident, Sergeant Montville was swimming at "Five Mile Pond," located in the suburbs of Springfield. The plight of the imperiled child was brought to the Sergeant's attention by a non-swimming civilian. The child disappeared, however, even before Sergeant Montville started to swim the intervening 25 yards to reach her, with the result that at least a minute elapsed before she was recovered. A Springfield Girl Scout assisted the soldier in administering artificial respiration, and some 30 minutes later the rescued child was pronounced safe.

In the absence of the usual floodlighting system, expected to be installed in the near future, night flying is being conducted at Westover Field, Mass., with a temporary set-up of electrical equipment around the runways such that any type of plane may make a night landing without danger.

The 37th Bombardment Squadron (M), which had been stationed at Lowry Field, Colo. recently moved to its new home at Pendleton, Oregon. The enlisted strength of the Squadron is 217, while the officers are Major W.C. Mills, Captain Karl E. Baumeister, 1st Lieut. Arch G. Campbell, Jr., 2nd Lieuts. Wm. M. Bower, Jack H. Butler, John D. Feltham, Harvey H. Hinman, Travis Hoover and Blair M. Sorensen.

The 116th Observation Squadron, commanded by Major Hillford R. Wallace, which, prior to its induction into the Regular Army last September, was a National Guard unit stationed at Spokane, Wash., recently departed by truck convoy for the maneuvers in California. This squadron has attained a very satisfactory record with the Regular units at Fort Lewis.

Completing their training as navigators at various Air Corps training centers, 14 aviation cadets on June 24 were given their oath of office as second lieutenants in the Air Corps Reserve by the commanding officer of McChord Field, Wash., and assigned to active duty with the Thirty-fourth and Ninety-fifth Bombardment and the Eighty-ninth Reconnaissance Squadrons at that post.

Two hundred enlisted men of France Field, Panama Canal Zone, spent a day of sightseeing at Old Panama City and other points of interest, this being the first of a series of excursions arranged by the France Field Morale Section for the men of the Atlantic side airdrome.

The trip, under the supervision of the France Field Holy Name Society and Chaplains James Cunningham and Joseph Koch, gave many of the men their first opportunity to visit points of interest on the Pacific side, including various Army posts, Madden Dam and Summit Gardens.

B-17 Flying Fortresses were recently ferried from Langley Field, Va., to Westover Field, Chicopee Falls, Mass., the new home of the Thirty-fourth Bombardment Group (H). This organization, comprising the Headquarters and Headquarters Squadron and the Fourth, Seventh and Eighteenth Bombardment Squadrons, effected its change of station from Langley Field by motor convoy within the period of three days.

A distinctive emblem of their own in the way of an individual pin, now in process of manufacture, will be presented to the Air Corps Draftettes of France Field, Panama Canal Zone. The design for the emblem consists of the Air Corps wings with a center field inscribed with the letters A.C.D. The wings are gold plated, the field is blue enamel and the lettering is of gold - the Air Corps colors.

This emblem will be presented to each Draftette to denote membership in the Canal Zone's "Most Patriotic Organization," and as a token of gratitude on the part of the Commanding Officer of France Field, Colonel Edwin J. House, for the splendid cooperation of the "Air Corps Draftette Squadron."

"Spirit of the Air Corps," a military march composed by Major William Clinch, Adjutant of the Gulf Coast Air Corps Training Center, Randolph Field, Texas, was officially adopted as the marching song for the Aviation Cadet Regiment at the "West Point of the Air." This song was first presented publicly in a nation-wide radio broadcast on February 21, 1941, from Randolph Field, and since then it has been sung by male chorus groups on Randolph Field broadcasts.

According to Major Clinch, the song will be published by Broadcast Music, Inc., within a few weeks, with special Randolph Field pictures to be reprinted on the cover of the sheet music.

Major Clinch, a graduate of the Air Corps Training Center in 1928, directed a dance orchestra at the University of Nevada, from which he graduated in 1926. He has composed a number of other songs.

The reason some soldiers are called "Dog-Face," observes the Brooks Field Observer, Brooks Field, Texas, is because "all they do is sit on their haunches, growl and sleep in a pup tent."

More young men qualified as Aviation Cadets during the week of June 16th than during any single week in the history of the Army Air Corps. A total of 786 applicants were accepted for flight training. The Air Corps now has 9,000 cadets in training, the War Department announces.

An Infantryman is a "gravel agitator."
"Hit the silk" - to use a parachute.
"Gasoline Cowboy" - a member of the Armored Force.
"Motorized dandruff" - insects.

ENLISTED PILOTS BEGIN TRAINING IN AUGUST

Gulf Coast Training Center Gets First Students

The first full class of enlisted flying students in the history of the Army Air Forces will begin flight training next month under the supervision of the Gulf Coast Air Corps Training Center.

Two hundred students, all of whom will be detailed from the ranks of the Army and many of whom are expected to be enlisted men of the Army Air Forces, will start learning to fly August 23. The name of the school to which they will be assigned has not been announced.

Another 200 tentatively are scheduled to begin training October 4 and a third class, also of 200 men, will get underway about December 8. For the time being, at least, the enlisted students will get their elementary training at the same schools now training aviation cadets.

Letters Sent To Cadet Applicants

Most of the students in the first class probably will be men who previously had applied for appointments as aviation cadets, but who had to be turned down because they couldn't meet the educational (two years of college or its equivalent) requirement for men training to become pilot officers. Letters went out this week to all such men, advising them that they probably are eligible for training as enlisted pilots.

Until the Air Corps has had time to set up replacement centers for the preliminary training of enlisted students--probably at Maxwell, Kelly and Moffett Fields--applicants from civil life will not be enlisted for assignment to training centers. In any event, it is believed that there are hundreds of qualified men already in the service--enough to fill up the first few classes, at least.

Use of Pilots Undetermined

Exactly how the enlisted pilots will be used after they graduate from the flying schools has not been determined definitely. Their ultimate duties will depend to a large extent, it is understood, on the Army Air Forces' experiences with the graduates of the first few classes. Since the whole idea of large numbers of enlisted pilots is brand-new, plans for their assignments probably will be revised frequently as the Army learns more about their aptitude for various types of flying.

Similarly, the nature of the flight training which they will undergo is subject to change, and it is very likely that their course will be revised from time to time--at least until the most satisfactory method has been determined. Members of the first class will undergo the same course of instruction as that given cadets, but this is an experiment and not likely to be repeated.

Because the results of the first few classes will, to a large extent, determine procedure in the future, commanding officers of the training centers to which the first enlisted students are assigned have been requested to pay particularly close attention to their new charges. They also have been asked to submit their own recommendations, on the basis of their initial experiences, as to the form which future flight courses for enlisted men will take.

Ferry Duty Anticipated

It is reasonably certain that many of the enlisted pilots will be assigned to the interesting task of ferrying new aircraft from the factories to the squadrons to which the ships are assigned. Thousands of military aircraft, from trainers to bombers, thus will be delivered to their units by enlisted pilots. It is equally likely that enlisted pilots will be assigned to transport squadrons, carrying government-furnished equipment to the factories and freight from air depot to air depot.

Since all the plans are still very much in the formative stage it is not known definitely--or at least has not been revealed--to what extent the enlisted pilots will be used for combat flying. Selected enlisted pilots probably will be assigned to certain combat units, it was said this week in Washington, but whether these units will be pursuit, bombardment or whatever type was not disclosed.

What Kind of Insignia?

Many other minor problems have not been settled, although most of them probably will be within the next few weeks. One point, of very little seriousness from the military standpoint but of interest to every potential enlisted pilot, is that of insignia. Will enlisted pilots wear silver wings on their left breast, as do all pilots now, or will they have a special insignia of their own--possibly wearing embroidered wings on their upper sleeve, as was done during the first World War?

All such questions remain to be decided, or at least made public. Regulations for the training of enlisted pilots have been drawn up and submitted to the Adjutant General for approval. They will be outlined here when approved finally. In the meantime, applications from enlisted men seeking assignment as flying students are being held in abeyance.

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IN A (BUMPY) RUT

Jack Johnson and Charles Evans bumped into each other regularly and violently as rival soccer players in Glasgow, Scotland. They have bumped again: Pvt. Johnson and Pvt. Evans collided while making up their bunks at Lowry Field, Denver.

Johnson, a commercial artist in civil life and a resident of Montclair, N.J., and Evans, New York City elevator operator and resident of Staten Island, found themselves together in the Forty-First School Squadron.

BRAZILIAN OFFICERS VISIT RANDOLPH FIELD

These officers of the Brazilian Air Force recently inspected the training center at Randolph Field while enroute from Burbank, Calif., to their home station at Rio de Janeiro on a ferry flight with four American-made military aircraft. Members of the group are Capts. Manoel Rogerio, Ary Bello, First Lieuts. Almir Martins, Paulo R. Goncalves, Joao A. Belloc, Astor Costa, Haroldo Lima and Ary Neves.

CABBAGE AND X-C DON'T MIX

World War I pilots who quieted their nerves at the end of particularly hazardous flights by rushing to the village estaminet and gulping "huge glasses" of whiskey (a device not considered sound practice for the pilots of the high-speed aircraft of World War II) had an excellent chance of becoming chronic alcoholics.

In fact, two of the Medical Corps' best known flight surgeons write in a new book, "flying is a hazardous and exhausting occupation, but the pilot will be wise who learns to 'take it' without recourse to alcohol as a benumbing drug.....military aviation in our time requires both physical and moral hardihood of the highest degree. The neurotic weakling, seeking escape from stress, or the chronic alcoholic have no place in aviation."

The authors are Lieut. Col. Malcolm C. Grow, M.C., stationed at headquarters, Southeast Air District, Tampa, Florida, and Capt. Harry G. Armstrong, M.C., who recently was in England on a War Department assignment. Their new book is "Fit to Fly," a medical handbook for fliers published by D. Appleton-Century Company, with a foreword by Maj. Gen. H. H. Arnold, Chief of the Army Air Forces. It is entirely possible that their book may prove to be as valuable a guide to young military fliers seeking to maintain their efficiency through proper health as, for example, Assen Jordanoff's "Your Wings" and "Through the Overcast" are valuable to embryo civilian fliers.

Food Vs. Altitude

Cabbage and cross-country don't mix, at least not at altitudes, Col. Grow and Capt. Armstrong maintain. If you're going on a cross-country, it would be a good idea to lay off large quantities of cabbage, cauliflower, Brussels sprouts, turnips and all other coarse vegetables. The same thing applies to all kinds of beans, highly spiced or greasy food and "excessive amounts of tea, coffee, sweets and alcoholic liquors."

Even beer or carbonated drinks, such as the afternoon "coke," should be avoided in too great quantities. That somewhat bloated feeling you get after a large dinner, or too many carbonated drinks, can become something more than just bloated when you get to altitudes and the gas begins to expand.

Pioneer transoceanic fliers who took along a few candy bars instead of trying to live on picnic lunches apparently knew their stuff, whether they knew why or not. The authors recommend that very thing, asserting that "during a long or fatiguing flight a few candy bars are ideal as a means of allaying hunger and providing energy to flying personnel without, at the same time, overloading the stomach."

More and Smaller Meals

"It is probable that small meals or small amounts of concentrated and highly nutritious foods at frequent intervals, say five times a day, during intensive flying activity would be highly desirable for flying personnel," they say. "The importance of sufficient fluids should not be overlooked. Good pure water, containing sufficient necessary salts and minerals is, after all, the best possible form of liquid to be consumed prior to and during flights."

Col. Grow and Capt. Armstrong even tell their flying readers what sort of exercise to take and why they should take it.

"Young men," they say, "should engage in competitive strenuous exercise such as rowing, football, track, basketball and the like.....There are certain sports that increase the capacity of the heart and lungs to a marked degree. These are mountain climbing, skiing and hunting in mountainous country.

Hill Climbing Fine

"Climbing hills brings into play not only the large muscles, but, as we ascend in altitude, calls on the heart and lungs for great additional work due to the rarified air. Developments of this type make for better performance in the airplane at heights."

Of course, for the exercise of the eyes and to increase coordination they recommend tennis, squash, handball and such shooting as skeet. For men of forty and over, they limit exercise to the general confines of golf, fishing, swimming, cycling, bowling and "even squash and tennis....in short of the point of undue fatigue." Next time no more than nine holes, with more congenial partners, if the 40-year-old officer winds up his last eighteen with a feeling of irritation and fatigue, however.

How It Feels To Fall

Service friends of Capt. Armstrong, who may recall that he attracted widespread attention a few years ago by making a parachute jump in order that he might make a professional, medical study of his reactions while falling free, will recognize portions of the chapter in "Fit to Fly" on protective devices and equipment, ranging from winter flying suits to parachutes and fire extinguishers. In this chapter he describes the sensation of falling free.

"Falling free, contrary to the general idea on the subject, is not a harrowing experience," he and Col. Grow write. "The principal reason for this is that until one gets very close to the earth, there is no sensation of falling.

Floating With Ease

"One feels as though he were simply suspended in space. As one gets closer to the earth, however, and the eyes are able to detect the shortening of the distance between the body and the earth, the sensation of falling appears.

"It was formerly thought (Capt. Armstrong's leap seems to have been largely responsible for scotching this belief) that a fall of any considerable distance through space would cause unconsciousness and death.

"We now know that it has no effect on ei-

or ...e m..., an.. one should never worry about not being able to think or act normally in a delayed parachute jump. It should also be borne in mind that from any reasonable altitude one has a considerable period of time to carry out his intentions since it requires about a quarter of a minute for the body to gain its full velocity, during which time only 1,500 feet have been traveled...."

Advice To All

The book is very complete, giving advice to young men seeking training as military pilots as well as to those who already have reached that category. Five full chapters are devoted to the physical examinations, outlining disqualifying defects and recommending health measures to avoid such defects. One chapter, the last, even discusses the various diseases to which airmen may be exposed while serving in the tropics, their cause, symptoms, preventive measures and treatment.

Gen. Arnold reviews the work effectively in his foreword.

"The subject of physical fitness of personnel," Gen. Arnold wrote, "has from the earliest days of aviation been of paramount importance. During the many years of my association with flyers and flying I have felt the need of a book, written in simple language, yet scientifically accurate, that would serve as a guide to health for aviators.

"Lieut. Col. Malcolm C. Grow, for approximately four years Chief Flight Surgeon of the United States Army Air Corps, and Capt. Harry G. Armstrong, who for five years was director of the Aero-Medical Research Laboratory, Materiel Division, Air Corps, Wright Field, Dayton, Ohio, because of their interest and experience in aviation medicine, are well qualified to accomplish this task.

"This book should perform an important service for the youth contemplating aviation, the younger, qualified airman and the veteran pilot, because it deals with the prevention of diseases important in relation to flying, the physical examination all aviators must take at frequent intervals and those factors peculiar to aviation that tend to affect the lives and well being of all who venture into the air."

"Fit to Fly" is dedicated to "the memory of the medical officers of the United States Army who lost their lives in aircraft accidents in the performance of duty" and who "did much during their active careers toward advancing the science of aviation medicine." It contains 375 pages, is indexed and sells for $2.50.

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LINK TRAINERS SUPPLIED BROOKS FIELD

Fifteen additional Link trainers are being supplied to Brooks Field and will be installed in the first consolidated Link trainer building at the Texas field. The building has been completed.

Link trainers in the past have been installed in small numbers in the various hangars at Brooks and Kelly Fields. Ultimately all the trainers will be under one roof.

REORGANIZATION OF THE ARMY AIR CORPS
(Continued from page 1)

ins.

A-2 (Military Intelligence)--Brig. Gen. Martin F. Scanlon.

A-3 (Operations and Training)--Col. Earl L. Naiden.

A-4 (Materiel and Supply)--Lieut. Col. Edgar P. Sorensen.

Air War Plans--Lieut. Col. Harold L. George.

Budget Section--Lieut. Col. Leland Miller.

Statistics Section--Capt. J.M. Farrar.

The Air Staff includes the old Plans Division of the Office, Chief of Air Corps, which was taken over in its entirety and to which additional personnel has been assigned. The Air Staff assumes the general planning function, and the Air Inspector takes over the over-all inspection function which formerly was in the Office, Chief of Air Corps.

The Air Staff essentially is a policy making and planning staff, and not an operating staff. Consequently, while the staff will determine broad policies to govern the Army Air Forces, it will be the duty of Gen. Emmons to direct the execution of those applicable to the Combat Command, and of Gen. Brett to supervise the actual operations required of the Air Corps.

Regulations pertaining to the Army Air Forces charge Gen. Arnold with the following duties:

The control of the activities of the Air Force Combat Command and of the Air Corps, the preparation of plans pertaining thereto, the supervision and coordination of training of all other air units, and the inspection essential to the fulfillment of these duties;

The determination of requirements of the Army Air Forces with respect to personnel, materiel, equipment supplies and facilities, and the preparation of necessary plans for the development, organization, equipment, training, tactical operations, supply and maintenance thereof, including overseas garrisons and task forces for theaters of operations and the assignment of personnel and materiel thereto;

The determination of the Army Air Forces' financial requirements and the control and supervision of funds appropriated for this purpose.

Created with the Army Air Forces was an Air Council, of which Gen. Arnold is president. This body is charged with periodically reviewing and properly coordinating all major aviation projects of the Army, and passing on all matters of current policy. Its members include the Asst. Secretary of War for Air (ex officio), the Chief of the War Plans Division of the War Department General Staff, the Chief of the Air Force Combat Command, the Chief of the Air Corps, and any others who may be appointed from time to time by the Secretary of War.

No outline of the functions assigned to
(Continued on page 21)

July 1941

Senior officers of the new Air Corps Maintenance Command have begun developing a component of approximately 1,000 officers, 10,000 enlisted men and 40,000 civilian employees to carry out the functions for which the command was organized recently at Wright Field.

Operating under the Chief of the Materiel Division, the Maintenance Command will have complete responsibility for the storage, issue, repair and maintenance of all supplies and equipment required by the Army Air Forces, "under any conditions whatsoever and in any location in which the Air Forces may be called upon to operate."

The new unit will have three sections, the command group, the staff group and the operating group. The first will function under Gen. Henry J. F. Miller, Chief of the Maintenance Command. The second will be headed by Col. E.E. Adler, Asst. Chief of Staff for Plans, and the third by Lieut. Colonel F.S. Borum. Colonel Borum also is Chief of the Field Service Section.

The operating subdivision will include one transport wing under the supervision of the Chief of the Maintenance Command, with headquarters at Wright Field. In this wing will be placed the responsibility for the organization, operating and training of all transport groups.

There will be four maintenance wings, with headquarters placed conveniently near wings of the Air Force Combat Command, further subdivisions being located at the control depots at Fairfield, Ohio; San Antonio, Texas; Sacramento, Calif.; Middletown, Pa.; Scott Field, Ill.; Ogden, Utah; Mobile, Ala.; Rome, N.Y.; Oklahoma City, Okla.; Macon, Ga., and somewhere in Washington. The last four have not yet been established.

Mobile units also are to be established, in order that they may move into the field for temporary or semi-permanent basing in connection with any aircraft activities of a "task" nature either in the continental United States or anywhere outside the country to which Air Force units might be sent.

Gen. Miller is expected to put into operation in the Maintenance Command a number of innovations for which he is well known. The idea of mobile repair units, for instance, was his while he was in command of the San Antonio Air Depot, where he had command for four years before assuming his new post at Wright Field.

The value of the mobile unit was demonstrated first by the repair of a B-17, complete to the installation of new engines and even to the extent of putting in aluminum rivets where needed, in the field in which it was forced down. In another instance, a B-23 not only was completely repaired in the small field in which it made a forced landing, but the field from which it flew out was built around it while the repair job was going on.

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NEW AIR CORPS DEPOTS

The Air Corps will have 11 large supply and repair depots within the continental United States when the present depot construction program is completed. Four are now in operation and two more are under construction. The two new depots are at Ogden, Utah, and Mobile, Ala.

Of the remaining five depots yet to be constructed, the selection of sites for three was announced in recent weeks. They are to be located at Oklahoma City, Okla.; Rome, New York, and Wellston, Ga.

The Oklahoma City Depot

This depot will involve an outlay of approximately $14,036,215 to cover the construction of the necessary housing accommodations for officers and men, and all the necessary warehouses, hangars, repair shops, gasoline storage tanks, runways and aprons, night lighting facilities, etc.

The Rome Air Depot

The Air Depot near Rome, N.Y., will embrace an area of 2,000 acres and will cost approximately $13,200,000. About 2,800 civilians will be employed initially at this depot, and the military personnel to be stationed there will number about 350 officers and men. A flying field will comprise part of the installation. Plans and specifications call for auto parks for employees, quarters, barracks, hangars, salvage yards, airplane and engine overhaul shops and other facilities to provide complete overhaul of airplanes, engines, armament, radio, instruments and other aircraft accessories.

The Wellston, Ga., Air Depot

The site selected for this depot, 13 miles south of Macon, consists of approximately 2,200 acres. Initially to be employed at this activity will be about 2,800 civilians, with a maximum of 5,400 if a three-shift work program is required. A flying field will comprise part of the installation, as well as three runways, each measuring about 5,000 feet. Approximately 350 officers and men will be stationed at the depot.

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BAPTISTS PROVIDE FUNDS

Recreational facilities for enlisted men at Lowry Field and other military establishments in the Denver area will be provided with $8,000 appropriated for the purpose by the Northern Baptist Convention, Chaplain Raymond Collier, Lowry Field, has been advised.

The money is part of a total of $150,000 set aside by the Northern Baptist Convention at its May meeting in Wichita, Kansas, for the use of communities providing recreational facilities for soldiers.

BOMBING RANGE FOR ORLANDO AIR BASE

The acquisition from the Department of Agriculture of a 22,400-acre tract of land in the Ocala National Forest for use as a bombing range by the Orlando, Fla., Air Base, was announced recently by Colonel Thomas S. Voss, base commander.

The bombing range is 35 miles northwest of Orlando and encompasses a sector of the Ocala Forest which was visited by fire in 1935. Clearance and construction work on the targets and towers was scheduled to begin by July 1.

The Orlando Air Base has been utilizing a section of the Florida east coast for aerial gunnery and bombing practice.

Shifting of Organizations

Offsetting the departure in the latter part of June of the testing and experimental unit - the Twenty-third Composite Group - with a strength of 900 men, from Orlando to Eglin Field, Valparaiso, Fla., was the arrival at Orlando from Langley Field, Va., of the Thirteenth Bombardment Group, commanded by Lieut. Colonel Westside T. Larson, and the Third Reconnaissance Squadron, commanded by Major Samuel W. Van Meter.

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PROGRESS AT GOODFELLOW FIELD

The recent activation of the 388th School Squadron at Goodfellow Field, San Angelo, Texas, increased to four the number of school squadrons at the basic flying school thereat. Comprising this new unit are men transferred thereto from the Forty-ninth, Sixty-seventh, and Sixty-eighth School Squadrons and the Sixty-fourth Air Base Group (Special), plus 50 Selective Service trainees.

The training of aviation cadets is progressing smoothly. Classes 41-E and 41-F completed their training at this School, and Class 41-G is well on the way toward the completion of the 10-weeks' course. This last-named class is about to set a record with respect to its flying ability, less than five percent of the cadets having been eliminated with only three weeks to go, this being twice as good a record as that of the two previous classes.

Class 41-H, numbering 114 cadets, recently reported from two elementary flying schools - Hicks Field, Fort Worth, Texas, and the Missouri School of Aeronautics, Sikeston, Mo.

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MARSHALL FIELD EMERGES FROM FLOOD

Normal operations once more are in full swing at Marshall Field, Fort Riley, Kans., after being interrupted by floods. The adjacent Kansas River went on a rampage, necessitating lively action to evacuate the field. This was accomplished in 6 hours, 40 minutes, during which a total of 57 cargo truck loads of equipment, machinery and material were trucked out to high ground on the military reservation.

All airplanes of the First Observation Squadron were flown to the Fairfax Airport save one, an O-19, which was landed on Fort Riley's upper parade ground and utilized by Major Mower, the squadron commander, in conducting constant accurate and highly helpful vigilance and surveillance of the flooded areas, thus enabling him to give warnings to the population in the river valley area.

The flooding of the field tended only slightly to delay the intensive training program, inaugurated by the squadron commander, to prepare the commissioned and enlisted personnel for any emergency or summer maneuver duties.

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OCCUPATION OF CHARLOTTE AIR BASE

The air base at Charlotte, N.C., is now garrisoned by the Twenty-ninth Air Base Group, comprising the Thirtieth Air Base and the Fortieth Materiel Squadrons; the Fifty-sixth Pursuit Group, comprising the Headquarters and Headquarters Squadron and the Sixty-first, Sixty-second and Sixty-third Pursuit Squadrons; the 677th Ordnance Company, Aviation, and the 707th Ordnance Company, Air Base.

The nucleus of personnel of the Twenty-ninth Air Base Group arrived at Charlotte on April 17 from MacDill Field, Tampa, Fla. The officers and men are well pleased with the post, the city of Charlotte, and the surrounding country.

The Fifty-sixth Pursuit Group accomplished its move from the air base at Savannah, Ga., by rail, motor convoy and privately-owned conveyances. Tactical operations began shortly following the arrival of ten Pursuit planes from Selfridge Field, Mich.

Major David D. Graves was assigned as commanding officer of the Group, relieving Captain Charles W. Stark, Jr., detailed as Group Executive Officer. First Lieut. Alfred H. Guy took over the duties of Group Adjutant.

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CRASH TRAILER AT CAL-AERO

A "crash trailer" that can be towed behind an automobile or any other vehicle somewhat like the auxiliary fire-fighting equipment towed behind taxicabs and other cars by London's anti-raid organizations, has been put into service at the Oxnard, Calif., training center.

Designed by Hugh Nicholson, stage commander for Cal-Aero Academy, operators of the school, the trailers contain all necessary tools, stretchers and first aid equipment. They are assigned to the headquarters field and all auxiliary fields used by the Air Corps. Detachment.

Every piece of rolling stock assigned to the center, from private automobiles to busses and gasoline trucks, is equipped with a hitch. In case of an accident, a trailer can be hitched to the nearest vehicle and be on its way to the scene in less than a minute. Nicholson is responsible for the development of several pieces of equipment which are in use in training aviation cadets.

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VIRTUE REWARDS ITSELF

A sergeant on duty in the Philippine Islands, having completed thirty years' service, has retired with savings of $60,000. He amassed this comfortable fortune through his courage, enterprise, initiative, attention to duty, faithfulness, military efficiency, the careful investment of his savings and the death of an uncle who left him $59,950.

Nichols News
Nichols Field, P.I.

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SIXTEEN NEW FIELDS "CHRISTENED"

A name which was borne for many years by a small Air Corps station on a tiny tropical island in the far Pacific now has been given to a new air base on a semi-tropical island a few hundred miles out in the Atlantic.

The name is that of Capt. Field E. Kindley, an American hero of World War I. Henceforth the new Army Air Forces base on the British resort island of Bermuda will be known as "Kindley Field" and the old air station on the little island of Corregidor, in the Philippine Islands, will have disappeared in all but memory.

Sixteen Named

The new designation was one of sixteen "christenings" of new Army Air Forces flying fields announced recently. Eight of the fields, all but one of which were named in honor of Army aviators cited for gallantry while flying with the A. E. F., are on the overseas bases acquired from Great Britain. The one exception is Sheppard Field, at Wichita Falls, Texas, named in honor of the late Senator Morris Sheppard, of Texas, for many years chairman of the Senate Military Affairs Committee.

The new Kindley Field probably will be of most interest to the hundreds of officers and enlisted men who have served in the Philippines, since the field of that name was considered one of the most desirable stations to which Air Corps personnel in the Philippines could be assigned. It was free of the mosquitoes found on the mainland and, being entirely surrounded by water, was cool at night.

Pilots assigned to Kindley Field flew seaplanes and amphibians, since there wasn't enough room on the little island for a regular landing field. The airplanes were hangared ashore, but were rolled or taxied into the water for take-offs. The Air Corps officers flew missions for the Coast Artillery Corps, spotting the fire of the huge guns guarding the entrance to Manila Bay.

Abandoned Years Ago

For various reasons, Kindley Field finally was abandoned by the Air Corps about 1930 and the station turned over to the Coast Artillery. Most of the personnel--only six or seven officers and their families and the necessary enlisted personnel to handle three or four aircraft were assigned to the field--returned to the United States. Lieut. Col. Vincent J. Meloy, now a member of the General Staff, Third Air Force, Tampa, Fla., was the last Commanding Officer at old Kindley Field.

Capt. Kindley, whose name now is attached to what probably will be another highly desirable station, was a native of Pea Ridge, Ark. The British Government credited him officially with 12 victories over enemy aircraft, and for his exploits King George V presented him with the Distinguished Flying Cross and the United States awarded him the Distinguished Service Cross with Oak Leaf. After the War he returned to this country and had a brilliant record as a racing pilot, but was killed in 1930 in a crash at San Antonio, Texas.

Other Heroes Honored

Other equally heroic American pilots are memorialized in the designation of new fields. Some of these new bases and the records of the men for whom they were named, follow:

SITE	NAME
Antigua, Leeward I.	Coolidge Field
Bermuda	Kindley Field
British Guiana	Atkinson Field
Jamaica	Vernam Field
Stephenville, Newfoundland	Harmon Field
St. Lucia, Windward Isls.	Beane Field
Trinidad	Waller Field
Island of Great Exuma, Bahamas	Campbell Field
Fort Wayne, Ind.	Baer Field
Phoenix, Ariz.	Luke Field
Wichita Falls, Tex.	Sheppard Field
Camp Beauregard, La.	Esler Field
Spokane, Wash.	Geiger Field
Macon, Ga.	Cochran Field
Panama City, Fla.	Tyndall Field
Denver, Colo.	Buckley Field

One of the heroes was 1st Lieut. Frank Luke, Jr., World War ace and renowned "balloon buster," whose record of 18 victories in 17 days was not equalled by any other American flyer. He was officially credited with bringing down four planes and 14 observation balloons. On September 28, 1918, while on a balloon foray, he was forced down and killed when he refused to surrender.

He received three decorations, the Distinguished Service Cross for extraordinary heroism in the St. Mihiel offensive on four different occasions, the Oak Leaf Cluster to the D.S.C., and the Congressional Medal of Honor, the latter posthumously on recommendation of Gen. John J. Pershing.

Luke Field at Phoenix, Ariz., is the second Air Corps station to be named in memory of this World War hero. The first so named was at Ford Island in the Hawaiian Department, which several years ago was taken over by the Navy and given a Naval designation. Since Phoenix was Lieut. Luke's home town, the naming of the new Air Corps station there in his memory is highly appropriate.

Coolidge In Leewards

The new field at Antigua, Leeward Islands, was named in honor of Capt. Hamilton Coolidge, a native of Chestnut Field, Mass., who was killed in action October 27, 1918, while leading his patrol in France. The Distinguished Service Cross was conferred upon him posthumously.

Capt. Coolidge was graduated from Groton School in 1915 with an Aero Club license. He attended the officers' training camp at Plattsburg, enlisted in the Army as a Sergeant, attended Massachusetts Institute of Technology and was sent to France in 1917 as a 1st Lieutenant. He was assigned to the 1st Pursuit Group there and promoted to Captain.

Atkinson Field, British Guiana, was named for Maj. Bert M. Atkinson, whose leadership of the 1st Pursuit Wing in France won him a recommendation for the Distinguished Service Medal. He twice was cited for meritorious service and received the Legion of Honor and Croix de Guerre with Palm (French).

A native of Newman, Ga., he attended the Georgia Military College and the University of Georgia and was commissioned a 2nd Lieut. in the Regular Army in 1911, rising to Major by 1917. After the War he was retired for disability and died in 1937.

Vernam Field, Jamaica, was named for 1st Lieut. Remington deB. Vernam, credited with bringing down three or more enemy airplanes and two or more balloons. He took part in numerous engagements, was cited for heroism, and died of wounds December 1, 1918, after being taken prisoner. The Distinguished Service Cross was conferred upon him posthumously.

He was born at Rutherford, N. Y., and attended St. John's Military Academy.

Harmon Field, Stephenville, Newfoundland, was named for Capt. Ernest E. Harmon, who served as an instructor and test pilot during the War and later specialized in patents and as a test pilot for bombers. He was born in Dallas, Tex., and was killed in 1933 bailing out on a test flight.

Windwards For New Yorker

Beane Field, St. Lucia, Windward Islands, gets its name from 1st Lieut. James D. Beane, a native of New York City, who went to France in 1916 as an ambulance field worker. He enlisted in the A.E.F. at Paris in 1917 and was commissioned after receiving flying training. His role in an air battle June 30, 1918, in which he was wounded, won him the Croix de Guerre. Upon his return to the front he was cited for the Distinguished Service Cross for extraordinary heroism in battling eight enemy planes. He was credited with more than five enemy airplanes before his death in action was reported October 30, 1918.

Waller Field, Trinidad, was named for Maj. Alfred E. Waller, a native of Morganfield, Ky., who enlisted in the Army in 1917 and was commissioned as a 2nd Lieut. in May, 1918, after flying training. He was promoted to 1st Lieut. in 1920, became a flying instructor, and was elevated to Captain in 1932, and to Major in 1935. He was killed December 11, 1937, in a crash at Langley Field, Va.

Campbell Field, Island of Great Exuma, Bahamas, was named for 1st Lieut. Murton L. Campbell, a native of Columbus, Ohio, who was cited for the Distinguished Service Cross for gallantry in action. On June 20, 1918, he was killed in action while flying behind the German lines.

First Lieut. Paul Frank Baer, for whom Baer Field, Ft. Wayne, Ind., was named, was a native of that city and enlisted in the French Army February 26, 1917. Later he transferred to the Lafayette Escadrille where his gallantry in action won him the commendation of Gen. Pershing, and he received the Distinguished Service Cross.

While battling eight enemy planes, May 23, 1918, he was reported missing but later it was revealed that he had been taken prisoner. Subsequently, he was recommended for the Bronze Oak Leaf to the D.S.C., and at the end of the War he was honorably discharged and returned to civilian life.

Esler Field, Camp Beauregard, La., was named for 2nd Lieut. Wyler Esler, who was killed April 11, 1941, in a crash at the field that will bear his name. Born in 1916 at Des Moines, Iowa, Lieut. Esler was a graduate commercial pilot when as a commissioned officer of the National Guard he was inducted into the Federal Service on October 5, 1940.

Geiger Field will be the new name of Sunset Field, Spokane, Wash. It was named in honor of Maj. Harold Geiger, veteran dirigible pilot, who was killed in 1927. A native of Plainfield, N.J., he was a graduate of the U.S. Military Academy and served in France in 1918.

He was sent to Italy in 1919 to study dirigibles and upon his return to the United States, specialized in lighter-than-air craft. He also served as military attache to The Hague and to Berlin. He was killed in an airplane crash at Middletown, Pa.

Georgia Field For Georgian

Cochran Field, Macon, Ga., was named for 1st Lieut. Robert J. Cochran, who was born at Camilla, Ga., and attended the University of Georgia and The Citadel. Sent to France on flying duty in 1918, he was attached to the 101st Observation Squadron as an observer and was killed in action in the St. Mihiel offensive October 10, 1918.

First Lieut. F.B. Tyndall, for whom Tyndall Field, Panama City, Fla., was named, was born at Sewells Point, Fla., and attended Valparaiso University.

He was sent to France in 1917, where he received flying instruction and was commissioned March 22, 1918. He scored four air victories, became a flight commander, and was recommended for the Distinguished Service Cross.

For ten years after the War he did distinguished work as a test pilot and military representative at aircraft factories. He was killed July 15, 1930, in an airplane accident near Mooresville, N.C.

Buckley Field, Denver, Colo., was named for 2nd Lieut. John Harold Buckley, a native of Longmont, Colo. After attending the University of Colorado and serving in the National Guard, he enlisted in the Regular Army, January 30, 1918. He was commissioned a 2nd Lieut. after receiving flying training. Sent to France, March 12, 1918, he was killed in an accident, September 27, 1918.

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PROMOTION OF AIR CORPS OFFICERS

President Roosevelt sent to the Senate the nominations for promotion to major general of Brig. Generals Gerald C. Brant, Rush B. Lincoln, Walter R. Weaver, Lewis H. Brereton, Millard F. Harmon and Herbert A. Dargue.

The promotions to brigadier general of Colonels Edwin B. Lyon, Henry J. F. Miller and Ralph P. Cousins were also submitted to the Senate for confirmation.

MAXWELL MANEUVERS TEACH FIELD DUTIES

Squadrons of the Air Force Combat Command based at Maxwell Field have taken to the road and the woods this summer in a series of individual maneuvers intended to give their officers and men field training in all departments and practical experience in working under actual field conditions.

Each squadron is being required to function as an entirely separate unit. Every noncommissioned officer has been given individual, definite and important tasks to perform. At the conclusion of the maneuver, results are being published and critiques are held--first by the officers and then with all the noncommissioned officers.

Four Movements To Date

Under command of Capts. Harold H. Fulk and Glen A. Kime, the AFCC Squadrons, each traveling in a convoy of from 60 to 70 trucks, have participated in movements to Selma and Passmore Field, Ala., and twice to Eglin Field, Florida. About 371 officers and enlisted men participated in each movement, the convoys being escorted through communities by civilian police working in cooperation with military policemen.

Each squadron functioned as a separate unit with respect to such matters as transportation, supplies, mess, field sanitation and such field problems as refrigeration, shelter, development of bivouac areas and the like. During the day the officers, in a group, made a tour of inspection of the bivouac areas, followed by the first sergeants on similar tours. Noncommissioned officers inspected each other's installations with a critical eye.

The maneuvers proved to be exceptionally valuable in training the lower ranking noncommissioned officers in carrying out their duties in the field. They were assigned the important tasks of acquiring the wood supply for cooking, locating and obtaining safe water for bathing and drinking purposes, pitching tents, providing drainage and setting up sanitation facilities.

Bugler Toots In The Rain

Clerks set up their field headquarters. Cooks operated under full field conditions. A first aid station was established and a truck park functioned. Drivers were required periodically to inspect their vehicles and the maintenance crew worked out in the open to keep trucks in operation. Even the bugler had to wipe the rain off his instrument and go to work under the stars.

Because of unusually heavy weather, it was deemed inadvisable for the squadrons participating in the Selma and Passmore trips to remain overnight in the field, although preparations were made to this end and the command was not otherwise notified until orders for a forced march were issued.

Breaking camp, loading and formation of the convoy nevertheless was swift and efficient, being completed fully an hour ahead of schedule. Morale was high, although most of the officers and men were disappointed when it was decided that the overnight phase of the two exercises should be eliminated. Apparently members of the command like to spend the night in the rain.

The two trips to Florida covered four days. While the squadrons were there, the entire command was given enough time off to take off for the beaches and get in a little fishing and swimming.

Participating in the exercises were the following officers, in addition to Capts. Fulk and Kime: First Lieuts. Ralph F. Gandy, mess; and William G. Prince, transportation; and 2nd Lieut. Colon S. Auvil, supplies and field sanitation.

Driving At Night

Truck drivers gained valuable experience in night driving in convoys on the two Alabama trips, the overnight phase of which had to be cancelled. A standard menu was in effect on all four maneuvers and subsistence was issued at the home station prior to departure.

Each mess sergeant prepared and submitted his requisition for rations; and ice was issued at the home station for each squadron mess. One organization took along its own wood and water supplies on the Selma trip and, as a result, was the first squadron to serve the noon meal.

Each squadron provided its own shovels, axes, lanterns, soap, mirrors, wash basins, lime, tables, chairs, stools, bulletin boards and other such supplies. Some organizations purchased extra delicacies for the mess, such as ice cream and such fresh fruits as were available at reasonable prices in the locality.

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COLONEL OLDS RECEIVES TROPHY

The bronze trophy and medal of the International League of Aviators have been awarded to Col. Robert Olds, Chief of the Air Corps Ferrying Command, for his "many contributions to the science of aeronautics" and particularly for commanding several squadrons of B-17's on goodwill missions to South America.

The award was made this month in the office of Robert A. Lovett, the Asst. Secretary of War for Air, who made the presentation. Present for the ceremony were high-ranking officers, including Maj. General H. H. Arnold, Chief of the Army Air Forces, and members of the International League of Aviators, led by Maj. Charles Wayne Kerwood, Air Corps, co-founder of the League, chairman and president of its American section.

The bronze trophies of the League have been presented to outstanding airmen by presidents and rulers of more than 21 countries since 1927. The medal carries the portrait of the late Albert, King of the Belgians, patron of the League. King Albert personally posed for the medal.

THE AVIATION CADET TRAINING PROGRAM

A new record in the number of applicants accepted for flight training was set during the week ending June 21, a total of 786 men receiving assignments as aviation cadets. The previous high, 555 accepted applicants, was set during the week ending June 14.

The Air Corps now has over 9,000 aviation cadets in training--most of them as pilots-at civilian contract and Army flying schools.

Early this fall, the Air Corps will attain its 12,000-pilots-a-year rate of training, when it will have 51 schools in operation. Thirty-four new flying schools are being added to the Air Corps training system under the program to train pilots at the rate of 30,000 a year, thus raising the total number in the training system to 85.

Elementary Flying Schools

Under the 12,000-pilot training program, 26 civilian schools are under War Department contract to give elementary training, as follows:

Southeast Air Corps Training Center:
- Alabama Institute of Aeronautics, Inc., Tuscaloosa, Ala.
- Embry-Riddle Co., Carlstrom Field, Arcadia, Fla.
- Darr Aero Tech., Inc., Albany, Ga.
- Lincoln Flying School, Lakeland, Fla.
- Graham Aviation Co., Americus, Ga.
- Mississippi Institute of Aeronautics, Inc., Jackson, Miss.
- Chicago School of Aeronautics, Albany, Ga., and Lakeland, Fla.
- Southern Aviation School, Camden, S.C.

Gulf Coast Air Corps Training Center:
- Pine Bluff School of Aviation, Pine Bluff, Ark.
- Parks Air College, East St. Louis, Ill.
- Missouri Institute of Aeronautics, Inc., Sikeston, Mo.
- Spartan School of Aeronautics, Municipal Airport, Tulsa, Okla.
- Air Activities of Texas, Corsicanna, Tex.
- Brayton Flying Service, Inc., Cuero, Tex.
- Texas Aviation School, Inc., Hicks Field, Fort Worth, Tex.
- Lou Foote Flying Service, Stanford, Tex.

West Coast Air Corps Training Center:
- Southwest Airways, Inc., Phoenix, Ariz.
- Ryan School of Aeronautics, Hemet, Calif.
- Palo Alto Airport, Inc., King City, Calif.
- Cal-Aero Training Corp., Ontario, Calif.
- Cal-Aero Training Corp., Oxnard, Calif.
- Ryan School of Aeronautics, Lindbergh Field, San Diego, Calif.
- Allan Hancock College of Aeronautics, Santa Maria, Calif.
- Rankin Aeronautics Academy, Inc., Tulare, Calif.

Basic Flying Schools

Southeast Air Corps Training Center:
- Gunter Field, Montgomery, Ala.
- Macon, Ga.
- Augusta, Ga. (civilian school under contract).
- Tuskegee, Ala. (also an advanced school).

Gulf Coast Air Corps Training Center:
- Randolph Field, San Antonio, Texas.
- San Angelo, Texas.
- Brady, Texas (civilian school under contract).

West Coast Air Corps Training Center:
- Moffett Field, Sunnyvale, Calif.
- Bakersfield, Calif.
- Ontario, Calif. (civilian school under contract).
- Taft, Calif.

Advanced Flying Schools

Southeast Air Corps Training Center:
- Maxwell Field, Montgomery, Ala.
- Barksdale Field, La. (also bombardier and navigation school).
- Selma, Ala.
- Albany, Ga.

Gulf Coast Air Corps Training Center:
- Brooks Field, San Antonio, Texas, (also observers' school).
- Ellington Field, Houston, Texas, (also bombardiers' school).
- Kelly Field, San Antonio, Texas, (also navigation school).
- Victoria, Texas.

West Coast Air Corps Training Center:
- Stockton, Calif.
- Mather Field, Sacramento, Calif., (also navigation school).
- Phoenix, Arizona.

Gunnery Schools

Panama City, Fla.
Las Vegas, Nev.

Navigation School

Pan American Airways, Inc. (under contract).

In stepping up the pilot training program from 12,000 to 30,000, the contract civilian elementary flying schools are increased from 26 to 41; the basic military flying schools from 7 to 15; the advanced military flying schools, (single engine), from 3 to 7, and two-engine from 8 to 14; the flexible gunnery training military schools, from 2 to 3; and the Replacement Centers, (pilot, bombardier, navigator) from 3 to 4.

No increase has been made over and above the three basic civilian flying schools under contract, the one basic-advanced military school, and the one contract civil navigation school.

Sites for 12 of the 19 additional Army schools to be established under the 30,000-pilot program have already been selected by the War Department, viz: Advanced Schools--Dothan, Ala.; Moultrie and Valdosta, Ga.; Greenville, Miss.; Lake Charles, La.; Midland and Lubbock, Texas, and Victorville, Calif.; Basic Schools--Sumter, S.C.; Sebring, Fla., and Higley, Ariz.; and Harlingen, Texas (gunnery school).

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"KEEP 'EM FLYING!"

FLEDGLING SON OF FAMOUS FATHER

Lieut. Kline D. Culbertson. Cadet James H. Doolittle, Jr.

Striding away from a basic trainer at **Randolph Field**, the lad in the parachute **harness is the namesake** son of Major James **H. Doolittle, whose identity is not unknown in the Army Air Forces.** With Aviation Cadet **James H. Doolittle, Jr.**, is Lieut. Kline D. Culbertson, Air Corps, left, his instructor. Cadet Doolittle is a former Purdue University student and a member of the Purdue Flying Club. Paper watched him being sworn in as a cadet, and the newspapers made much of it.

Schools added to S.E.A.C. Training Center

The construction of six new flying schools in the Southeast Air Corps Training Center is proceeding on schedule and will be completed in all cases by November 1, 1941. Their completion will give this training center a total of 23 pilot training schools.

Preliminary surveys have been made of the sites of these schools, and the construction program has been approved and authorized by the War Department. The buildings will be of the temporary wooden type construction.

Data regarding these six new schools, such as the names of the Project and Assistant Project Officers, personnel allotment, acreage, etc., is given below as follows:

Sumter, S.C., Basic Flying School; Maj. Burton M. Hovey, Project Officer; Capt. D. A. Cooper, Asst. Project Officer; 217 officers, 475 Flying Cadets, 1,930 enlisted men and 15 nurses. This field will cover about 2,800 acres.

Greenville, Miss., Basic Flying School; Majs. A.R. McConnell, Project Officer; John F. Guillett, Asst. Project Officer; 217 officers, 475 Flying Cadets, 1,930 enlisted men. This field will cover about 1,900 acres.

Moultrie, Ga., Two-engine Advanced Flying School; Maj. Y.H. Taylor, Project Officer; Capt. D. I. Moler, Assistant Project Officer; 188 officers, 352 Flying Cadets, 2,015 enlisted men, and 15 nurses. This project will cover 1,600 acres and will have wide runways, 300 by 4,500 feet for fleet landings.

Valdosta, Ga., Two-engine Advanced Flying School; Lieut. Colonel Fred C. Nelson, Project Officer; Capt. T. Miller, Asst. Project Officer; 388 officers, 628 Flying Cadets, 3,104 enlisted men, and 22 nurses. To the east of the field a bombing area will cover 30 square miles. The vast swamp area easily affords 12 theoretical circles of one mile in diameter each, at the center of which bombing targets will be placed. The flying field itself will occupy 2,500 acres.

Dothan, Ala., Single-engine Pursuit School; Maj. Earle E. Partridge, Project Officer; Lieut. Edgar T. Martin, Asst. Project Officer; 188 officers, 352 Flying Cadets, 2,015 enlisted men and 15 nurses. This site will embrace about 1,600 acres and will have wide runways, 300 by 4,500 feet for fleet landings.

Panama City, Fla., Air Corps Flexible Gunnery School; Lieut. Colonel Warren A. Maxwell, Project Officer; Majs. Mills S. Savage and D.W. Jenkins, Asst. Project Officers; 255 officers, 1,400 Flying Cadets, 2,781 enlisted men and 30 nurses. This site, which is on the Gulf of Mexico, was selected because of the wide area required to insure safety in firing at any angle. The gunnery reservation will cover about 35,000 acres. The wide runways will be 300 by 4,500 feet, large enough to accommodate all types of ships, since all types capable of lugging a gun of any description will be used at this post, in many cases in group take-offs and landings. Panama City's warm-up mat alone will contain 195,000 square yards of concrete.

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ENLISTED MEN'S RETIREMENT BILL SIGNED

President Roosevelt has signed the Army Enlisted Men's 20 Year Retirement Bill--S. 239.

This bill authorizes the War Department to place on the retired list at three-quarters base pay plus $15.75 allowances enlisted men who are found unfit for further military service.

The bill further authorizes anyone retired under its provisions to waive retirement pay and accept a pension under the laws of the Veterans Administration. However, those enlisted men in the higher grades would lose money by such a transfer as the tables below indicate, according to the Regular Veterans Association.

The first table shows the amounts including allowances that will be paid for each enlisted grade, while the second table shows amounts paid to disabled men under the laws administered by the Veterans Administration.

TABLE I

Grade 1, (Master Sgt.) - - - - - -	$133.87
Grade 2, (Tech. or 1st Sgt.) - - -	94.50
Grade 3, (Staff Sgt.) - - - - - -	83.25
Grade 4, (Sgt.) - - - - - - - - - -	72.00
Grade 5, (Cpl.) - - - - - - - - - -	66.37
Grade 6, (Pvt. 1st Cl.) - - - - - -	49.00
Grade 7, (Pvt.) - - - - - - - - - -	43.87

TABLE II

Per cent Disabled	Monthly Pension
100 - - - - - - - - - - - - - -	$ 75.00
90 - - - - - - - - - - - - - -	67.50
80 - - - - - - - - - - - - - -	60.00
70 - - - - - - - - - - - - - -	52.50
60 - - - - - - - - - - - - - -	45.00
50 - - - - - - - - - - - - - -	37.50
40 - - - - - - - - - - - - - -	30.00
30 - - - - - - - - - - - - - -	22.50
20 - - - - - - - - - - - - - -	15.00
10 - - - - - - - - - - - - - -	7.50

The Regular Veterans Association and the War Department have worked for the passage of a 20 year retirement bill for many years.

The Association understands that the War Department will revise AR 615-395 to include retirement authorization and procedure under the new law.

The bill also includes the Philippine Scouts.

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Contractors have virtually completed the new field near Fort Wayne, Ind., named Paul Baer Field, in memory of that city's World War "Ace." The 46th Air Base Group is performing the necessary preliminary work prior to the arrival there for station of the 31st Pursuit Squadron from Selfridge Field, Mich.

FRESNO BASE FIRST SINCE CIVIL WAR

The establishment of the future home of the Fifteenth Bombardment Group at the Fresno Air Base marks the first time since the Civil War that military personnel have been located in this section of California. This air base, about 100 miles inland, is strategically situated midway between two great metropolitan areas of the Pacific Coast--San Francisco and Los Angeles, and is a key point in the defense plan for both of these areas.

When completed, on or about July 20, the base will cover approximately 1,000 acres. Under construction at present are 124 buildings, and additional construction involving the sum of $29,624, is being planned for the future. The four wells being dug and expected to furnish an average of three million gallons of water per day will serve a very useful purpose, since the average day time temperature in Fresno during the summer is around 100 degrees.

Headquarters In Postoffice

At present, the headquarters of the Fresno Air Base is situated in an abandoned post office building in the heart of the city of Fresno. So keen an interest in the new bombing base has been exhibited by the citizens of Fresno and the neighboring towns that since June 1st no less than 15 requests were received from various organizations for speeches by members of the command, or an average of one speech per day.

Mosquito Dive Bombers

The only uncooperative element in Fresno seems to be a constant swarm of overly-active mosquitoes. The commanding officer of the medical detachment at the air base has formulated plans for eliminating this pest on the military reservation. Civilian agencies are planning immediate steps to extend this mosquito abatement work in the environs of Fresno. Malaria, a mosquito-spread disease - "epidemic encephalitis" (sleeping sickness)- is on the increase in California, 12 deaths in Fresno County during the last six months of 1940 being attributed to this disease. Hope is expressed that, with the combined action of military and civil authorities, an early solution of this problem may be reached.

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THE DEVELOPMENT OF GRAY FIELD

Gray Field, adjacent to Fort Lewis, Wash., which started out in 1936 as just a "landing field," has now attained the importance of an air base headquarters.

In June, 1936, the Ninety-First Obs. Squadron was transferred to Fort Lewis from the Presidio of San Francisco, Calif., and about a year later it was joined by the Third Balloon Squadron, from Moffett Field, Calif. These two units performed the cooperative missions and photographic work for the Fort Lewis troops as the post grew from an artillery regimental station to its present size.

Personnel of the post point with pride to new construction and landscaping. Engineering classes were initiated by the post engineering officer, 1st Lt. Roy W. Gustafson, and the new men arriving daily are being instructed as rapidly as possible.

Ninety-First Departs For Maneuvers

The Ninety-First Observation Squadron, in command of Major K.R. Crosher, is participating in the Fourth Army maneuvers in California. Master Sgt. Steven B. Young is making excellent progress in training recruits to be crew chiefs. Although he has twice before served as First Sgt. in line branches, "Top Kick" Harry Stevenson is busily acquainting himself with the duties of a first sergeant in the Air Corps.

New Photo Squadron

Flight "F," First Photographic Squadron, commanded by Major George G. Northrup, is to become the nucleus of the Second Photographic Squadron under the same leadership. It is stated that reports of the flight putting out 2500 prints a day, or from 30,000 to 35,000 a month are not mere rumors. The supervisor of the laboratory work is 2nd Lieut. George W. Fisher, former instructor in the Photographic School at Lowry Field, Colo.

A Long Trek By Motor Convoy

The Third Barrage Balloon Squadron left very early one morning in June for Wilmington, N.C., by truck convoy. Lieut. Colonel M.E. McHugo was in command. Three warrant officers and two master sergeants accompanied the unit on the trip down south, two of the former, Robert E. Lassiter and Arvin E. Miller, accepting commissions as captain and second lieutenant, respectively.

With the Gray Field tactical units absent on maneuvers, the Air Base Detachment, activated only six months ago, was confronted with the task of carrying out the functions of the post. In a very short time, however, everything was running smoothly under the able guidance of the several veteran noncommissioned officers on duty with this unit.

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SAFETY BELTS ARE REALLY SAFE

Safety belts on airplanes at Scott Field, Belleville, Ill., were recently subjected to the regular bi-annual tests, under the direction of the plane crew chiefs, and no replacements were found necessary.

Removed from the airplanes every six months, the end of each safety belt is attached to a heavy concrete block and the other end to a weight-testing machine. A lever is then pulled which suspends the block from the machine by the safety belt. While under the strain, the belt is carefully checked for stretching or weaknesses.

EXTENSIVE FLYING OPERATIONS AT RANDOLPH

Student pilots at the basic flying school flew over 300,000 miles in cross-country navigation flights during the month of May, according to figures recently computed.

Distance flights involving navigation problems have not been a part of the course of instruction at Randolph Field in the past two years. In May, however, these flights were again introduced as part of the 70 hours of basic flying training.

Before completing his basic flying training course, each cadet participates in three cross-country flights to various points in Texas.

On a 30-day month basis, officials estimate that aviation cadets are aloft 1,000 hours each flying day per month.

Cadets Report From New Schools

Air defense pushed ahead another step when the first aviation cadets from six new civilian elementary flying schools arrived at Randolph Field for basic flight instruction.

Out of 346 cadets in Class 41-H, which started basic instruction the second week in June, 187 were from schools where the training set-ups started functioning a little over ten weeks ago. The new schools at the following localities furnished students, as follows: Pine Bluff, Ark., 31; Cuero, Texas, 34; Stamford, Texas, 19; Oklahoma City, Okla., 24; Corsicana, Texas, 37; and Phoenix, Ariz., 42.

Of the remaining students in the new class, turned in by the older elementary flying schools, the largest number, 86, was credited to the one at Tulsa, Okla., followed by East St. Louis, Ill., with 58; San Diego and Santa Maria, Calif., with 12 and 3, respectively.

The new class will receive ten weeks of training on larger and more maneuverable and powerful aircraft than the type utilized in primary training.

Showing Mistakes By Visual Method

Mechanical failures having been cut to zero, flight instructors recently formed a "visual educational" series of pictures to erase the last remaining problem in pilot training--the "empty void between earphones" mistake.

These pictures, which are on the walls of every engineering control office on the field, show vividly what can happen when a pilot "goes to sleep" during landings and take-offs. One, demonstrating a plane with its nose "biting the earth," has the caption: "Big feet, little judgment."

Another, of a smashed landing gear, is accompanied by the comment that the pilot made a "nice landing, but at 50 feet above the ground."

A photograph of a plane on a highway near the field, with its landing gear and wings damaged, bears the following caption: "Randolph Field too small for this pilot-landed in road."

Failure of a pilot to shift mixtures on the aircraft engine was blamed for a mishap which was responsible for wing crumpling. "Empty void between earphones" was the ironical comment.

"Eyes but no vision" was the cause described for another mishap where a student pilot allowed the propeller of his plane to eat away the wing of another plane.

Most mishaps in flight training are attributed to human failure, and students who persist in such obviously stupid "tricks" must be removed from further training.

Accidents in which flyers are injured are very rare at Randolph Field. In all mishaps covered by the pictures, the only damage was to the aircraft.

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MURALS AT SCOTT FIELD

Two outstanding Chicago artists, graduates of its famous Art Institute, designed murals for the walls of the general headquarters building at Scott Field, Ill.

Ralph Hendrickson, who designed the mural for the courtroom in the general headquarters building, has had a brilliant career as a painter, winning the Robert Jenkins Memorial prize in 1935, also the American Travelling Scholarship and the European Travelling Fellowship. His murals for Scott Field, chosen from four sketches submitted, symbolically depict a trainee, represented by a central figure, being inducted into the service. Grouped around the central figure, service men are represented working in the various branches of the Army. An American eagle in the foreground represents the Army Air Forces.

Equally famous in this phase of art is Miss Mildred Waltrip, whose mural will be placed in the lobby of the general headquarters building. Miss Waltrip, after graduating from the Chicago Art Institute, won both the resident fellowship and the $2,000 travelling fellowship. She studied in Europe in 1934 and later at the New Bauhaus in Chicago. Her mural will be painted in three large panels and is to depict the history of aviation, from mythological experiments to the present modern stage. Showing the first experiments by Leonardo Da Vinci, early French balloon flights, including the Picards' ascent into the stratosphere, it will end with a painting of a modern bombing plane.

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Featuring the recent celebration of Aviation Cadet week in St. Louis, Mo., was an hour-long parade of 175 marching units, including 38 bands. The Scott Field Aviation Cadets were judged the best appearing outfit in the parade, and the Radio School's float, a silver-colored model airplane, actual size, evoked much favorable commend.

REST CAMP IN OLYMPIC NATIONAL FOREST

A rest camp for enlisted men of the Army Air Forces has been established on the shores of a lake in the Olympic National Forest at an old CCC camp, 70 miles northwest of the air base at McChord Field, Wash.

The camp has accommodations for 100 enlisted men a week, who will be classified as being on regular duty - not leave - while they are at the "summer resort." However, the only duty to which they will be assigned while there will be the bare minimum required to keep the camp in good condition.

Carl B. Neal, supervisor of the forest, granted McChord Field permission to use barracks, mess hall, recreation building and other structures formerly occupied by the CCC youths. Fifteen enlisted men, under the supervision of Lieut. K. T. McCamman, spent several weeks getting the rest camp in readiness for the summer season. Cost of repairs to the buildings was met from the Educational and Recreational Fund, not by the government.

A permanent force of about ten cooks and caretakers from McChord Field will be on duty at the camp during the recreation season. Officers in charge will be rotated and organizations at the field will pro-rate the number of men to attend the camp, so that activities at the field will not be slowed or otherwise hampered.

The floor of the large, rustic recreation hall at the camp was put into shape for dancing, and a branch of the McChord Field Post Exchange was set up in the structure. Aside from dancing and spending canteen checks, recreational facilities include hiking, boating, fishing, volley ball, badminton, horseshoe pitching and loafing.

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THE BIG BABY SOLOED
The History
(Continued from page 3)

In this country, we were differently situated and, due to our magnificent isolation, we elected to plan for an air arm based upon a bomber fleet capable of meeting the seaborne enemy out at sea at a distance greater than the operating radius of his carrier-borne striking force. We even expected to meet him several days further away and harass his approach or even carry the war across great distances to strike at his unguarded weaknesses and economic life. These basic tactical bombing radii seemed to preclude the possibility of escorting fighters, and so we suspended our work along that line, as exemplified by the P-30 series and elected to have all our bombers fight their way along.

So, for years we planned and dreamed until our small painful achievements became such realities that, when added up in the year 1931, we were able to shape up the prototype design of our first modern tactical bomber.

This construction problem was undertaken by Boeing as the B-15. In those days, a 75,000 lb. design was a grave undertaking, and to enhance its chances of success the Boeing Company elected to bring out a smaller version which would prove some of the structural and aerodynamic problems for the B-15, as well as their new proposed transport designs. In addition, the Service was clamoring for an improved version of the by-then Service Test B-10 bomber series.

B-15 and B-17 Proven Successful

Thus, while the B-15 was being constructed, the so-called "Flying Fortress" or B-17 was built and proved so successful that its true purpose was lost sight of. Instead of remaining as an aerodynamic laboratory specimen for real development tests, it was rushed into production by pressure of events, lacking suitable offensive and defensive armament or armor. We, like Germany, considered this justifiable, due to the B-17's unequaled speed at altitude. It seemed that no fighters could combat a formation of these bombers.

Then the B-15 was completed, although the engines laid down for the basic design had not yet reached the production stage, and therefore, meanwhile, the only reliable engines available had to be installed in order to flight-test the airplane. These tests, even with this partial power available, were very successful and the B-15 established several world's records. The big bomber was a proven success--all nations rushed to produce them. We only partly utilized this chance to make this airplane a flight laboratory and solve many pending problems of armament, etc. The present European War had not yet broken out to bring home the magnitude of these problems with startling impact.

World's Largest Bomber Begun

However, in America we had already conceived the design of the first real hemisphere defense bomber, and in 1935 our basic design was used as the basis for secret design competition limited to some of our larger aircraft manufacturers. The completed detailed engineering data proposals from these companies were evaluated and two companies were awarded contracts to complete their detail designs through the mock-up stage, and to submit a complete engineering study including a stress analysis and complete wind tunnel tests.

In 1936, after all these data were evaluated, the tremendous full scale mock-ups inspected by a board of officers and the wind tunnel data rechecked at the Materiel Division laboratories, the Douglas Aircraft Company was adjudged the winner and a contract was consummated for the construction of the world's largest bomber. The Air Corps undertook to produce simultaneously the required government-furnished equipment.

This meant engines of greater power than

any in existence--at least 2,000 h.p. each--auxiliary power plants for 30 kws. of electricity--wheels so large that no company in America possessed the equipment to make them, as they required the largest aluminum castings ever made in America. When they were completed, they were 96 inches (eight feet) in diameter.

Special Equipment Developed

Control systems had to be engineered that would permit a puny human manually to fly this monster. We had to develop special radio equipment, utilizing new ideas, capable of transmitting messages in all weather for 5,000 miles or more. Many similar problems were painfully worked out.

The tide of human affairs ebbed and flowed many times during these past five years to 1941. Many people had sought to have the project dropped, saying that we did not need such huge, expensive machines that could fly 8,000 miles or more across oceans with tons of bombs, and with enough guns and men on board to defend it. They said small, fast mosquito bombers were the thing. They were cheaper and did not put all our eggs in one basket. They said the enemy must come to us.

Still we carried on this enormous laboratory project with the hope that the information it would disclose would some day help us select the proper production articles for our Air Force. World events have forced our hand, meanwhile, and before our prototype has been tested we have initiated a greatly expanded bomber program.

Need For Powerful Bomber Force Apparent

By now we have seen enough in the present European War to convince us all that we were correct in building our Air Forces around the bombing airplane, as it is only their use of that weapon that decisive action can be taken against an enemy nation. We must have a powerful bomber force.

This force must, however, be balanced to meet all conditions against all targets at all ranges. Some bombers must be for very long range work; others can be for shorter range employment as conditions and theatres quickly shift in warfare. Soon we shall see if the B-19 is really the prototype of the heavy bomber type we need for the American defense of our hemisphere with its vast distances and far-flung frontiers. Does it represent the "American Way?" We shall hope so.

The Flight
(Continued from page 3)

Slowly the ship began to move down the runway--very slowly, it must have seemed to those watching, but with a tremendous surge of power to those on board.

Considerably before the estimated distance had been traveled, the huge machine was lunging to get aloft. Maj. Umstead was holding it down--65, 70, 75 miles an hour.

It was drawing near the huge crowd--thousands of people--which encircled the end of the field, massed solid for blocks in every direction as far as the eye could see.

When the pilot eased back on the controls, would it fly or would it crash ingloriously into the massed public? Many came to see a Roman holiday, probably, and perhaps their unexpressed wishes would be granted.

Climbs Like A Fighter

But when Maj. Umstead moved the controls, pulling the wheel back ever so lightly, he discovered that he was flying a pursuit plane--not a bomber--for the huge machine came off with a rush, climbing at a tremendous rate.

Quickly he pushed the wheel forward, then eased the controls into a normal rate of climb. This caused the bomber apparently to hesitate--to falter uncertainly in flight.

Such was far from true--the lightness of the controls and the tremendous power of 8,000 horses were difficult to adjust to the feel of the pilot's hands in the first few seconds.

We were off, having used only 1,800 feet of the runway, and it was apparent that we could have left the ground much sooner. Gathering speed she climbed rapidly, crossing the end of the runway high in the air with a great excess of speed. The engines were throttled back, but the landing gear could not be retracted because, for this flight, the landing chassis was faired in.

"She's An Airplane"

It was immediately clear, to the great relief of all on board, that we were flying in a real airplane, abnormal only in its size and potentialities.

Circling out over the ocean, then back over adjacent Los Angeles Airport, the El Segundo factory of the Douglas Company and the waiting crowd took but a few moments for so fast a ship.

As we had cleared the runway, we were attended by six P-40 fighters from Hamilton Field which were to clear the way and insure that there would be no interference from blundering or otherwise misguided airplanes. With this escort in close formation, we proceeded on schedule directly to March Field.

We flew at approximately 4,000 feet, flying at greatly reduced speed as we tried out the various controls and forces, and becoming more and more satisfied, as our tests and quick inspections proceeded, that everything was functioning as planned. The view from the windows of the many gun turrets gave assurance that here was a bomber that could and would be defended. The long trip back to the tail gun turret to check the tail controls seemed the last long mile when undertaken shortly after take-off, but so satisfyingly solid and quiet was the journey that when the inspector once had arrived at the extreme stern position, the return journey was completed in a much lighter frame of mind.

At last, everyone aboard serene, we ap-

questions--How would she land? How would she handle? As large as March Field is, would it be big enough? How was the wind?

Reassuring messages from the control tower reported that ever-considerate nature had swung the wind obligingly down the main runway. The way was cleared--all airplanes were down.

Completing a long, circling approach, we turned straight back for the field, diminishing our speed. We landed surprisingly short, even though we knew we were at least 30 tons light. No actual jar of contact with the ground could be noticed; it was difficult to know when we had actually landed.

Slowly the huge plane settled down onto its nose wheel. Gently the pilot applied the brakes, wondering if they were all right after all these weeks. They were.

Quickly we turned about, taxied back up the runway to the hangars, reached our parking position and cut the switches. There we were--success at last. A quick look at the clock--12.55 p.m.

Detailed tests of the myriad mechanisms with which this plane is equipped will continue for some time. These are items which must be completed by the manufacturer, as they form a part of the Douglas Company's contract. As soon as these hours of testing are completed, final acceptance will be made by the Materiel Division and the airplane will proceed to Wright Field for further checking, testing and development. It will then become in fact the flying laboratory which it was designed to be. As the progenitor of its plan, a long life and a happy one!

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REORGANIZATION OF THE ARMY AIR CORPS

(Continued from page 8)

the Chief of the Air Corps need be given, since his duties remain very much the same as they have been. The duties of the Chief of the Air Force Combat Command in general outline are about the same, but have been broadened to a considerable extent.

For instance, the new regulations give him "control of all aerial operations of the Air Force Combat Command....." Under the old order, this control was in the hands of General Headquarters. Similarly, he now has court-martial jurisdiction over all elements of the Air Force Combat Command, which he did not have before reorganization.

Reorganization will have little personal effect on any individual officer or enlisted man, however, except for those few who are assigned to Headquarters Army Air Forces or to fill any of the other new jobs. The great majority will continue to do the jobs to which they already have been assigned, either in the Combat Command, the Air Corps or wherever they may be serving.

The War Department's purpose in creating to announcements made at the time, was to promote air power while facilitating and ensuring "the joint action of air, ground and naval forces which the progress of the present war is so clearly demonstrating."

As an example of the way it is supposed to work, Gen. Emmons is charged with the tactical training of combat units of the Air Forces. These units may be assigned to a task force, in which case they would operate under the orders of the commander of the task force. On the foreign stations, they would operate under the department commander, while their training still would be the responsibility of the Chief of the Combat Command.

Under the procedure outlined in Washington, it might be possible, however, for the entire Combat Command to be assigned to a task force commanded by a ground officer--possibly even by a high-ranking Navy officer. In such an eventuality, of course, the situation temporarily would be somewhat like conditions before reorganization, when what is now the Combat Command was under the jurisdiction of General Headquarters.

Explaining reorganization at a press conference in Washington, Gen. George C. Marshall, the Chief of Staff, said, however, that air units assigned to a task force will not necessarily be commanded by a ground officer. The command function in any such force will be exercised, he said, by a senior officer of whichever arm--land, sea or air--has the major responsibility in the particular task to which the force is assigned.

Thus Brig. General Henry W. Harms, an air officer, has command of all elements of the Army in Newfoundland, air and ground alike, since the defenses of that area primarily are considered an air operation. Gen. Marshall used this situation as an example, and added that he anticipated the time when an Air Forces officer might have command of defense forces in Alaska, although they are under ground control at present.

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AIR CORPS SOLDIER WINS WEST POINT CADETSHIP

An Air Corps enlisted man stationed at Albrook Field was the winner of a competitive examination in which enlisted men from all military posts in the Panama Canal Zone competed for an appointment to the United States Military Academy, and has received orders to report to West Point.

The soldier was Pvt. Abraham M. Glass, 20, son of Mr. and Mrs. Joseph Glass, of Baldwinsville, N. Y. He enlisted in the Air Corps at Syracuse, N.Y., June 27, 1940. Cadet Glass is a graduate of the Baldwinsville Academy and of the West Point Preparatory School at Corozal, Canal Zone.

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THE COVER

The photograph of the young gentleman on the cover, standing at the business end of a P-40, was made available to The Air Corps News Letter through the courtesy of Rudy Arnold, well-known photographer of things aerial.

WRIGHT FIELD LIBRARY SYMBOLIZES AIR CORPS DEVELOPMENT

The library at Wright Field was born amid the confusion and bustle of the first World War. At that time, however, Wright Field and the Materiel Division, of which it is a part, were not in existence. We were situated at McCook Field and were known as the Engineering Division. On October 7, 1918, the first entry was made in the accession book, and by the time the Armistice was signed 1,350 entries had been made. At the end of 1940, in the midst of again strengthening our defenses, we have over 13,000 books and almost 70,000 documents. At first the document file and the library were two separate units, but in 1926 they were combined and have so remained ever since.

By 1927, McCook Field had become too small for the engineering activities in progress there, and the move was made to Wright Field. By this time the library was a lusty youngster, growing in importance to the officers and engineers engaged in research and development work.

Although essentially an aeronautical library, it is surprising how many fields of science that includes; and of course, in order to answer all questions, books and magazines on these subjects must be on hand. About one-third of the over 100 magazines on the subscription list are foreign publications. One will find on the shelves books on physics and mechanics, radio and electrical engineering, thermodynamics, optics, chemistry, strength of materials and metallurgy, engines--internal combustion as well as Diesel, photography and navigation. The books on mathematics are pretty well worn through constant use. There are now being added medical books for the workers in the physiological research laboratory who study the effects on pilots of flying, especially at high altitudes. These are subjects which most people do not even associate with the subject of aeronautics. There are on hand, of course, those books most often thought of when aeronautics is mentioned, covering aerodynamics, aircraft construction, propellers, etc. These are only part of the subjects covered in the library, for aeronautical engineering embodies many fields of science and Materiel Division engineers come to the library to supplement their knowledge and to ascertain what has been done in a given field.

Many times we are asked for "everything you have" on a certain subject and, after hours of searching, we are forced to admit: "nothing at all,"--for the idea is a new one. At other times, data is collected to enable the engineers to select such as are of importance to them. Their possession of such data obviates the possibility of undertaking tests, involving both time and money, which had already been carried out by someone else. By following the trend of requests from these engineers and the growth of the library, one can follow the growth and development of aeronautics. One day, requests started coming in for data on pressure vessels, and an intensive search was inaugurated on that subject. Not long thereafter, rumors were heard of a stratosphere plane with a pressurized cabin, and sometime later the Lockheed XC-35 was an actual fact. And now who has not heard of sub-stratosphere flying?

Aerodynamic characteristics must be tested in a wind tunnel, and when the new 20-foot wind tunnel was proposed it was to the library that the engineers came for data. What kind of tunnels did various countries have? And so, another intensive search was started, which resulted in unearthing descriptions of wind tunnels all over the world, what they can do and how they operate.

What kind of bombs are in use abroad and how effective are they? Our reports which come from all over the world keep the men in touch with what is going on.

The parachute, which has saved so many lives, was developed at Wright Field; and so our reports on strength of silk and testing of silk were consulted, as were the reports of rates of descent of falling bodies. The parachute has played a dramatic role in this latest War, and our own Army Air Corps is developing equipment for the Infantry parachute troop units. And so, in its small and roundabout way, the library has also played its part in this element of military activity.

In practically every phase of research the Army Air Corps has conducted, the engineers have at some stage in its development had recourse to the library.

A staff of five in the library circulates about 4,000 books, magazines, and documents each month to 1,103 borrowers. And so this infant of the first World War has grown up to take its place in aiding our national defense.

- Hope Thomas

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ENLISTED MEN TRAIN FOR COMMISSIONS

Four men from Scott Field, Ill., were accepted into the Army's officer candidate schools to receive training entitling them to commissions as second lieutenants in the Officers' Reserve Corps. They were chosen from an original class of 21 selected for officer training as a reward for excellent performance of their duties, thus typifying the Army's system of opportunity for promotion based on merit.

Of the four men, Tech.Sgt. Richard Stricklin, Staff Sgts. Richard E. Tankersley, George J.Ford and Pvt. Kenneth C.Wallender, the first-named will attend classes in the Infantry School at Fort Benning, Ga., for training in modern and mechanized warfare, while the remaining three will undergo training in signal communications at Fort Monmouth, N. J.

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APPROXIMATE STRENGTH OF THE ARMY AIR FORCES
(May 31, 1941)

Officers, Regular.....	2,380
Officers, Reserve on active duty....	8,300
Aviation Cadets in training.....	8,700
Enlisted Men.....	126,700

THE JOB OF AIR CORPS TEST PILOTS

Much of the danger has been engineered out of the test pilots' job since 1903 when the first test pilot, Orville Wright, made the first successful test flight in the first airplane.

So say the highly trained group of Air Corps test pilots at Wright which each year makes hundreds of test flights in more kinds of airplanes than are tested by any other single organization in this country.

Records of the aviation industry through the years in which the airplane was transformed from a county fair novelty to a production article substantiate this viewpoint. Engines are reliable. Wind tunnels have brushed countless bugs out of new designs. Structural testing proves the design strength of experimental military airplanes before they are flown. Speaking as airmen who have flown scores of different airplanes in hundreds of hours of test flights, the test pilots say that airplanes have become standardized.

Laboratory engineers do not agree that the test pilots' job is as easy as falling off a log and about as dangerous. Quoting a representative opinion of an aeronautical engineer, "There are only two kinds of airplanes--those that fly and those that don't. Engineers, in laboratories and factories, can only develop an airplane so far and then it takes a test pilot to prove whether we were right or wrong."

To illustrate his point, he cited pertinent questions surrounding the first flight of the world's largest airplane, the XB-19, with Maj. Stanley M. Umstead, the Air Corps chief test pilot, at the controls.

"The first question about this new 82-ton airplane is, will it fly? We are certain it will, but Maj. Umstead will have to prove that we are right. The insurance premium for the first minute of flight has been placed at $82,000. Odds like that, 13 to 1, are not quoted for sure things. Our figures show that the XB-19 can be taken out of the comparatively small Clover Field. But can it? There is no precedent to go by in this case. Imagine placing yourself in the position of test pilot of the XB-19, responsible for 3-1/4 million dollars worth of experimental airplane and the lives of the crew as well as your own."

That is the way the job looks to engineers on the ground and probably to the earthbound public. Sitting in the cockpit, absorbed in his duties, it strikes the test pilot as naive to believe that he executes flight tests in a perpetual state of thrills, danger and raw courage, when he has made hundreds of such flights as a routine part of his job.

In real life the job of an Army test pilot bears only accidental resemblance to that of the one who lives after a fatal crash in the seventh reel only because the script calls for a happy ending.

The secret of the Materiel Division's success in consistently getting the accurate flight test data which are indispensable to the development of military aircraft and equipment is based on three key factors: first, the flight instructions for each flight test are prescribed by project officers and engineers; the flight testing instruments used are the best obtainable and the methods of recording the results of flight tests are standardized; and third, the test pilots and flight observers are the product of uniform training.

Under this system engineers have found that the results are dependable. Flying the same test in the same airplane, five Air Corps test pilots would get much nearer the same data than would five outside test pilots chosen at random.

New test pilots are selected, not by personal application, but from recommendations filtering through the service grapevine from other pilots. The preferred prospect, who apparently possesses the makings of a good test pilot, is one who has considerable flying experience in a variety of single -and multi-engine military airplanes; who has demonstrated cool judgment in tight spots; and who has, in addition to the flying skill common in all seasoned Air Corps pilots, an extra inherent ability with which only a lucky few are blessed.

Before a new test pilot is permitted to take regular flight test assignments there is an intervening "practice" period of from two to three months. Guided by the Manual for Test Pilots, he makes flight tests in an older service airplane and records the data in the same fashion as do regular test pilots when flying standard performance tests in new airplanes. Flight engineers compare the novice's data with the official performance data secured on that particular type of airplane when it first went into service. The new pilot is assigned to regular flight test work only after he can consistently return accurate data from any of the many different kinds of flight tests.

During the "practice" period, the beginner becomes intimately familiar with the 17 items which compose the complete standard performance test which is used by the Materiel Division to determine whether an experimental airplane meets minimum requirements, or whether a production airplane comes up to the performance guaranteed by the manufacturer.

The fundamentals of a performance test include calibration of the air speed meter; determination of high speeds at various altitudes, and of cruising, or operating, speeds; saw-tooth climbs; check climbs; take-off and landing characteristics; engine cooling tests; various tests of military equipment, and pilot's observations.

These techniques frequently demand maintaining constant speeds within plus or minus one mile per hour, or absolutely level flight instead of approximately level, and altogether a precise type of flying which wrings every ounce of concentration out of the test pilot. Since he must fly the airplane during every second of a test flight, and since the responsibility for safeguarding valuable new experimental airplanes and the first production airplanes are peculiarly his own,

from 50 to 75 hours of flight tests per month are about all a test pilot can withstand and remain physically fit.

To calibrate an air speed meter, the test pilot makes at least five two-way runs over a measured course at an altitude of about 25 feet. The runs are made at approximately equal intervals between the high speed and the minimum safe flying speed of the airplane. It is vitally important to keep the air speed and altimeter readings constant during each run. If the pilot finds that the speed has changed after entering the course, he immediately turns out and starts over. Each of the runs is timed with a stopwatch. The times, together with the indicated air speeds and free air temperatures, are later converted to calibration speeds by applying temperature-pressure corrections for the whole speed range of the airplane.

In the speed runs, the limits of precision in determining horizontal speed at sea level or at altitude must be within plus or minus one per cent.

The cruising speed is determined by using the normal rated power of the engine, not to exceed a maximum of 75 per cent.

Saw-tooth climbs are so named because the tracings on the barograph record of a properly executed saw-tooth climb look like saw teeth. They are employed to determine the indicated speed at which the maximum rate of climb occurs at different altitudes. The maximum rate is obtained by climbing the airplane through specified altitude ranges at various speeds, with full power.

Check climbs establish the true rate of climb from sea level to the airplane's service ceiling, the point at which the rate of climb drops off to 100 feet per minute. In this test, the airplane is climbed steadily to its service ceiling at the indicated speeds established for each zone by the saw-tooth climb. Readings recorded for a check climb are free air temperature, r. p. m., manifold pressure, and carburetor air temperature. Time and pressures are recorded by a barograph, and all data are coordinated with pressure altitude.

The Air Corps definition of a test pilot is a pilot who is able to run full standard performance tests on any airplane. To measure up, the student test pilot still has more tests to master.

Involving more real hazard than some of the more spectacular tests, take-off and landing tests are executed under maximum operating conditions on or near the ground. The object is to establish the minimum distances within which an airplane can take-off and clear a 50-foot obstacle, and come to a stop after landing over a 50-foot obstacle. In the take-off tests, flaps are set at various positions, from fully closed to fully open, to determine the best flap position for a minimum run and getting the airplane off the ground and over a 50-foot obstacle as quickly as possible. The landing tests are just the reverse--landing the airplane and braking it to a stop as soon as possible after passing over a 50-foot obstacle. The landing and take-off characteristics reveal, among other things, the minimum size of the base from which the airplane can be operated.

During the engine cooling tests, the test pilot first flies for 30 minutes in level flight at 2,000 feet, with military load and full power. Then he pulls into a climb and continues at best climbing speed to within 2,000 feet of the service ceiling. Afterward a ground cooling test is obtained at 60 per cent of the ground r.p.m. permissible.

Those are the basic flight testing methods which the rookie test pilot practices for two or three months, and do not include the tests of air intake and exhaust systems; carbon monoxide tests; radio interference; armament; navigation instruments; and night tests of lighting equipment.

The final requirement is to fill out "Pilot's Observations," a lengthy questionnaire which inquires about the airplane's controllability, stability, trim, balance, maneuverability, interior arrangements of equipment and controls, and all-around characteristics in the air and on the ground. Approximately 157 questions must be answered.

By studying the "Manual for Test Pilots" and talking with the other test pilots, the newcomer is ready for regular flight tests after 10 or 12 weeks of practice. On an average, six months more are required to turn him into a seasoned test pilot, taking his regular turn in rotation with the other test pilots in the more difficult flight test assignments.

Due to the fatigue which follows a test flight to extreme altitude, a test pilot is not ordinarily expected to take more than one high altitude flight in one day, but frequently he will take a number of different types of airplanes up for test flights on the same day. In one way of thinking, an Air Corps test pilot is a highly trained specialist; he must also be amazingly versatile in that his next assignment for flight test may be a 30-ton, four-engine bomber, a tiny half-ton short-range liaison airplane, or any type between. The effective horsepower he controls may increase from a mere 65 to 6,000 h.p. or more.

It is not uncommon to find 40 or more different airplanes ready for flight tests at one time. Typically they would include light, heavy and medium bombers; single- and twin-engine pursuits; observation, photographic and cargo airplanes; and a variety of basic combat, transition, advance, basic and primary training airplanes.

Routine flight tests of new development equipment are being made constantly at Wright Field by project officers as well as test pilots. In the equipment flight tests, the project officer is interested primarily in recording the functioning of the new equipment under maximum operating conditions. Air Corps equipment is developed in a group of laboratories at Wright Field. There is an excusable misconception that military airplanes and equipment are manufactured here, although none is for service use. Experimental equipment is fabricated only when it cannot be obtained commercially without undue delay.

Requests for routine flight tests of equipment originate in the Production Engineering and the Experimental Engineering Sections. Some of the latter's laboratories contain laboratories within laboratories.

The Power Plant Laboratory, for instance, consists of 25 units, each specializing in

(Continued on page 25)

The transfer of 33 Air Corps units to newly established flying schools has been ordered to augment training units stationed at the schools. The additional troops were provided to step up training under the 30,000-pilot program.

Air Base Group Leaves

Scheduled to move from Maxwell Field, Ala., to the basic flying school at Macon, Ga., are the 321st, 322nd and 323rd School Squadrons and the Seventy-First Air Base Group, comprising the Headquarters and Headquarters Squadron (Special), Sixty-First Air Base Squadron (Special) and the Seventy-Seventh Materiel Squadron.

Scheduled to move from Brooks Field, Texas, to Las Vegas, Nev., on July 5 are the Fiftieth, Fifty-First and 351st School Squadrons, and the Seventy-Ninth Air Base Group (Special), comprising the Headquarters and Headquarters Squadron, Seventieth Air Base and Eighty-Fourth Materiel Squadron; and on July 10, the 352nd and 353rd School Squadrons.

Materiel Squadrons Move

Moving from Kelly Field, Tex., to the basic flying school at Taft, Calif., on July 15, are the Seventy-Ninth Materiel Squadron (Special) and the 329th School Squadron.

The basic flying school at Bakersfield, Calif., is to receive on July 15, the 326th School Squadron from Moffett Field, Calif., and 327th School Squadron from Kelly Field, Texas.

Units moving to the advanced flying school at Mather Field, Calif., on July 15 are the 333rd and 335th School Squadrons and the Seventy-Seventh Air Base Group (Special), comprising the Headquarters and Headquarters Squadron, Sixty-Seventh Air Base and Eighty-Third Materiel Squadron from Stockton, Calif., and from Randolph Field, Texas, seven School Squadrons, number 336 to 342 inclusive.

The approximate strength of the School Squadrons and the Materiel Squadrons are 200 men each; the Headquarters Squadrons, 140 men each, and Air Base Squadrons, 150 men each.

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THE JOB OF TEST PILOTS
(Continued from page 24)

the various components of an aircraft engine, such as ignition, carburetion, cooling systems, etc., and enormous dynamometer and torque stand laboratories are included in this organization. The Aircraft Laboratory, in addition to aerodynamic, design, flutter study and other units, includes two wind tunnel laboratories, a giant high-speed wind tunnel in construction, a brake-tire-wheel testing laboratory, and a large structures laboratory.

Similarly, laboratories within laboratories are necessary in the Photographic Laboratory, concerned with the development of new lens, emulsions and cameras used in aerial photography; in the Equipment Laboratory, where aero medical research, parachutes, oxygen equipment, navigation instruments, airdrome equipment and scores of kindred development projects are directed; the Propeller Laboratory with huge outdoor test rigs; the Armament Lab with its firing range; and the Aircraft Lab with its numerous mobile laboratories on wheels all are intricately organized.

Obviously, the volume of test flight requests initiated in these laboratories is large, and constitutes an additional burden on the test pilots even though part of the load is taken by project officers.

Engineers and test pilots agree that flight tests are more hazardous than conventional flights since either new equipment or a new airplane is involved. If one hour of flight, or 20 or 50 hours are safely passed, it is still the first 50 hours on that particular equipment or airplane, and there is no positive assurance that it will hold up under the stress of flight for 51 hours. Much of the danger has been engineered out of the test pilots' job, but the danger of mechanical failures is still present in test flights.

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SWITCH OF LOWRY FIELD PERSONNEL TO WICHITA

Approximately 400 officers and enlisted men will be transferred from Lowry Field to the new Air Corps Aviation Mechanics School at Wichita Falls, Texas, beginning August 1. The personnel will comprise the administrative unit for the new training center.

The Denver contingent will be the first large group ordered to the school, where thousands eventually will undergo training. Replacements for the men switched from Lowry to the Texas School already have started arriving at Denver, with 764 additional men scheduled to arrive by troop train from eastern replacement centers before the administrative personnel all are transferred.

Chanute Field will furnish the services, including Finance, Quartermaster and Ordnance, and Colonel Edward C. Black, of the Illinois air station, will be the commanding officer at Wichita. Major Charles Martin, of the Twenty-Second School Squadron, at Lowry, will be in charge of the truck convoy by which the Lowry men will move to Texas.

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Smashing all previous flying time records for Randolph Field, the 53rd School Squadron during May flew more than a million miles for a total flying time of 8,285 hours. This eclipsed the previous all-time one squadron record of 7,377 hours established last January by the 52d School Squadron at this field.

I N S U R A N C E

By Major Waddell F. Smith, Air Corps,
Military Personnel Division

The National Service Life Insurance Act was signed on October 8, 1940. It provided that the insurance was issued as a five-year level premium term contract and that it could be converted at any time after one year and before expiration of the five years to either Ordinary Life, Twenty Payment Life or Thirty Payment Life. On October 8, 1941, the first policies will be one year old and eligible for conversion. The following tables quote the rates on the three available forms. Rates for ages not quoted will be furnished by the Veterans Administration upon direct request.

ORDINARY LIFE

Premium Rates for $1,000

Age	Monthly	Quarterly	Semi-Annual	Annual
18	$1.18	$3.53	$7.04	$13.97
19	1.20	3.59	7.16	14.21
20	1.23	3.68	7.33	14.56
21	1.25	3.74	7.45	14.80
22	1.28	3.83	7.63	15.15
23	1.31	3.92	7.81	15.51
24	1.34	4.01	7.99	15.86
25	1.37	4.10	8.17	16.22
26	1.41	4.22	8.41	16.69
27	1.44	4.31	8.59	17.05
28	1.48	4.43	8.83	17.52
29	1.52	4.55	9.06	18.00
30	1.56	4.67	9.30	18.47
31	1.60	4.79	9.54	18.94
32	1.65	4.94	9.84	19.53
33	1.69	5.06	10.08	20.01
34	1.75	5.24	10.44	20.72
35	1.80	5.39	10.73	21.31
36	1.85	5.54	11.03	21.90
37	1.91	5.72	11.39	22.61
38	1.98	5.93	11.81	23.44
39	2.04	6.10	12.16	24.15
40	2.12	6.34	12.64	25.10
41	2.19	6.55	13.06	25.93
42	2.27	6.79	13.54	26.87
43	2.36	7.06	14.07	27.94
44	2.45	7.33	14.61	29.01
45	2.54	7.60	15.15	30.07
46	2.64	7.90	15.74	31.25
47	2.75	8.23	16.40	32.56
48	2.87	8.59	17.11	33.98
49	2.99	8.95	17.83	35.40
50	3.12	9.34	18.61	36.94

TWENTY PAYMENT LIFE

Premium rates for $1,000

Age	Monthly	Quarterly	Semi-Annual	Annual
18	$1.91	$5.72	$11.39	$22.61
19	1.93	5.78	11.51	22.85
20	1.96	5.87	11.69	23.20
21	1.99	5.96	11.87	23.56
22	2.02	6.05	12.05	23.91
23	2.05	6.13	12.22	24.27
24	2.08	6.22	12.40	24.63
25	$2.12	$6.34	$12.64	$25.10
26	2.15	6.43	12.82	25.45
27	2.19	6.55	13.06	25.93
28	2.23	6.67	13.30	26.40
29	2.27	6.79	13.54	26.87
30	2.31	6.91	13.78	27.35
31	2.31	6.91	13.78	27.35
32	2.39	7.15	14.25	28.30
33	2.44	7.30	14.55	28.39
34	2.49	7.45	14.85	29.48
35	2.53	7.57	15.08	29.95
36	2.59	7.75	15.44	30.66
37	2.64	7.90	15.74	31.25
38	2.70	8.08	16.10	31.97
39	2.76	8.26	16.46	32.68
40	2.82	8.44	16.82	33.39
41	2.88	8.62	17.17	34.10
42	2.95	8.83	17.59	34.92
43	3.02	9.04	18.01	35.75
44	3.10	9.28	18.49	36.70
45	3.18	9.52	18.96	37.65
46	3.27	9.79	19.50	38.71
47	3.36	10.06	20.04	39.78
48	3.46	10.35	20.63	40.96
49	3.56	10.65	21.23	42.15
50	3.67	10.98	21.88	43.45

THIRTY PAYMENT LIFE

Premium rates for $1,000

Age	Monthly	Quarterly	Semi-Annual	Annual
18	$1.49	$4.46	$8.89	$17.64
19	1.52	4.55	9.06	18.00
20	1.54	4.61	9.18	18.23
21	1.56	4.67	9.30	18.47
22	1.59	4.76	9.48	18.82
23	1.61	4.82	9.60	19.06
24	1.64	4.91	9.78	19.42
25	1.67	5.00	9.96	19.77
26	1.70	5.09	10.14	20.13
27	1.73	5.18	10.32	20.48
28	1.76	5.27	10.50	20.84
29	1.79	5.36	10.67	21.19
30	1.83	5.48	10.91	21.67
31	1.87	5.60	11.15	22.14
32	1.90	5.69	11.33	22.49
33	1.95	5.84	11.62	23.09
34	1.99	5.96	11.87	23.56
35	2.03	6.08	12.11	24.03
36	2.08	6.22	12.40	24.63
37	2.13	6.37	12.70	25.22
38	2.18	6.52	13.00	25.81
39	2.24	6.70	13.36	25.62
40	2.30	6.88	13.72	27.23
41	2.37	7.09	14.13	28.06
42	2.43	7.27	14.49	28.77
43	2.51	7.51	14.97	29.72
44	2.59	7.75	15.44	30.66
45	2.67	7.99	15.92	31.61
46	2.76	8.26	16.46	32.68
47	2.86	8.56	17.05	33.86
48	2.96	8.86	17.65	35.04
49	3.08	9.22	18.37	36.46
50	3.20	9.58	19.08	37.88

All three forms of converted insurance will contain a table of surrender values consisting of cash or loan value, paid up insurance value and extended insurance value. The premiums charged for any of these three converted forms of policies are lower than any obtainable old line legal reserve participating insurance. Policyholders will receive a substantial annual dividend which will further reduce the cost of the insurance. No other insurance should be considered to be equal to these converted policies due to the low rates and dividends. The table of cash and loan values and paid up and extended insurance values will be equal to or greater than obtainable in any other commercial insurance issued at the same age and on the same plan of insurance.

New National Service Life Insurance Applications

The act authorizing this insurance provides that it must be applied for within 120 days (not four months) of induction into the service or extension of active duty. By reference to the following table the last day upon which application may be made and signed and put in channels or the mail may be readily obtained.

Daily Table Showing the Last Day of the Statutory 120-Day Period During Which Acceptable Application For Insurance may be Submitted

Entry Date	Final Date	Entry Date	Final Date	Entry Date	Final Date
Jan. 1	May 1	Feb. 1	June 1	Mar. 1	June 29
2	2	2	2	2	30
3	3	3	3	3	July 1
4	4	4	4	4	2
5	5	5	5	5	3
6	6	6	6	6	4
7	7	7	7	7	5
8	8	8	8	8	6
9	9	9	9	9	7
10	10	10	10	10	8
11	11	11	11	11	9
12	12	12	12	12	10
13	13	13	13	13	11
14	14	14	14	14	12
15	15	15	15	15	13
16	16	16	16	16	14
17	17	17	17	17	15
18	18	18	18	18	16
19	19	19	19	19	17
20	20	20	20	20	18
21	21	21	21	21	19
22	22	22	22	22	20
23	23	23	23	23	21
24	24	24	24	24	22
25	25	25	25	25	23
26	26	26	26	26	24
27	27	27	27	27	25
28	28	28	28	28	26
29	29			29	27
30	30			30	28
31	31			31	29

Note: This Table being constructed for February with 28 days, the proper allowance must be made for leap year.

Entry Date	Final Date	Entry Date	Final Date	Entry Date	Final Date
Apr. 1	July 30	May 1	Aug. 29	June 1	Sept. 29
2	31	2	30	2	30
3	Aug. 1	3	31	3	Oct. 1
4	2	4	Sept. 1	4	2
5	3	5	2	5	3
6	4	6	3	6	4
7	5	7	4	7	5
8	6	8	5	8	6
9	7	9	6	9	7
10	8	10	7	10	8
11	9	11	8	11	9
12	10	12	9	12	10
13	11	13	10	13	11
14	12	14	11	14	12
15	13	15	12	15	13
16	14	16	13	16	14
17	15	17	14	17	15
18	16	18	15	18	16
19	17	19	16	19	17
20	18	20	17	20	18
21	19	21	18	21	19
22	20	22	19	22	20
23	21	23	20	23	21
24	22	24	21	24	22
25	23	25	22	25	23
26	24	26	23	26	24
27	25	27	24	27	25
28	26	28	25	28	26
29	27	29	26	29	27
30	28	30	27	30	28
		31	28		

Entry Date	Final Date	Entry Date	Final Date	Entry Date	Final Date
July 1	Oct. 29	Aug. 1	Nov. 29	Sept. 1	Dec. 30
2	30	2	30	2	31
3	31	3	Dec. 1	3	Jan. 1
4	Nov. 1	4	2	4	2
5	2	5	3	5	3
6	3	6	4	6	4
7	4	7	5	7	5
8	5	8	6	8	6
9	6	9	7	9	7
10	7	10	8	10	8
11	8	11	9	11	9
12	9	12	10	12	10
13	10	13	11	13	11
14	11	14	12	14	12
15	12	15	13	15	13
16	13	16	14	16	14
17	14	17	15	17	15
18	15	18	16	18	16
19	16	19	17	19	17
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26	23	26	24	26	24
27	24	27	25	27	25
28	25	28	26	28	26

Entry Date	Final Date	Entry Date	Final Date	Entry Date	Final Date
July 29	Nov. 26	Aug. 29	Dec. 27	Sept. 29	Jan. 27
30	27	30	28	30	28
31	28	31	29		

Entry Date	Final Date	Entry Date	Final Date	Entry Date	Final Date
Oct. 1	Jan. 29	Nov. 1	Mar. 1*	Dec. 1	Mar. 31*
2	30	2	2	2	Apr. 1
3	31	3	3	3	2
4	Feb. 1	4	4	4	3
5	2	5	5	5	4
6	3	6	6	6	5
7	4	7	7	7	6
8	5	8	8	8	7
9	6	9	9	9	8
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26	23	26	26	26	25
27	24	27	27	27	26
28	25	28	28	28	27
29	26	29	29	29	28
30	27	30	30	30	29
31	28			31	30

*NOTE: This Table being constructed for February with 28 days, the proper allowance must be made for leap year.

---oOo---

PATTERSON FIELD RECRUITING SUCCESSFUL

Recruiting crews sent through West Virginia and Ohio by Patterson Field, Fairfield, Ohio, headquarters succeeded in enlisting more than 200 men in 18 days for assignment to squadrons now based at the Fairfield Air Depot. No "high pressure" tactics were employed.

All men assigned to recruiting duty were instructed to present only the actual facts concerning life in the Army Air Forces and the opportunities afforded those who enlist for three years, particularly the opportunities to learn a skilled trade. This last is considered an important incentive to potential recruits.

The recruiting squads returned with former school teachers, mechanics, bakers, salesmen and members of many other occupational groups in civil life. A large percentage were below voting age, indicating that their parents hold a high regard for the Army Air Forces and consequently were willing to give their consent cheerfully to their sons' joining up.

A recruiting office was set up in the lobby of the Patterson Field headquarters building for the duration of the campaign. Thirty-three enlistments were completed in the office on the last day of the campaign, recruiting clerks working at top speed to set the one-day record.

---oOo---

CELEBRITIES AT CADET GRADUATION

At least two movie stars and a famous motion picture dance director have accepted invitations to attend graduation exercises July 11 at the Air Corps Advanced Flying School at Stockton Field, Calif., for the student officers and aviation cadets of Class 41-E.

Joe E. Brown and Andy Devine, the former famous particularly for his mouth and the latter for what comes out of his throat in the way of a voice, are the movie comedians who will be on hand. The dance director is LeRoy Prinz, who was a pilot in World War I, and has not abandoned his old interest in aviation.

Comedian Flies Regularly

Mr. Brown will be on hand, apart from his enthusiasm for flying, because his son is a member of the class. Aviation Cadet Don E. Brown, who holds a Reserve commission in the Infantry, will share the graduating limelight with his famous father. Mr. and Mrs. Brown have visited Stockton Field before. The comedian has been flying as a passenger since 1913, which means that he was flying before the Aviation Cadets he will see graduate were born.

Members of Class 41-E have a certain claim to fame themselves. Cadet Brown was president of the student body and of the junior class at the Los Angeles branch of the University of Southern California, and Cadets Lloyd Pearson Carlos and Robert Warren Christy have appeared as ice skaters in many of Sonja Henie's pictures.

"Senator" Gets His Wings

Mason Douglas Harrell, who also will receive his wings July 11, has had the most unusual past. Cadet Harrell was a member of the Texas Legislature when he became interested in flying while traveling on legislative business. The commercial air lines did such a good job of selling the young office holder that he resigned from the legislature and joined up as an Aviation Cadet.

The next class scheduled for graduation is 41-F, which reported June 2 from Moffett Field and is to finish the advanced course August 16 or thereabouts. The class graduating July 11, containing two student officers and 143 cadets, is the largest in the history of the Advanced School at Stockton.

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CADET ATTIRE EXHIBITED IN NEW YORK

An Aviation Cadet's complete dress uniform and the proper summer attire for the well-dressed enlisted man will be on display in a window in Rockefeller Center, New York.

The exhibit also includes a Cadet's summer outfit, including helmet, coveralls and shoes and a complete winter uniform. It was supplied by the Southeast Air Corps Training Center at Montgomery, Ala., at the request of the Commanding General, 2nd Corps Area.

The exhibit is being sponsored by the Museum of Science and Industry, the British War Relief Society and the British American Ambulance Corps. Brig. Gen. Walter R. Weaver, commanding the Southeast Training Center, ordered the equipment supplied.

KEEP 'EM FLYING!

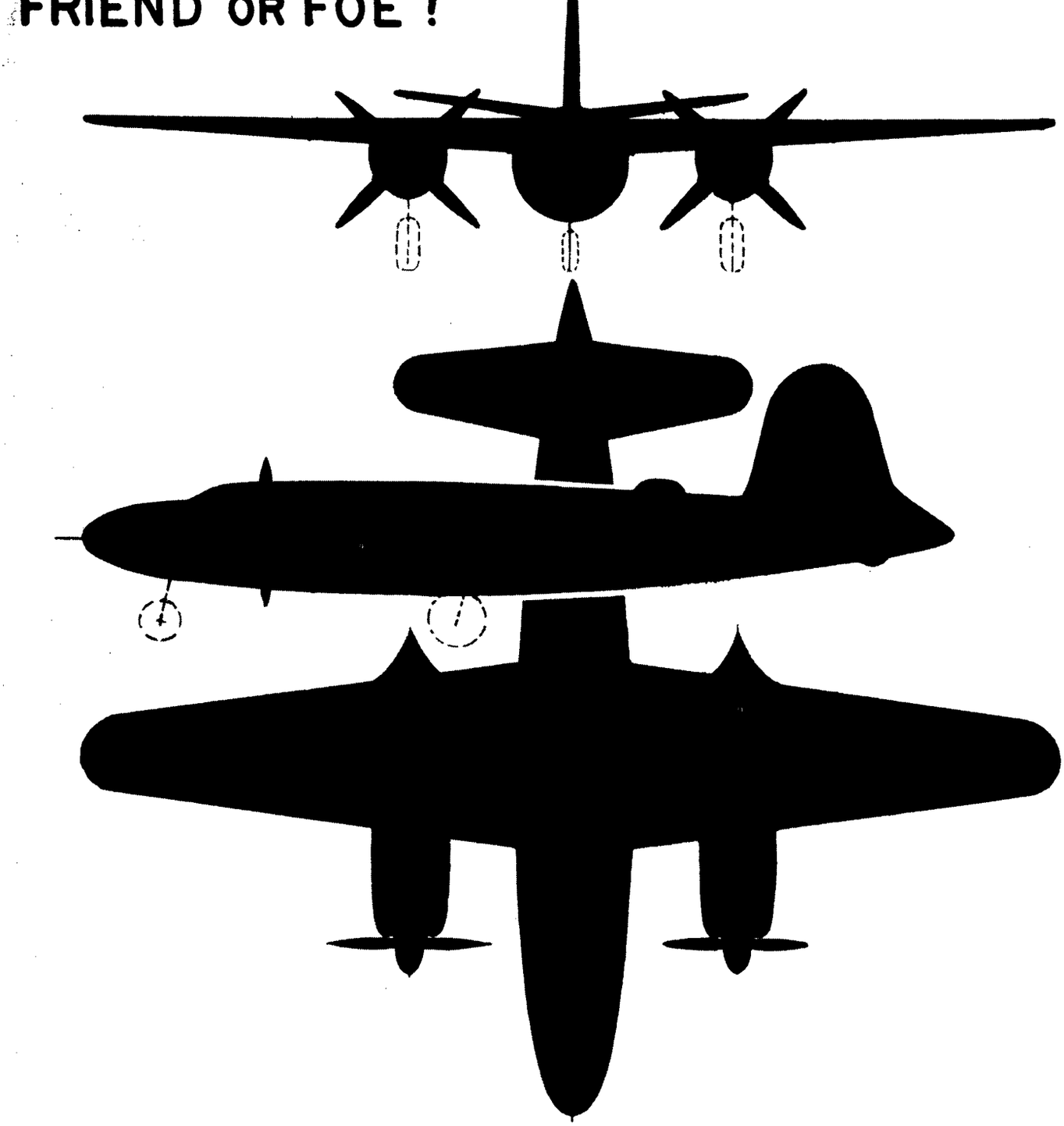
Blood and hunger, hunger and blood,
Red and white and white and red;
Fed and famished, famished and fed,
Bleeding and full, full and bled;
This is the law of the living and dead.
"Keep 'em Flying!" if you would eat,
Wolves are waiting to gnaw your meat.
Fight to hold the power and might,
Greedy wolves will tear and bite;
Strength alone they know as Right,
"Keep 'em Flying!" and WIN the fight.

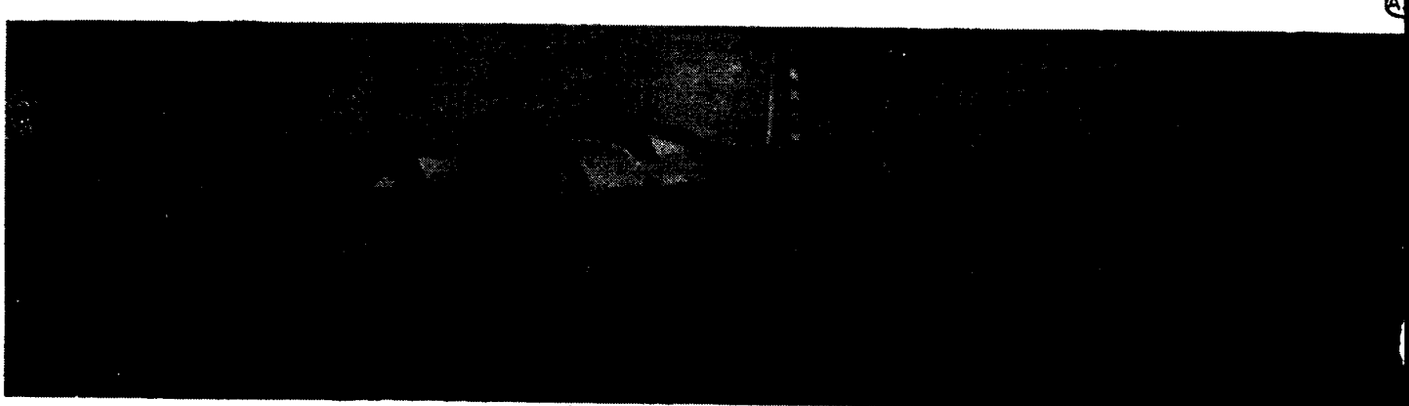
"Keep 'em Flying!" through rain and fog,
Through thunder and lightning and mud and bog.
Wheels must turn both night and day,
Wheels and speed and power to slay;
These for us NOW, without delay.
Wings and wheels and bombs and wings,
Men and women and robot things
Marching and working and fighting and flying,
Singing and shouting and straining and trying,
All together, we "Keep 'em Flying!"

"Keep 'em Flying!" through heat and cold,
Fill 'em up, WE can't be told
By Hitler HOW or WHEN or WHY--
Flying men will all defy
Weapons hidden in a lie.
Freedom is our greatest power,
God the Hero of this hour,
Faith in Him the beacon tower.
Wings and wheels and bombs and wings,
Men and women and robot things
Marching and working and fighting and flying,
Singing and shouting and straining and trying,
All together, we "Keep 'em Flying!"

-John Warwick Daniel III

FRIEND OR FOE ?





AIR CORPS NEWS LETTER

AUGUST 1941

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Last of a Series by Major Waddell F. Smith

THE COVER

The cover picture is of the Vultee BT-13 (basic trainer) and was made available through the courtesy of FORTUNE, which will carry an extensive story on Vultee in the September issue. Mike Roberts was the artist who made the photograph.

THE BACK COVER

The airplane shown in silhouette on the back cover (through the courtesy of Aviation News Feature) is, of course, the Boeing "Flying Fortress." The B-17D may be identified by its long, slim fuselage, four engines and towering vertical fin. This long-range, hard-hitting weapon is one of the most easily identified military aircraft in the world.

HEADQUARTERS ARMY AIR FORCES WASHINGTON, D. C.

THE AIR CORPS NEWS LETTER

VOL. 24 AUGUST, 1941 NO. 14

GLIDERS ORDERED

Troop Carriers Building

Engineering research and training in connection with the prospective use by the Army Air Forces of troop-carrying gliders has been underway for more than six months, and several experimental multiplace gliders are scheduled for delivery for tests within the next 60 days.

Twelve Army Air Forces officers already have completed courses in glider flying, to qualify them as instructors and supervisors in the event glider training is expanded in the army. Another six are undergoing training at the glider school at Elmira, and six more are scheduled to enter that school sometime this month. No other assignments have been revealed and future plans are not known at this time.

The entire army glider program is on an experimental basis, but various sources have indicated that a glider force definitely will be created. The Chief of the Army Air Forces declared at the close of the recent national soaring contest, at Elmira, that he hopes the army will "have a glider force second to none" and promised that "we shall have such a force, and we will have it when we need it." Further evidence of army plans is contained in the organization of the new Support Commands, as outlined elsewhere in this issue, which calls for "troop-carrying glider units."

The Air Forces have ordered an undisclosed number of training and transport gliders. The training gliders are two-place and similar to the one such powerless plane already delivered to the army by the well-known Schweizer brothers, of Elmira, and in which Maj. Gen. Arnold flew with Maj. Fred R. Dent, Jr., at the national soaring meet. The troop-carriers are eight and 15-place ships, and are true gliders, while the trainers actually are true soaring planes.

No details of the army's plans with re-

(Continued on Page 4)

COOPERATIVE AVIATION

Five Support Commands

All air elements necessary for the complete support of ground forces are being grouped into five Air Support Commands, newest combat units of the Army Air Forces. One of the commands, the First, will be seen in action for the first time during maneuvers in November.

Formation of the new units was described in Washington as "another step in the organization of the Army Air Forces that is intended to enhance the combat efficiency of the whole military establishment." The step will make possible effective and close cooperation between ground forces and the purely support-type air units.

One of the Air Support Commands is under the direct control of each of the four Air Forces, while the fifth will function under control of the Air Force Combat Command itself. The First, Second, Third and Fourth Air Support Commands will operate with the four armies bearing those designations, and the Fifth Air Support Command will cooperate with the Armored Force.

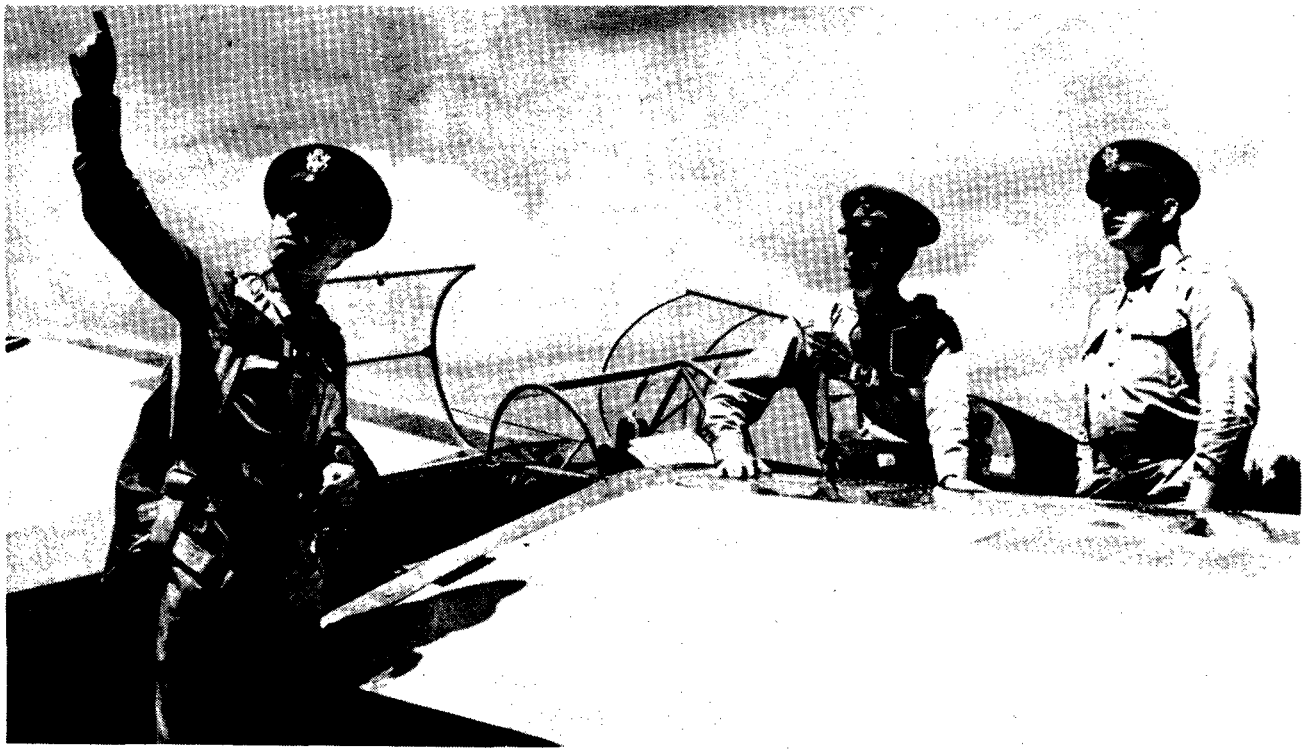
Each of the Air Support Commands will contain all the elements required to provide the support necessary to insure the success of a ground force's mission. These elements will include some old and well-known air units and some that are new and not so well-known, even to air personnel. Grouped in the support category will be observation (both lighter and heavier-than-air), light bombers, dive bombers, photo planes, gliders and transports for parachute and air landing troops.

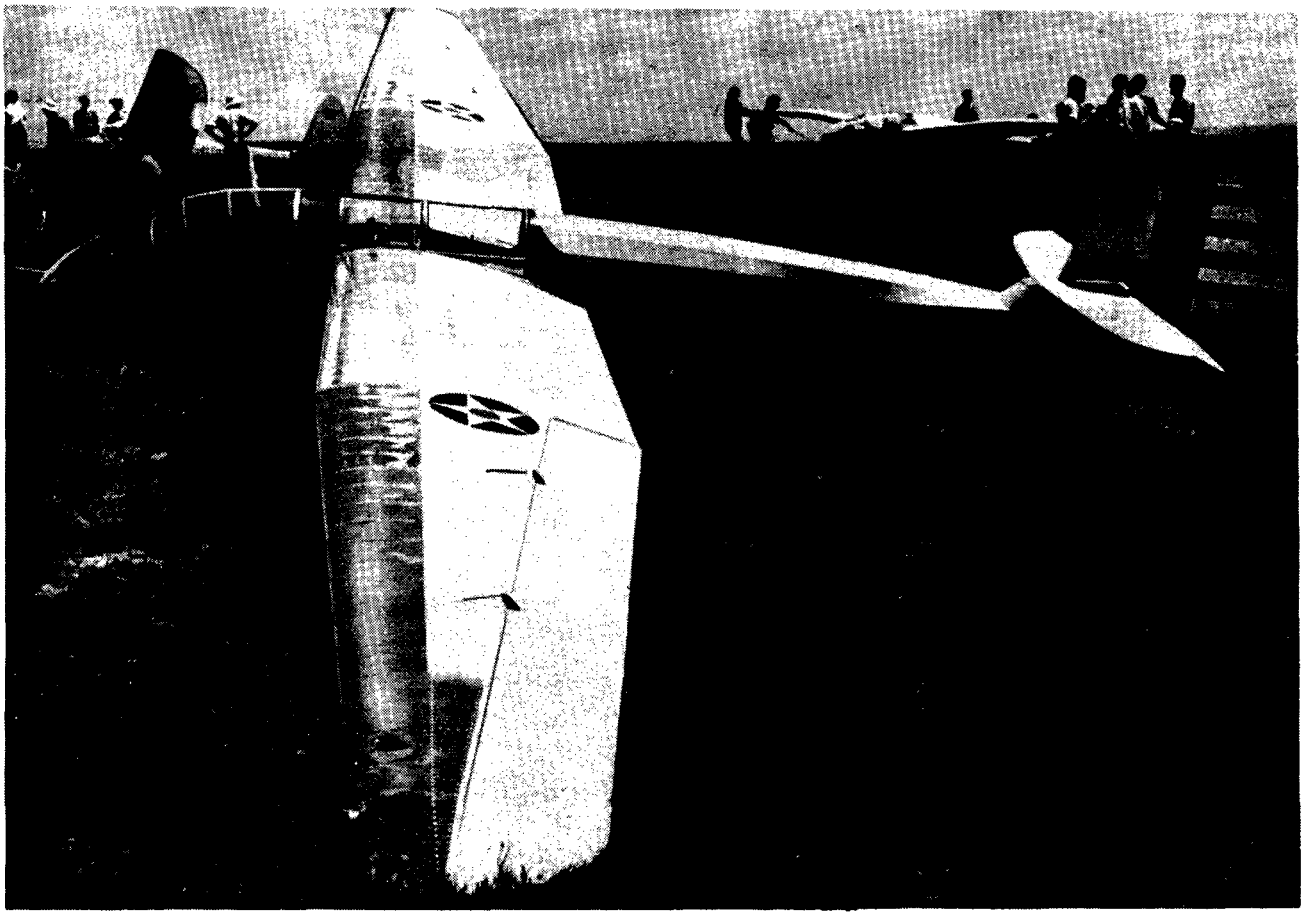
The command and staff functions will be centered as follows:

First Air Support Command, commanded by Col. William E. Kepner, headquarters at Mitchel Field, N.Y.

Second Air Support Command, commanded by Col. Hume Peabody, headquarters at Oklahoma City.

(Continued on Page 4)



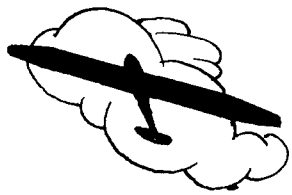


The Army Air Forces' first glider, designated TG-2 (Training Glider Type 2), is shown in the lower picture 'on the line' at the National Soaring Contest at Elmira, N.Y. Left to right above are Lieut. John C. A. Watkins, Maj. Fred R. Dent, Jr., and Maj. Walter S. Lee, also at the soaring contest.

Photos by Harold W. Kulick.

They Glide Through the Air

By Major Fred R. Dent, Jr.



WE LEARNED THIS WAY

Six Air Corps officers reported June 1 to Harris Hill, Elmira, N. Y., for three weeks' instruction in glider flying. For those members of the class who had been flying Boeing "Flying Fortresses," it might appear to be a step backwards. However, even these men unknowingly were in for three weeks of thrills, excitement, and experiences they will never forget.

Besides myself, the group at Harris Hill consisted of Capt. M. J. Lee from Wright Field, Lieuts. C. L. Luke and W. Filer from Middletown Air Depot, and Lieuts. J. J. Brennan and R. D. Bower from Fairfield Air Depot. Officers from Middletown and Fairfield arrived in Army transports. Lee and I made our appearance in an Army PT-13B, which was used for local flights during the course of instruction.

June 2 broke with good weather and the group assembled at Big Flats Airport near Harris Hill. Two Franklin single-place utility gliders were hauled out of the barn that serves as a hangar. First tows were made by automobile with a 200-ft. rope with the students given definite instructions not to let the glider leave the ground. These ground tows progressed to speeds of 50 m.p.h. Seated in the glider with your body only a few inches off the ground, 50 m.p.h. gives a definite sensation of speed.

After a half-dozen ground runs, the student was permitted to take the glider a foot to 18 inches in the air on the tow flight, cutting loose at the end and landing straight ahead. On succeeding tows the permissible altitude was increased to 10, 30, 50, 100, 300 and finally 500 feet. From 100 feet the student would make 180° approaches. From 300 feet a 360° approach was made. These altitudes seem extreme in terms of the altitudes used for these maneuvers in powered planes.

The landing technique presented the biggest transition problem. The approach to the field is made at a speed 10 to 15 miles above the stalling

(Continued on Page 6)

Maj. Fred R. Dent, Jr., is Assistant Chief of the Aircraft Laboratory at Wright Field. He was one of the original class of officers assigned as students at Elmira, and was pilot of the Air Corps glider in which Maj. Gen. Arnold flew from the Elmira Airport (Big Flats) to the [illegible]

THEN THIS HAPPENED

At 1:55 p.m. on June 18, I took off from the Big Flats Airport with a dual airplane tow in a Schweizer two-place sailplane with Mr. John Robinson in the rear cockpit. In the other sailplane were Capt. M. J. Lee and Mr. Raymon Parker. The airplane, a Waco trainer piloted by Lieut. Luke, towed the two sailplanes in the vicinity of the airport for 30 minutes, at which time the formation was at an altitude of 4,000 feet. By previous arrangement, it was agreed that if good thermal activity was encountered, Dent and Robinson would proceed in the direction of Williamsport, whereas Lee and Parker would return to the Big Flats Airport.

Upon cutting loose, Robinson suggested that I head for the cloud which was on our left. I looked to the left, and seeing two clouds, I headed for the "white one." John informed me that I was headed for the wrong cloud, a fact which I had suspected, but never having flown a sailplane on instruments, I would have been content to have started my experience on a "white one." The black cloud looked mighty black, but I figured John must know what he was doing.

We entered the cloud at 3,700 feet, and were immediately on instruments. Soon the variometer showed a good rate of climb, and we started the spiral. How many turns we made, I'd never guess, but it seemed that I had never been in any other position. The altimeter climbed 5,000, 6,000, 7,000, then 8,000 feet. Here, I lost lift and came out of the side of the cloud. The variometer again recorded a good rate of climb and the spiraling started all over. The altimeter was rising rapidly and we started picking up ice. The front of the windshield and the leading edges of the wings were taking on a good load.

I wondered how long we could continue to rely on the instruments. Soon the airspeed indicator went out of commission. However, having become familiar with the sound of the sailplane at various air speeds, this did not worry me too much. The altimeter now r[illegible] 9,500 feet,

GLIDERS . . . (Concluded) spect to a glider force have been revealed. General Arnold said the form of the force had not been decided upon—that the outcome of the experimentation would determine that. So far, however, only airplane pilots (officers) have taken the glider training, although it is considered fairly safe to assume that nonrated personnel eventually will be taught to fly the motorless aircraft.

One of the first officer-students, some of whom were taught to soar by the Elmira Gliding Area Soaring Corporation's instructors and the others by the Lewis School of Aeronautics, at Lockport, Ill., bailed out of his soaring plane and became the first "glider caterpillar" in the Army Air Forces. He was Second Lieut. Fred H. Highley, who bailed out at Lockport when the ship spun in after losing the left wing. Lieutenant Highley suffered no ill effects from his history-making leap.

General Arnold was emphatic in his description of army glider plans at the banquet which closed the national soaring contest. He pointed out that the Air Forces' decision of months ago to study the use of military gliders "was horribly justified when German troops swarmed down in gliders onto the island of Crete and captured the historic Greek island after bloody fighting."

"We in the Army Air Forces have never denied or failed to appreciate the military possibilities of the glider," General Arnold stated. "Power driven planes have been our first consideration, because our geographical position has made that necessary. Our first priority must go to the long-range, heavy bomber, a weapon so necessary to carry out our policy of hemisphere defense. But that did not and does not now mean that, merely because our great distances make our military situation different than that of Europe, we have ignored the glider.....

"We can't expect to tow strings of gliders behind airplanes over 3,000 miles of ocean, but we are certain that there are many missions for gliders which may develop in the future....We do know that we must have gliders, perhaps hundreds and possibly thousands of them, capable of carrying at least 15 men each, together with full equipment, including rifles, machine guns and even light cannon."

The first glider delivered to the Air Corps now is at Wright Field, undergoing routine tests. The glider, designated TG-2 (Training Glider Type 2) is an all-metal, two-place sailplane. It has a span of 52 feet, wing area of 214 square feet, empty weight of 480 pounds, useful load of 400 pounds, aspect ratio of 12:6 and gliding ratio of 23:5.

Although the Schweizer brothers delivered the first ship, it was designated TG-2, the designation TG-1 originally having been assigned to those ships being manufactured by the Frankfort Sailplane Company, of Joliet, Ill., none of which has been delivered. The Frankfort sailplanes will be of steel-tube fuselage type, with fabric-covered wooden wings. Both types will have dual instruments, including variometer, altimeter and air speed indicator, while provisions are being made for bank and turn indicators and compasses.

SUPPORT . . . (Continued) Third Air Support Command, commanded by Col. Asa N. Duncan, headquarters at the Savannah (Ga.) Air Base.

Fourth Air Support Command, commanded by Col. Robert C. Candee, headquarters at Hamilton Field, Calif.

Fifth Air Support Command, commanded by Brig. Gen. Junius W. Jones, headquarters at Bowman Field, Ky.

The Air Support Staff, Col. William E. Lynd, chief, headquarters at the Army War College, Washington, D.C.

The Headquarters and Headquarters Squadrons of the Fifteenth, Sixteenth and Seventeenth Bombardment Wings (Light) are forming the basis for the similar organizations of three of the Air Support Commands, according to instructions for activation of the commands. These instructions also stated that:

"The further development of doctrines, tactics and technique; the preparation of training directives; the training of aviation in conjunction with ground forces will require close liaison and interchange of information and recommendations between all echelons of command concerned with the problem. Therefore, direct contact and communication between the several commanders concerned is authorized with respect to this subject."

All observation aviation, including the squadrons which were part of the National Guard prior to their mobilization, is being assigned to the Support Commands. They will be transferred at a time recommended by the Chief of the Army Air Forces, and in the meantime will remain with the ground units to which they are now assigned. Glider units have not been formed yet, of course, and dive bombers only now are being

(Concluded on Page 30)

COMMANDS CARIBBEAN

Maj. Gen. Andrews Elevated

The largest command involving both ground and air troops ever assigned to an air officer was given Maj. Gen. Frank M. Andrews last month when he was selected to replace Lieut. Gen. Daniel Van Voorhis as head of the entire Caribbean Defense Command and the Panama Canal Zone.

Many other senior Army Air Force officers were shifted to new commands or promoted, or both, about the time General Andrews, who now heads the Air Defense Command in the Caribbean area, was given his important new assignment. Several brigadier generals were made major generals and a number of others received high temporary rank.

Brig. Gen. Herbert A. Dargue was made a major general and given command of the First Air Force, at Mitchel Field, New York. Brig. Gen. Millard F. Harmon was elevated to the same rank, with assignment as commander of the Second Air Force, at Fort George Wright, Washington, and Brig. Gen. Lewis H. Brereton was made commander of the Third Air Force, also with the rank of major general.

The appointment of General Andrews to head the entire defenses of the Caribbean area is considered particularly significant at this time, and was so hailed by authoritative commentators in Washington, in view of the Army's new policy of forming "task forces" for service in a particular area. This policy, as outlined by the Chief of Staff, involves the grouping of all elements under the command of a senior officer of an arm which seems most likely to bear the brunt of operations in that particular situation or area.

Recognition of the increasingly important role which the air arm plays in certain theaters in determining the success or failure of the whole task force was seen in General Andrews' assignment. In the event of an attack in the Caribbean or Canal Zone areas, it has been widely accepted that initial operations almost certainly would be in the air.

An Analagous situation may be found in a comparison of the Panama Canal Zone with the British base at Singapore. At both, extensive, permanent and vital facilities are contained in a very small area. Both are the

(Continued on Page 16, column2)

LANDING MATS

Mobile "Fields" Tested

Portable landing mats to permit the use of all sorts of unprepared fields within the theater of operations are being developed for the Army Air Forces by the Corps of Engineers, the Under Secretary of War disclosed this month.

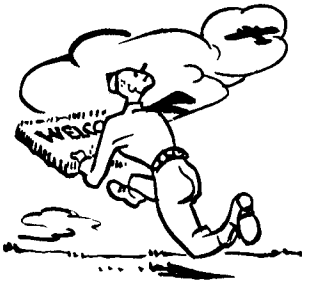
The mats are for use by medium and heavy bombardment, reconnaissance, and transport planes. Experiments on mats for use by these types are virtually completed, and the Chief of the Air Corps has issued a directive for work on a lighter type to be used by pursuit and other lighter military aircraft. These lighter mats are similar to the ones which have been developed in England for the Royal Air Force.

Testifying before the Senate's special defense investigating committee in July, Under Secretary of War Robert P. Patterson stated:

"Three successful types have been developed which are suitable for use by heavy bombers, but are considered too heavy for use on fields on which pursuit ships and light bombers are to land. Tests are now being made on other types which will be adequate for the lighter military aircraft and which will have the advantage of lighter weight and ease of placement.

It is reported that the Panama Canal Department wants a heavy landing mat for use with heavy traffic on auxiliary fields, in the event that tactical operations require this traffic. Some fields which are suitable for use by lighter types of aircraft could not be used by heavier craft without reinforcement of this type.

Experimental work looking toward the development of mats of this type was initiated in late 1939, when The Adjutant General issued a directive to the Corps of Engineers, stating that the Air Corps had an immediate need for a portable landing mat. A subsequent letter from the Chief of the Air Corps to the Chief of Engineers urged efforts to secure something usable at once, rather than strive for perfection at some later date. It was stated that the consideration of camouflaging of the runways was of prime importance.



A program involving various types of tests was initiated. Truck tests at Fort Belvoir, Va., were held to determine which of

(Continued on page 16, column 1)

WE LEARNED... speed. Soaring is normally done at speeds approximately five miles above the stall. Therefore, when the pilot decides to land, he increases rather than decreases his speed. There is no leveling-off process. The glider is flown right on the ground with this excess speed.

Once on the ground, the ground roll can be reduced by pushing forward on the stick, putting the weight on the nose skid and the single landing wheel. The roll can be still further shortened by following this with brake action. On the Franklin gliders the brake is applied by pulling a handle attached to a cable. Outside of the tow cut-off release, this is about the only use for the pilot's left hand. The absence of a throttle quadrant proved most annoying.

All instruction workup to this point had been solo in Franklin gliders and all towing done by auto. There is no small thrill experienced in an auto traveling across a sod airport at a speed of 55 m. p. h. with the driver alternating his attention between where he is going and how the glider is coming.

After approximately seven hours in Franklin gliders, the instruction shifted to two-place Schweizer sailplanes. These are much higher performance sailplanes. The student occupies the front cockpit and the instructor, the rear. The student is faced with the operation of a new gadget known as a "spoiler." This is a spring-loaded, venetian-blind type, operated by a lever on the left of the cockpit. The brake is actuated by the heel of the foot. This can be accomplished by either heel without removing the feet from the rudder. Training in these sailplanes was carried out with auto, winch, and finally airplane tow.

For any powered pilot who has not experienced a winch take-off in a glider, there awaits for him one of the biggest thrills of his life time. To anyone unaccustomed to glider launching, it looks like a suicide attempt. With a rope approximately 1,200 feet long, the sailplane gains an altitude of 600 to 700 feet. What happens if the rope breaks? Well, nothing, provided the pilot is alert, drops the remaining tow rope, noses down, and has sufficient altitude to land straight ahead or to make a 180° turn back to the field. Gliders can turn back onto the take-off field when such action would be disastrous for an airplane.

A little friendly cooperation comes in handy on airplane tows. The glider gets off the ground at about 45 miles per hour and climbs to 25 or 30 feet. At this time the poor tow plane is still struggling and running along the ground. The sailplane pilot then dives the sailplane to within 10 feet of the ground. This reduces the drag and permits the powered tow plane to clear the fence. The sailplane pilot can be quite a help or a hindrance, depending on both his experience and technique.

After an airplane tow, the sailplane pilot usually cuts loose at 1,500 feet. He would then either slope or thermal soar until these conditions failed him or he wished to return. On one of these flights the pilot climbed to 6,500 feet after cutting loose at 1,000 feet. On another occasion, a student stayed up over three hours. There is really a lot of opportunity to use a "biscuit gun."

Instruction during the course was in excellent hands. Among the instructors were John Robinson, last year's national soaring champion; Parker Leonard, an old glider pilot who has forgotten more than most people ever learn about gliding; Ray Parker, one of the leading sailplane pilots on the west coast; and Jay Buxton, the grand old man of gliding.

During the course of instruction all students obtained their "C" rating, which is a recognition established by the Soaring Society of America. To obtain this rating, the pilot must stay above the altitude of release for a period of five minutes. All students also obtained the C. A. A. rating of "Commercial Glider Pilot."

The next stage of instruction was dual airplane tow. The formation was the conventional Vee with the power plane in No. 1 position. The ropes leading from the airplane to the sailplanes were approximately 400 feet long, the one being about 30 feet longer than the other. This stage was not radically different from power plane formation flying but did require practice in keeping the rope tight under all conditions. A Waco trainer with 220 hp. Continental engine was used as a tow plane.

Students had several flights as pilot of the tow plane. For those pilots who complain about towing targets, I suggest a couple hours' towing gliders. I don't think they will ever complain again. The airplane feels as if it is continually stalling. If the sailplanes climb, they exert an up load on the tail which has to be offset by the elevator movement, at the same time trying to keep constant air speed and altitude. In addition, a 220 hp. Waco has no reserve power when hooked to two two-place sailplanes.

The course terminated in cross country

(Continued on Page 24)

CADET MENTAL TESTS UNDERGOING REVISION

Several changes and simplifications in the Air Corps mental exams for candidates for training as aviation cadets will be incorporated in the examination given in August. The examination has been developed and assembled by the Research and Analysis Group of the Personnel Procedure Section of the Adjutant General's Office, which has been making studies of the test.

Work on the examination has included two types of proposed changes, in subject and in method. The subject matter is to be changed first, the method in November. The exam formerly included nine compulsory subjects. The August exam will include five compulsory subjects, and two optional subjects which may be selected from a group of five.

The compulsory subjects are English Grammar and Composition, Arithmetic, Algebra, (to include quadratics), Plane Geometry, and Plane Trigonometry. The student must also select two subjects from the following: United States History, General History, Elementary Physics, Inorganic Chemistry and any modern language except English. The last two subjects are new additions to the curriculum. Geography has been dropped.

Important changes in the method of the examination have been made to shorten the time required to take the exam and to facilitate grading. The new method, which will not be used until the November mental exam, consists of the multiple-choice answer type of question. This method eliminates all discussion or essay questions, and is considered to ensure a fairer and more reliable exam.

The problem of grading the examinations has become acute because of the enormously increased number of applicants taking the exam. In August, 1939, only 159 candidates took the exam. A year later, August, 1940, this number rose to 1254. In November, 1940, a total of 2398 candidates were examined. On the last exam, May, 1941, exactly 3250 applicants took the test. Between 4000 and 5000 are expected to be examined in August.

Because of this increase, grading the examinations by a board at Randolph Field now requires many weeks of work. Using the multiple-choice type of questions, the time required for grading the examinations will be radically cut, and the time required to take the examination will be cut in half as well. The elimination of discussion questions by the multiple choice method will cut the time required for each exam from two hours to one hour. The entire exam will thus require seven instead of 14 hours.

Using an electric scoring machine with one operator, answers can be quickly scored, as the machine makes an electrical contact when the answers are on the right spot on the separate answer sheet. Five thousand exams can be graded in two weeks.

Use of the multiple-choice type of question on Air Corps examinations is not new. It has been used on examinations at the Air Corps Technical Schools at Chanute, Scott and Lowry Fields.

The Personnel Procedure Section of the Adjutant General's Office also has been developing a "Higher Classification Test" for applicants for enlisted pilots. This test is experimental, and will be used in connection with studies of the results of subsequent ground school and other work of those taking the test. As it is new and untried, the "critical score" has not yet been decided upon.

This examination for enlisted pilot applicants is more like an "I. Q." test than the mental exam. It includes three types of questions, arithmetic reasoning, general vocabulary, and number series completion, to measure inductive reasoning. This type of examination also has been used by the Air Corps in selecting prospective technical personnel.

Studies of the mental examination are continuing with a view toward simplifying and shortening the test. Modernization of the mental exam, through studies by experts in exam formulation, may eventually change the form of determining the basic educational level, in order more accurately to include everyone who is qualified.

More than 300 airplanes from other fields landed at Randolph Field, Texas, during the month of June, as compared with fewer than 60 visiting ships during the same period five years ago.

'The dive bomber is used to support, and works in close cooperation with, ground forces -- particularly armored divisions. Here are the first dive bombers to be turned out by Douglas for the Air Support Commands of the Army Air Forces.

DIVE BOMBERS DELIVERED

Many on Order

Initial deliveries of the new Douglas A-24 dive bomber, which is virtually identical to the Navy SBD-3, have been received by the Air Corps. The Air Corps has bought one group of this type for each armored division. The assignment of contracts to North American Aviation Corp. and to Curtiss-Wright for other dive bombers has been announced by Under Secretary of War Patterson. These will be newer types.

The multi-placed ship, which somewhat resembles the Army A-17 in appearance, has been highly praised by a Wright Field test pilot as a "sweet flying ship." Three similar planes were borrowed from the Navy by the Air Corps three or four months ago so that Army pilots could build up a technique of operation for this type of plane.

The A-24 is powered with a Wright Cyclone engine which has a military rating of 1,000 horsepower. It has a speed of about 250 m.p.h. and a range of over 1,000 miles. The ship has a gross weight of 9,000 pounds, a substantial portion of which is made up by an adequate bomb load.

Dive bomber pilots will be trained in their own units. At present, two naval officers are stationed with Air Corps units, one at Bowman Field, Louisville, Ky., and one at the Savannah Air Base, Savannah, Ga., for the purpose of acquainting operations officers with technique and methods developed by naval operation.

In addition, two Air Corps officers, one each from Bowman Field and the Savannah Air Base, where light bombardment units are located and where early deliveries of dive bombers are being and will be received, are on duty for one month at the Norfolk Naval Air Base, attached to navy dive bomber squadrons. At the end of this time they will return to their own fields. However, it is not expected that Army dive bombing tactics will be identical to the Navy tactics. As the situations in which dive bombers are employed will be different, technique will necessarily vary somewhat.

The dive bomber is used to support, and work in close cooperation with, ground

(Continued on Page 24)

Soviet Attitude

by Captain N. Krainev

Recent wars have demonstrated the efficacy of the power-dive bomber. Throughout the Chinese conflict Japanese bombardment aviation has utilized power-diving as the basic method of attack.

The war in Spain afforded many examples of the successful employment of power-dive bombing. We may recall that the Insurgent battleship Espania was sunk by two power-dive bombers. The German Junker-87 power-dive bomber was employed for the first time in this conflict. It was utilized in action against seaport objectives.

German power-dive bombers were employed on a particularly extensive scale in the German-Polish war. The results obtained by them created world-wide discussions throughout the military press. The Allied powers, having no aircraft units equipped with power-dive bombers, rushed the purchase of such aircraft in the United States.

Power-dive bombers were employed on an even larger scale in Belgium and France, especially against important small-size targets. German power-dive bombers attacked concrete structures, airdromes, railway bridges, communication centers behind the Allied lines. Of particular interest is the action of German power-dive bombers in conjunction with motorized and mechanized forces against Allied mechanized units on the march and against their infantry. There have also been noted some power-dive attacks on the part of the British bombardment aviation.

Power-dive functions may be accomplished from high or average altitudes. Compared to bombings from horizontal flight, they afford many advantages. Power-dive bombing enhances considerably the aiming of the bomber, the striking effect of the bombs, and involves less danger, compared to horizontal bombardment action, within the zone of hostile antiaircraft artillery fire. Moreover, power-dive bombers may combine the bombing of targets with the fire action of their cannon or machine guns.

Action from horizontal flight at very

(Continued on Page 20)

THEN THIS... and we were still climbing. About this time the variometer in the front cockpit ceased functioning, but John kept me informed of our rate of climb by telling me continually what the one in the rear cockpit indicated.

At 10,000 feet the altimeter hit the stops on the instrument but we continued to climb for a period that I now compute as seven minutes but which at the time seemed like an hour. Then the bank and turn indicator went out. I could see the ice-covered venturi. I figured it was time for the cloud and me to part company. I had gotten rather acclimated to the rumblings of thunder and its gratuitous gift of frozen precipitation, but honestly I was a long way from enjoying the situation.

There was that beautifully arranged instrument board; airspeed indicator, variometer, bank and turn indicator, altimeter, and compass. Of them all, only the compass continued to give me a reading. From the rate of climb indicator in the rear cockpit and the time of climb after the altimeter hit the stops, I am sure we had reached at least 15,000 feet.

I tried to hold a south course and after what seemed a lifetime, we broke out of the side of the cloud. By this time, we really had a nice load of ice. The bottom of the inside of the sailplane was covered with what looked like snow. Robinson took the controls while I installed an additional variometer in the front instrument panel, and hooked it into the trusty gallon jug.

We continued a south course, and I had no idea where we were. The sky ahead was clear with no clouds in sight. One by one the instruments began functioning as the ice melted; first the airspeed indicator, then the bank and turn indicator. The new variometer in the front cockpit was working fine. Although we held the south course for some time, and I had the map, I am ashamed to say that I had trouble getting oriented. But we continued this course with a constant rate of descent and no apparent thermal activity. After some time, the altimeter dropped to 9,500, then 9,000; even it was working again.

The sky was perfectly clear, and we were pretty sure at 5,000 feet that we wouldn't make Williamsport. At 2,000 feet, we got a weak thermal. After playing with it for a few minutes we left with a 200-foot loss of altitude. To the left was a mountain pass that opened into a level valley. To the right was a plateau between ridges running 30 degrees to the right of our course. The latter appeared to have fields where a landing could be attempted. We could probably have made it through the pass, but there was no altitude to spare. I just couldn't push on the left rudder, and leave those fields on the right.

In my power plane experience, I have returned to the Rio Grande Valley in the Big Bend Country, where as a young pilot I had flown the river bed, a few feet off the water and hundreds of feet below the canyon sides. But on my return trip eight years later, I just couldn't push forward on the stick hard enough to get the airplane down in the canyon. I guess it's just "old age" --smart people call it "experience." I found myself confronted with the problem here. I couldn't force myself to abandon a course, when a good landing was probable, for a sweepstakes ticket through the narrow pass.

We settled to 1,200 feet, then 1,000. Those level fields I saw at 3,000 feet all seemed to slope greatly at the lower altitude. Eight hundred feet altitude and I selected my field, a narrow one without planted crops and sufficiently long, provided I made a good approach. At 600 feet I changed my ideas as to which way the field sloped, so I made a 180 degree overhead, and put her down. Except for a ditch, grown over with weeds, that wasn't apparent from the air, the landing was uneventful. The ditch bounced us back into the air, but there was still sufficient speed to control the sailplane.

We were just 100 miles short of Williamsport but on the right side of the fence in the field selected. Well, I guess that's better than being three feet short and on the wrong side of the fence in the right field. These hours when you await the arrival of a trailer and ground crew give you a lot of time to think. I decided to write the above experience immediately.

This flight was truly the biggest kick in my flying career. As I look back now, it was really sport, but at the time I was in that cloud gathering ice, it was more like labor. To those novices who would repeat or better this flight, let me say-- "When you try it, it's a mighty good feeling to have the National Soaring Champion in the back seat with a set of controls."

"So this is Temple," the aviation cadet of Class 41-G remarked expansively, as he alighted at College Station, Texas.

His instructor at Randolph Field ordered him to write 500 times "I am a 'dodo' for not studying my maps before taking off on a cross-country navigation flight."

A Russian Officer's View

THE GERMAN ATTACK ON LONDON

By Colonel N. Zhuravlew

The air attacks on London afford a good example of the tactical forms modern aviation may assume in operations against large administrative and industrial centers.

To reach London in daylight, German aviation was required to overcome resistance of British pursuit craft disposed at the approaches to the capital. The Germans endeavored to crush the British pursuit aircraft at their airdromes. The British command, however, succeeded in providing its aircraft in due time with sufficient airfields and landing fields to insure the proper maneuver of their aircraft on the ground. As a consequence, the German raids on the British airdromes failed in their mission.

The Germans attempted also to facilitate their approach to London by staging aerial demonstrations against a number of points in South and Southeast England, hoping to divert the British pursuit aviation from approaches to the capital. This tactical method, however, also failed to produce satisfactory results: The British command would not disperse its pursuit craft or divert them for the protection of secondary areas.

The German air forces delivered their daytime raids on London with the aid of mixed groups. These included power-dive bombers of the "Junker-87" type or the fast "Dornier-17" bombers and the "Messerschmitt-110" and "Messerschmitt-109" pursuit craft. The mixed group ordinarily comprised three or four bombardment squadrons of nine airplanes each and two or more pursuit squadrons.

Practical experience demonstrated the expediency of this method. At the same time, however, it has shown that where the adversary is in possession of a sufficient number of pursuit craft, the bombardment craft of the attacker are far from being secure against attack by the hostile pursuit aircraft. Receiving timely information from the observation posts of the appearance of hostile airplanes, the defender is in a position to call out and to have in the air one and a half or twice the number of his own pursuit aircraft--and this was actually the case here.

In escorting the bombers, the single-place pursuit airplanes encountered such tactical obstacles as difficulty in withdrawing from combat and getting away from the hostile pursuit craft because of the fact that, in turning with their tail to the enemy, the single-place pursuit airplane becomes entirely defenseless. The two-place pursuit craft of the "Messerschmitt-110" type were tactically more satisfactory in escorting their bombers. These, however, were incapable of the full protection of their bombers against attack by the hostile pursuit craft.

In a word, the Germans found it impossible to overcome completely the action of the British pursuit craft that were massed at the approaches to London and, not desiring to endure heavy losses in massed daytime attacks on the British capital, resorted to night raids.

Practical experience of aerial engagements during the mass aerial attacks on London has shown that the pursuit craft are capable of attacking the modern fast bombers only from the rear, and this at close range only. Crosswise and frontal attacks are practically impossible because of the fact that the machine-gun fire at long-range, owing to the great dispersion of fire, has little effectiveness, and at close range, in view of the great speed of the airplanes, is almost impossible. Hence machine-gun fire in aerial engagements is opened at a range of 250 to 300 meters, and frequently at not more than 200 meters. However, even though the rear part of the bomber is less protected, the bombardment group, proceeding in close formation, is quite capable of producing sufficiently strong fire protection from the rear so that the pursuit craft, in the case of attacks at close range, will be subjected to serious losses.

The Germans endeavored to overcome the fire of hostile antiaircraft artillery weapons by two methods: By attacks on their battery positions and by a dispersion of the combat formations of their bombardment aviation. Experience failed to justify these methods, and the German air service

increased its altitude of flight during aerial attacks. Even the German night raids are now being undertaken at altitudes of six to seven thousand meters.

The British pursuit aviation and anti-aircraft artillery concentrated in the London area, proved quite effective in daytime action. The Germans, however, unwilling to abandon completely their daytime raids on the British capital, began utilizing their two-place "Messerschmitt-110" pursuit craft on bombardment missions. They possess powerful armament and great speed, and experience less difficulty in overcoming the action of the British in their defense against aerial attacks. The tactical importance of the daytime bombardment attacks carried out by these aircraft consists mainly of the fact that it impedes the work of restoration (especially the extinguishing of fires) and starts fires by which night bombers locate their objectives.

The tactics of German aviation in night operations is characterized by the concentrated attack. There were nights, for example, in which as many as 500 airplanes raided London.

Practical experience has shown the night raids to be far less hazardous than the daytime attacks, though these demand particular skill in the handling of aircraft without the aid of ground orientation features. The Germans execute their night raids by echelons consisting of a score or more airplanes each. To provide maximum safety during flight, each echelon is assigned its own line and precise altitude of flight. The actual raid is delivered not by all echelons simultaneously but by small groups of planes of one or two elements each. This extends the duration of the raids.

In order to enhance the accuracy of their bombardment at night, the Germans usually illuminate their bombardment objectives. They send out special "illuminating planes," which fly at low altitude, and somewhat in advance of the combat groups, and drop illumination bombs over attack objectives. More protracted illumination is provided mainly by starting conflagrations. Incendiary bombs are dropped by the first echelons of the night raiders.

The experience of the raids on London shows that the crushing of a hostile air force by the destruction of hostile airdromes where the enemy has at his disposal a more or less properly developed airdrome system, and where he is in possession of sufficient means for restoration of losses--is a rather difficult matter. This is true, moreover, even where the attacker possesses a relative superiority of forces over the enemy. The neutralization of antiaircraft artillery established on fortified defense positions and equipped with means of defense against low-flying and dive-bombing craft is even more difficult of accomplishment.

The protection of bombers with the aid of escorting pursuit craft in daytime raids still remains an unsolved problem. The matter of determining the proper proportion of pursuit and bombardment craft in mixed aircraft groups during daytime raids on London has proved difficult.

The ratio of 2:1 employed in the Spanish conflict fails in the action against the British.

Nor did the Germans find an effective method for the penetration in daytime of the screen of pursuit aircraft situated at the approaches to their attack objectives. If this proved so difficult of achievement where the bombardment objective was situated a distance of 120 to 150 kilometers (about 75 to 95 miles) behind the advance line of observation posts, the difficulties will be even greater where the bombardment objectives will be situated several hundred kilometers from the front lines.

The two-place twin-motor pursuit airplane proved itself more suitable for daytime bombings which, being a fighter airplane and possessing high ceiling and great speed, experiences relatively small difficulty in overcoming all modern means of antiaircraft defense. Important results, however, may be achieved only by the employment of large quantities of these pursuit craft, since the load which each of these may carry is rather insignificant.

The most effective means in action against bombardment craft flying in close formation is the pursuit plane armed with cannon. It is capable of firing at such range as to remain beyond the reach of the machine-gun fire of the bombers. Though the bombers may suffer some damage from the cannon fire of the pursuit craft, yet, considering the meager effectiveness of the small-caliber shells and the limited reserve of these carried by the pursuit craft, it will not be advisable for the bombers to assume dispersed formations. In such event, these will lose their fire contact among themselves and become easy prey for the pursuit craft in subsequent attacks.

Aerial engagements with the aid of machine-gun fire are conducted at close range, not

(Continued on Page 24)

Facilities Under Construction

GULF COAST PREPARES TO TRAIN 18,000 YEARLY

Facilities for training more than 18,000 military airmen annually are in operation or under construction in the Gulf Coast Air Corps Training Center's administrative area, Maj. Gen. Gerald C. Brant, commanding the center, revealed recently at Randolph Field in a survey of activities under his direction.

Thirty-two primary, basic and advanced flying schools and one bombing range are involved in the training program, part of the Air Corps' plan to train 30,000 pilots annually.

New construction totalling approximately $55,000,000 for the military flying schools will be required to meet the greatly increased training program. Many of the new training schools are nearing completion, as in the case of the twin-engined pilot and bombardier school at Ellington Field, Houston, Texas, and the pursuit pilots' school at Victoria, Texas. Kelly Field and Brooks Field, San Antonio, Texas, "veterans" of many years, are undergoing extensive modernization, at a cost of about $6,500,000.

Twelve thousand of the 18,000 airmen to be trained annually in the GCACTC area will be airplane pilots, 3,000 will be bombardiers, 2,000 will be aerial navigators, and 1,000 will be observers. Of the 12,000 fliers, 7,500 will be trained as multi-engined pilots, and 4,500 will be taught the intricacies of single-engined pursuit planes.

In announcing the details of the expanded training facilities, General Brant pointed out that as late as June, 1939, there were only two Air Corps flying schools in the entire nation - Randolph Field, a combination primary and basic school and Kelly Field, the advanced flying school. Two years and a few days later, 32 major flying fields comprise the Gulf Coast Air Corps Training Center alone, with almost as many schools in each of the other two training centers, the West Coast and the Southeast Air Corps Training Centers.

The thirty-two schools are divided into three categories, primary, basic and advanced. When the program swings into high gear late this fall, there will be 16 primary schools, six basic flying schools, five twin-engine advanced flying schools, three single-engine advanced schools and one gunnery school. Aerial gunnery and bombing ranges will be constructed at numerous points along the Texas coast from Brownsville to the vicinity of Lake Charles, La.

Ten civilian elementary flight training schools, under Air Corps supervision, using Air Corps planes and equipment, are now in operation in this area. Contracts have been let to civilian operators for an additional six schools, which will be in operation by October, making a total of 16 civil elementary flight training schools.

Location of the new primary training fields are: Bonham, Texas; Chickasha, Okla.; Vernon, Texas; Uvalde, Texas; Coleman, Texas, and Ballinger, Texas.

One basic flying school, operated by civilian personnel, and two military basic flying schools are in operation in the area today. Three additional military basic schools will be added to the far-flung training system. Sites have been selected at Enid, Okla., and at a point midway be-

(Continued on page 26)

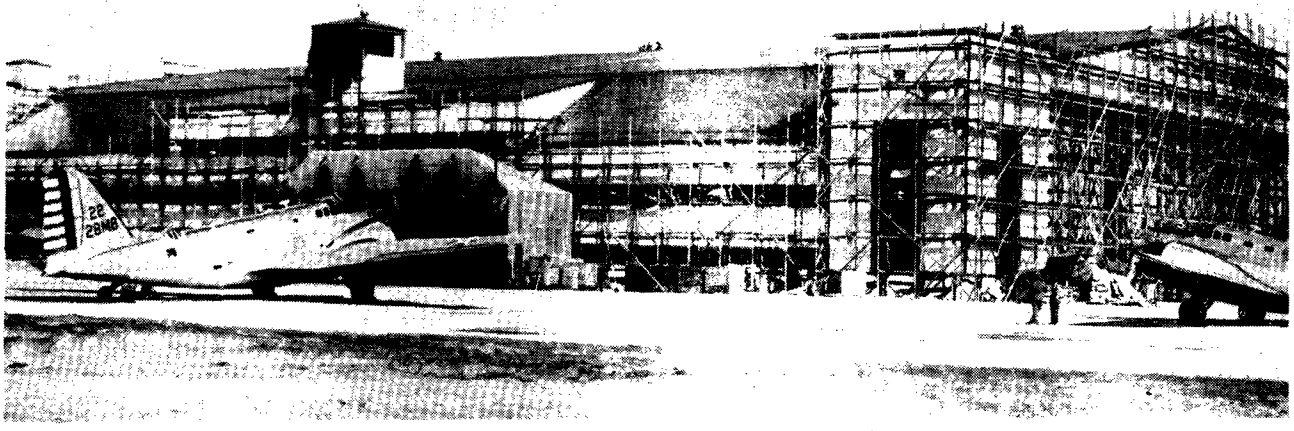
NEGRO SCHOOL OPENS

The first school to train Negro students as officers in the Army Air Forces was opened formally last month at Tuskegee, Ala., when Maj. Gen. Walter R. Weaver, commanding the Southeast Air Corps Training Center, set into motion activities of the Ninety-ninth Pursuit Squadron and Pilot Training School.

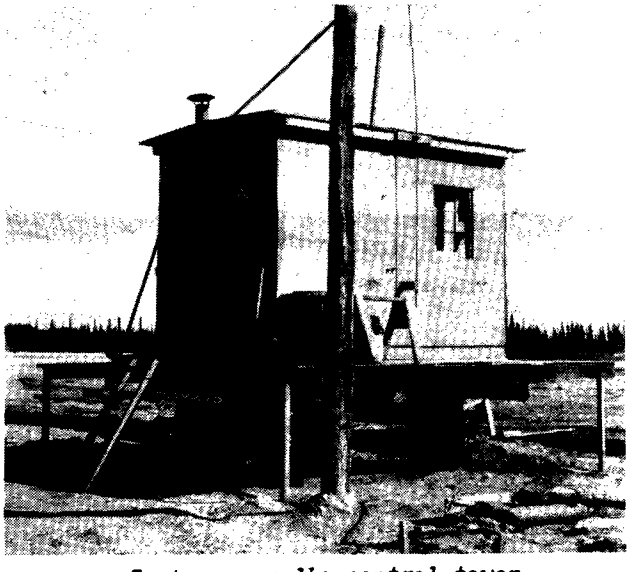
The first group of Negro aviation cadets sat in the shadow of the monument to Booker T. Washington, famed leader of their race, on the campus of Tuskegee Institute to hear General Weaver address the group attending the opening ceremonies. Dr. F.D. Patterson, President of Tuskegee Institute, also spoke and G.L. Washington, civilian director of the flying school, acted as master of ceremonies.

Captain Noel F. Parrish is Air Corps Training Detachment commander at Tuskegee and was among the Air Forces officers participating in the program. Maj. Gen. H.H. Arnold, Chief of the Army Air Forces, and Gen. George C. Marshall, the Chief of Staff, sent congratulatory messages.

ALASKA

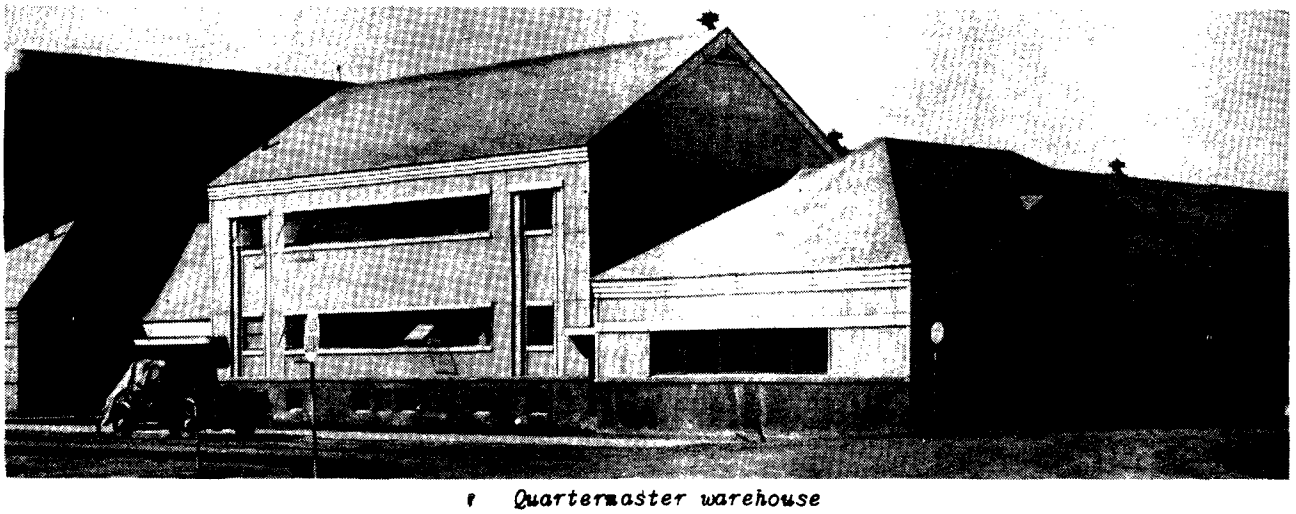


Ladd Field: Hangar under construction

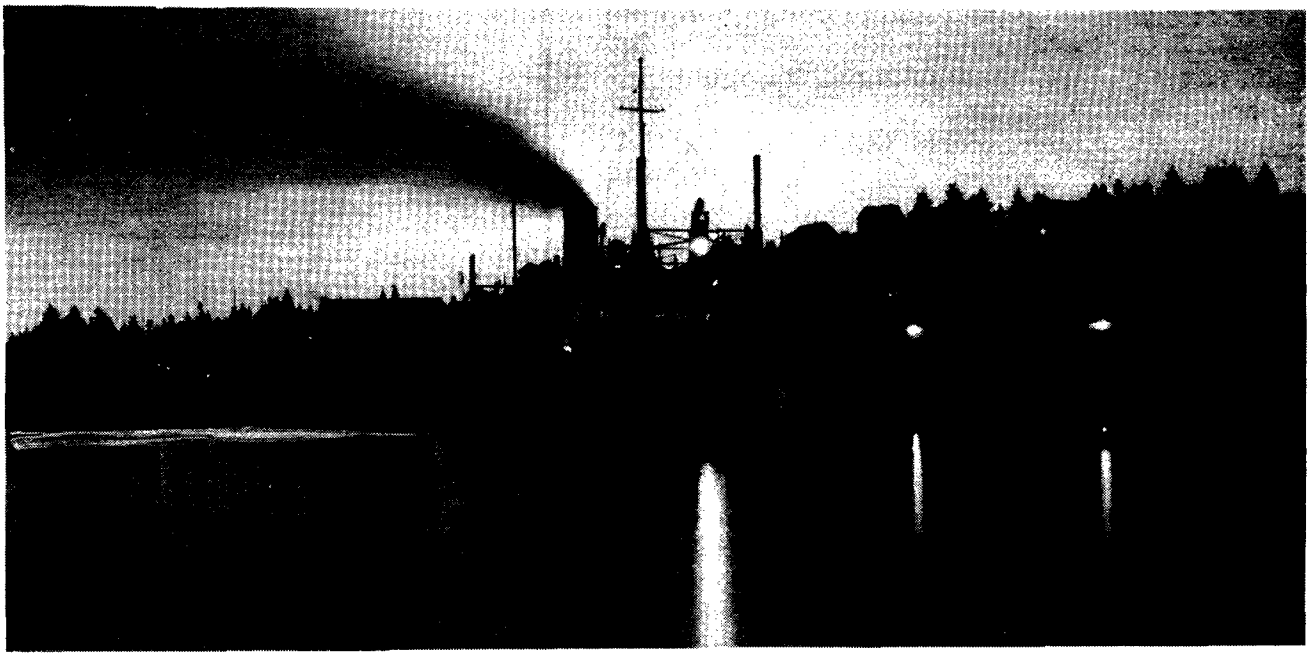


Temporary radio control tower

Boat dock (No ice?)



Quartermaster warehouse



The Army Air Forces in Alaska: The transport St. Mihiel at Yakutat and Iliamna Volcano, photographed from an F2 photographic plane attached to the photo squadron at Elmendorf Field.

LANDING various materials under consideration were worth a more extended test at Langley Field. Truck tests on swampy ground were held at Langley Field to obtain some idea of the efficacy of a met in distributing a plane load. Tire damage studies were conducted with various surfaces. Five materials were tested with plane loads at Langley Field.

The test program developed certain characteristics which should be found in any mat suitable for use as an emergency landing mat. These include strength, continuity, surface, speed of laying, speed of production and rehabilitation, plus variable factors whose relative importance could not be immediately determined, such as ease of camouflage, cost, cargo space required to transport one runway, weight, ease of reconditioning, skid proofing, usable life, amount of maintenance required, and accelerated tire wear.

Three materials were found which, in the opinion of the Engineer Board, were suitable for use as an emergency landing mat. These three materials were steel plank, Irving grid with slip ring connectors and rod and bar grid with wedge connectors.

In July of 1940, 150,000 sq. ft. of foreign designed Chevron grid, and 150,000 sq. ft. of steel plank were purchased for test at Langley Field. The Chevron grid was found to lack the continuity required at the joints. While the steel plank presented a more satisfactory surface, it was slippery when wet and muddy, and it was difficult to camouflage. Accordingly, the Engineer Board proceeded with a two-fold program: elimination of the shortcomings of the steel plank, and the development of a satisfactory grid type mat.

In regard to the former, improvements were provided to facilitate coupling of the planks. A raised button pattern was provided to inhibit skidding, and truck tests indicated that the buttons helped to a certain extent. Efforts to camouflage the steel planks by paint met with a considerable degree of success. However, the smooth surface, when viewed from a certain angle, reflects light in such a manner that no paint would disguise it. A steel plank with openings stamped in it was devised to permit grass to grow through and help disguise the surface.

Development work on the grid type mat resulted in the purchase of 450,000 sq. ft. for service test in the field. The mat appears to have the physical characteristics required, but costs 50% more than the steel plank and cannot be produced as rapidly.

ANDREWS keys to vast areas. And as a veteran American air officer has been placed in command of the Caribbean defense zone, so the British have placed Air Marshal Sir Brooke-Popham in charge of the entire defenses of the Singapore area.

The Caribbean Defense Command has under its jurisdiction the Panama Canal Department, the Puerto Rican Department and the base commands at Trinidad, St. Lucia, Antigua, the Bahamas, Jamaica and British Guiana. The Caribbean Air Force, which is, incidentally, the largest air force in the history of the United States, operates directly under the Caribbean Defense Command with components located at the various bases. All army air forces in the Panama Canal and Caribbean areas were grouped under a single command in June.

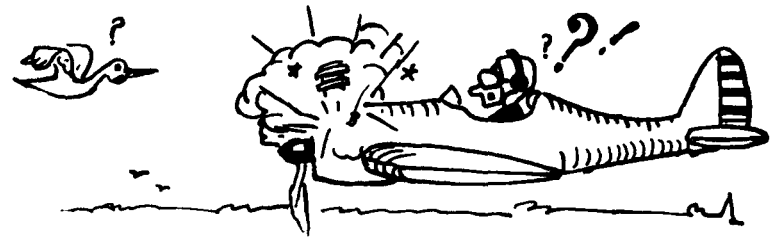
Three Army Air Force brigadier generals were promoted to be temporary major generals in July. They are Brig. Gen. Gerald C. Brant, commanding the Gulf Coast Air Corps Training Center, Randolph Field, Texas; Brig. Gen. Rush B. Lincoln, commanding the Mississippi Valley Technical Command, Chanute Field, Rantoul, Ill., and Brig. Gen. Walter R. Weaver, commanding the Southeast Air Corps Training Center, Maxwell Field, Ala.

Three other Air Corps generals were assigned to new commands during the month. They are Maj. Gen. John F. Curry, assigned as head of the Rocky Mountain Technical Command, with headquarters at Lowry Field, Colo.; Maj. Gen. Barton K. Yount, to command the West Coast Training Center, Moffett Field, Calif., and Brig. Gen. William O. Ryan, to command the Fourth Interceptor Command, with headquarters at Riverside, Calif.

Promoted to be temporary brigadier generals were Col. Henry J.F. Miller, commanding the Air Corps Maintenance Command, Wright Field, Ohio; Col. Ralph P. Cousins, Headquarters, Army Air Forces, Washington, D.C., and Col. Edwin B. Lyon, formerly commanding officer of the West Coast Air Corps Training Center, Moffett Field, Calif.

A welded rod and bar type of grid has been developed which is somewhat cheaper and speedier to fabricate than the riveted Irving grid. Preliminary general conclusions indicate that the steel plank type of mat has far more bearing surface than the grid, requires 50% less cargo space, and can be produced much more rapidly. The open grid type of mat is definitely easier to camouflage than the steel plank type, and is skidproof.

TECHNIQUE



An epidemic of broken cylinder heads has indicated a necessity for a review by the Materiel Division, Wright Field, of the technique of correctly operating the throttle and propeller control. The sequence of events is important. While this information is published in various technical orders, it is consolidated here for ready reference and emphasis.

In the training type airplane equipped with a two-position propeller and an engine having no altitude rating, the technique of reducing engine power may differ somewhat from that required for satisfactory operation of high performance tactical type airplanes.

Following take-off in a training type airplane, the throttle may be left in the advanced position while the propeller is shifted to the high pitch position without subjecting the engine to any adverse operating condition. In the tactical type airplane engine, with its constant speed propeller and variable altitude horsepower ratings, operating procedure on the above method, when reducing engine power, may cause serious overstressing and failure of engine parts.

When power is reduced as outlined above, the throttles are wide open, supplying all air possible to the internal supercharger, so that the cylinder obtains a heavy charge of mixture. In attempting to burn this dense charge at a slow engine speed, preignition, and often detonation, is experienced. Failures resulting from these conditions are cracked cylinder heads, stuck and broken piston rings, burned pistons and scored cylinders.

In airplanes equipped with an exhaust turbine supercharger, the excessive strains on the engine are accentuated because of the attempt of the turbine to maintain a constant exhaust back pressure with a diminished amount of exhaust gases.

Instances of 50 to 60 inches of manifold pressure have been reported when cylinder heads have failed following take-off. Under conditions of excessive manifold pressure immediate failure or overheating are usually experienced. Sometimes the final failure is noted several hours later when cruising at very moderate power. Under some conditions the time lag in the propeller pitch changing mechanism prevents failures in that the slowing of the engine is not rapid enough to produce excessive cylinder pressures. This feature cannot be relied upon to prevent failures because it depends upon the clearances in the propeller and the viscosity of the oil supplied to the propeller.

To reduce to a minimum failures caused by excessive cylinder pressures, it is recommended that the procedure used when reducing engine power be:

1. Close throttle or supercharger control to obtain desired manifold pressure.
2. Reduce engine speed by operating the propeller control.
3. Lean mixture to obtain the desired values.

When increasing engine power, the procedure should be accomplished in the reverse manner:

1. Set mixture control "rich."
2. Increase engine speed by operating the propeller control.
3. Open throttle or supercharger control to obtain the desired manifold pressure. If necessary, readjust the mixture control and throttle to obtain the exact value desired.

It is again desired to emphasize the point that the above holds true in airplanes equipped with or without the turbo supercharger.

A streamlined aircraft maintenance system is being introduced at Gunter Field, Montgomery, Ala., following the efficient production methods of automobile and airplane factories throughout the country.

Prior to entering the hangar to be started on their course down the production line, airplanes will be subjected to a thorough cleaning process. The aircraft radio equipment and other instruments will then be checked; engines tuned, or replaced where necessary; bolts and brakes adjusted, and minor repairs effected. Each operation will be performed at one of a series of stations set up along the production line, where there will be on hand groups of top-flight, experienced mechanics who have had

specialized training for their particular jobs. The idea of keeping the same men continually on the same job will not only result in a considerable improvement in the quality of work but will prove a time-saving factor.

This accelerated maintenance system will be run on a 24-hour basis in three eight-hour shifts. The night and day crews will alternate weekly. An improved lighting system will be installed to eliminate the eye strain heretofore encountered by mechanics working at night.

Before airplanes are returned to the hangar line, they will be carefully inspected by trained technicians and sent up for a flight test.

With the inauguration of this maintenance system, squadrons at Gunter Field will have an increased number of planes in commission, airplanes rarely being absent from the flying line longer than four hours.

Some of the time-saving devices to be utilized in this system will be electrical test benches for checking booster coils, solenoid switches and magnets, and a portable hydraulic brake servicing stand, consisting of a drum of compressed air and brake fluid, pressure gauges, bleed lines, etc.

Lieut. Col. Aubrey Hornsby, Commandant of the Basic Flying School at Gunter Field, an engineering officer of wide experience, feels that this new arrangement will not only relieve the pressure of maintenance in the squadrons and keep a greater number of planes in the air at all times, but will prove the means of giving specialized training and actual experience to the new officers and enlisted men who will be assigned to the miscellaneous crews. They will learn the process of maintenance step by step. Class room lectures will also be given for their benefit.

The trained specialists and noncommissioned officers will come from the Seventy-Second Materiel Squadron, but each squadron at the field will furnish officers and men to learn the process.

A representative of the Vultee Aircraft, Inc., at Gunter Field, Mr. John Harris, has aided in the establishment of the streamlined maintenance system. Capt. H. F. Muenter will be the executive technical supervisor of the system, with Lieut. R.E. Greer as officer in charge of the maintenance.

In view of the tremendous amount of maintenance required in order for this station to continue its schedule of 750 flying hours a day, or an average of from 10 to 12 hours for each assigned plane, a rough idea may be gained of just how beneficial this new maintenance system may prove to be.

A redesigned portable work shelter has proved exceptionally valuable at Goodfellow Field, San Angelo, Texas, in protecting mechanics against both excessive heat and bitter cold while working on aircraft at the Texas air station.

The new shelters are steel frames covered over with waterproof canvas, with flaps on the sides which may be raised or lowered. Mounted on wheels, the shelters may be quickly moved from one place to another. The floor is mounted in the shelter at a position where all parts of the engine are accessible without much reaching or stooping. Immediately beneath the engine the floor is cut away and a detachable oil pan may be suspended there to catch oil or dropped parts. The floor is also cut away beneath the propeller, so that it may be rotated as it is worked on.

During the cold winter months before Goodfellow Field was opened, Lieut. Col. George M. Palmer, post commander, who was at that time doing his own office work in an unheated building, sitting on a nail keg with a typewriter on his knees, decided that his men, who would soon be coming to the new post to work on airplanes on the outside, were going to need some protection against the icy wind and blistering sun of the West Texas plain.

The Colonel mentioned to his men the work shelter he had seen at Duncan Field, but could not forget that they were complicated and required much time to build. Mr. Sgt. H. V. Johnson came forth with a plan for a smaller and simpler shelter that could be built with civil service labor at the San Antonio Air Depot. In addition to being cheaper, the new shelter could be built quickly in relatively large numbers.

The shelters are proving to be more valuable than anticipated. They not only protect the men from severe sunburn, but also prevent the ship from becoming so hot as to burn one's hand when touching it. In cold weather the flaps may be fastened down to form a copy and dry workroom. When the rain does not fall the shelters also keep out dust.

Maj. Gen. Arnold and Robert A. Lovett, Asst. Secretary of War for Air, reviewed 700 aviation cadets August 1 at Randolph Field.

JUNGLE RUNWAY

Do Record Job

A huge runway has been carved out of the heart of the Panamanian jungle, in a major engineering triumph over nature, to provide landing and take-off facilities for Army Air Force planes based at Howard Field, newest air field in the Panama Canal defense zone. A great slab of concrete, more than 85,000 square yards, was poured in 21 days.

From start to finish, nature interposed obstacles to the task. The thick, tangled jungle offered every sort of impediment to the plotting of an air field by ordinary surveying methods, and the impending rainy season threatened to break down the work.

The first problem was to plot the course of the runway. A new twist was given to the art of surveying by selecting the site from the air. There was the problem confronting the Air Corps of attempting to present its decision as to the position of the runway, when going over the location on foot, while in the air the pilots could point out exactly what they wanted.

Translating their wishes to the Constructing Quartermaster's surveyors in the bush, however, was almost impossible, because the pilots could not recognize the plot except when flying over it. So the decision was made to survey from the air.

Several flights were made over the area, prevailing winds were studied and seasonal changes noted. Through the camera opening in the floor of the bomber, 100-pound bags of powdered lime were dropped at regularly-timed intervals. Surveying parties on the ground located the white lime-bursts. After a second trial, they set up their instruments, mapped the route of the bomber by triangulation, and established the runway's position.

The entire contract, including aprons, runway and taxi strips, required the pouring of 180,000 square yards of concrete. The contractor furnished equipment, labor, supervision and miscellaneous materials other than cement, sand, rock and water, which were supplied by the government.

On the technical side arose the task of combating and preventing cracks or checking, in the concrete, which experts said would occur from too rapid evaporation of the water content of the cement, due to

(Continued on Page 22)

FACILITIES EXPANSION

Plant Builders Aided

Project-engineering problems connected with the requests of industrial firms for Government aid for expansion purposes, in order to enable them to meet scheduled deliveries on contracts already held or about to be entered into with the Air Corps, are being met at Wright Field by the Facilities Expansion Branch.

The branch, which will be a year old next month (September) forms part of the Industrial Planning Section of the Materiel Division. It analyzes and evaluates every cost applying to industries set up with Government aid, determines that the subject is adequate and suitable for the production intended, and that the output for each project is standard for the particular type of industry.

The problems of tax amortization of expansion financed by companies with their own capital to meet increased production requirements of the Government are also included in its duties. In executing this work a group of field personnel operate under the direction of the Wright Field office.

To date the branch has thus project-engineered the expansion of some 80 plants ranging in size from $38,000 to $56,000,000, at a total cost which is not communicated to the average taxpayer for fear of the disastrous effect on blood pressure. It is always working with 40 to 50 expansion projects in various stages of progress. It has also refused expansions of industry that could not be justified and has pared down others, thereby saving the Government several hundred million dollars.

The section is doing its small part in what it believes to be a keystone task for the Air Corps in project-engineering industries all the way from setting up magnesium reduction plants to airplane and engine plants. In addition, it has to date analyzed and certified for approval the expansion of some 360 industries that are to receive the benefits of tax amortization.

The cockpits of BT-14's are so hot during the Texas version of the summer months that fifteen instructors at Randolph Field lost an average of eight pounds each during the last two months. They always regain their lost poundage in the fall.

SOVIET . . . low altitude or "hedgehopping" aids in hitting the target, but at the same time lowers the striking force of the bomb. Furthermore, where an object is well protected by antiaircraft defense weapons, heavy losses may be inflicted upon such attacking aircraft.

Horizontal action from great altitude may be utilized against extensive areas. The chances of hitting a target of some score of square meters in extent are negligible. Horizontal bombardment from average altitude will likewise afford slight effectiveness and will be rather hazardous where the target is protected by antiaircraft artillery.

Only power-dive bombing affords accuracy, effectiveness and striking power of bombs together with lesser danger from the action of the antiaircraft defense weapons on the ground.

The essential features of the power-dive bombing consist of the dropping of the bomb at the moment when the airplane is directly over the target, flying at a sharp vertical angle. Aiming is accomplished by the direction of the airplane itself. When power-diving at a sharp angle the trajectory of the plane and bomb is nearly the same.

Theoretically, it might be said that when power-diving at an angle of 90° the trajectory of the flight of the airplane and that of the bomb are identical. The sharper the angle of the power-diving airplane the greater the accuracy of aim. At the same time errors in determining the exact altitude, speed of flight and variations in the course of flight have a much lesser effect on the accuracy of the attack than in horizontal bombing. There remains, however, the influence of the wind on the flight of the bomb. The effect of wind on the flight of the bomb, however, is less in the circumstances, since the speed of the bomb is increased while the time that the bomb is affected by the wind is reduced.

The striking power of the bomb is increased, since being released in the process of the power-dive, it already possesses the initial velocity of the airplane. In dropping bombs from horizontal flight the initial velocity of the dropped bomb is zero. The employment of air bombs with reactive propelling devices, affording the bombs additional velocity, further augment their destructive power.

On approaching a target the power-dive bombers enjoy full freedom of maneuver. They do not require a stage of horizontal flight to take aim, as in the case of bombings from horizontal flight. The very act of power-diving is performed in the course of flight, though it involves the loss of altitude at tremendous speed. This flight maneuverability greatly complicates the aiming of antiaircraft weapons. The greatest losses may be expected from barrage fire, but even here matters are facilitated by the fact that power-diving at tremendous speed reduces the time during which the bomber remains within the zone of antiaircraft fire.

Along with the advantages involved in power-diving, there are also certain disadvantages. Targets may be attacked only with small elements. In the circumstances, the dispersed aircraft enable hostile pursuit planes to attack small groups of planes or individual aircraft.

The theory and actual practice of power-dive bombing resulted in the construction of a new type of plane--the power-dive bomber. The construction features of the latter include ailerons and reverse screws designed to retard the speed of the craft during power-dive actions. In the case of an ordinary airplane the speed attained in power-diving so intensifies the action of the motor as to increase considerably the radius involved in coming out of power-dives.

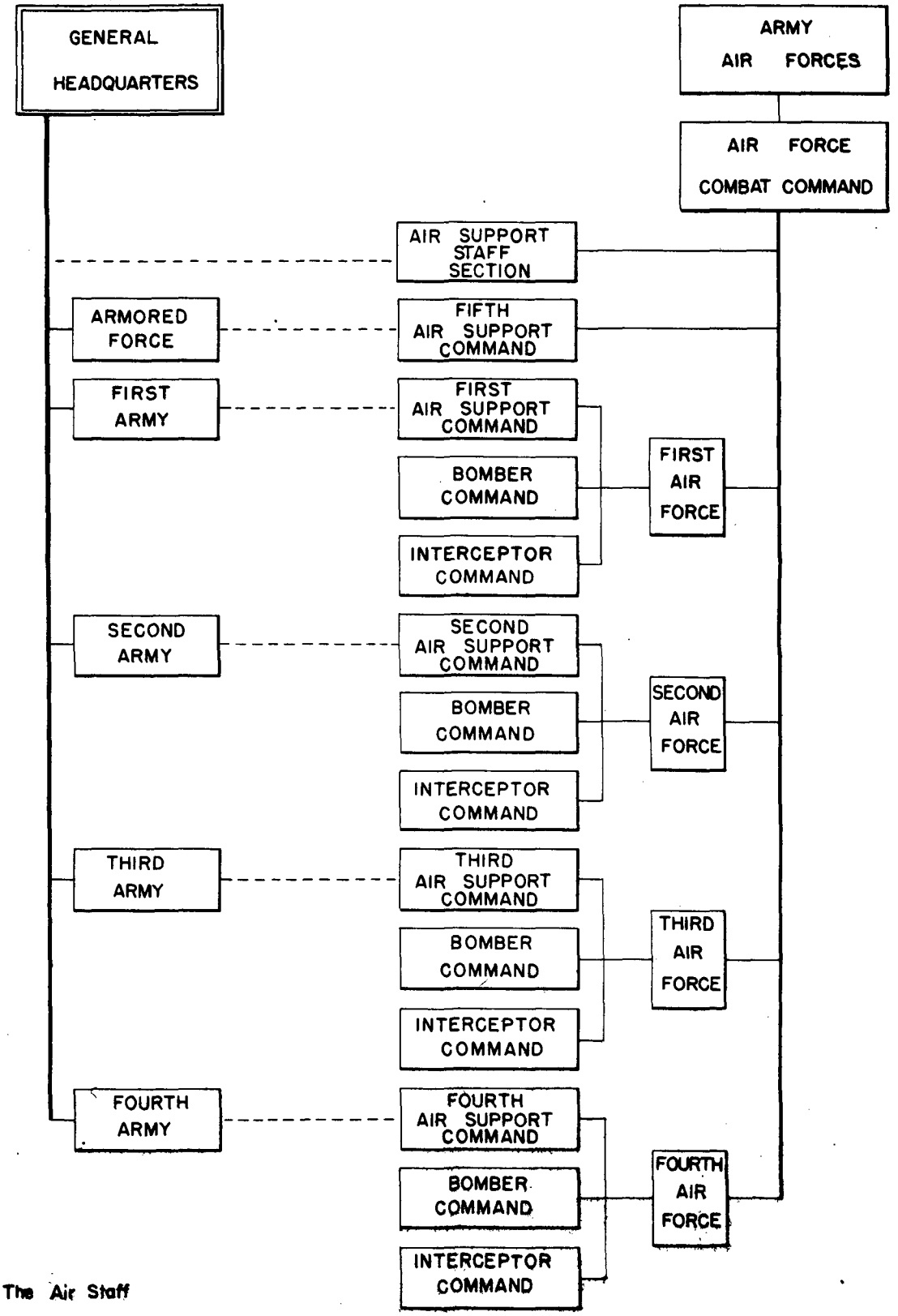
The altitude of the airplane in coming out of a power-dive is proportionally greater with the increased speed of the craft. Greater altitude renders aiming more difficult and complicates the bombing. The employment of devices for slowing down the dive of the plane retards the drop and thus facilitates the functions of the airplane crew. The power-diving Junker-87 bomber attains a speed in power-diving of about 470 miles per hour. The employment of the slowing-down devices lowers this speed to 280 miles per hour. For the purpose of increasing the radius of action of the Junker-87, extra gas containers are carried on bomb racks under the airplane wings.

At the outbreak of the Second World War in Europe only the German air service possessed special aviation units of power-dive bombers. These were equipped with the Junker-87 and Henschel-123 planes and were extensively employed in the war against Poland.

The single-motor, two-place power-dive

(Concluded on Page 22)

ORGANIZATION
OF
ARMY SUPPORT AVIATION



The Air Staff

SOVIET ... (Concluded) Junker-87 bomber has a maximum speed of 206 miles per hour, a radius of action of about 519 miles, and is capable of lifting one 1,000 lb. bomb and four 110 lb. bombs. These planes are employed in the bombing of bridges, railway centers, industrial objectives, as well as against troop concentrations.

The one-place pursuit plane and power-dive Henschel-123 bomber have a maximum speed of about 220 miles per hour, a range of 560 miles, carry 440 lbs. of bombs and are armed with four machine guns. These planes are utilized primarily in action on the battlefield against artillery batteries, machine-gun nests, troops in shelters, tanks and other targets.

Considerable assistance was afforded by the power-dive bombers to their forces on the ground. A major portion of these was attached to mobile motorized and mechanized units with the mission of insuring the continued progress of these units. Contact with the bombers was maintained by radio. The moment that mechanized columns encountered resistance the aircraft were called upon for assistance. Combined air and ground attacks against hostile troop concentrations and antitank batteries soon paved the way for the advance of the Germans.

A few words are necessary on the tactics employed by the power-dive bombers in attacking objectives protected by antiaircraft artillery. A group of five airplanes, two of which are power-dive machines, approach the target at an altitude closely within maximum range of the antiaircraft fire. The power-dive bombers then immediately descend upon the target, acting as if they had been hit by the antiaircraft fire below. The fire of the antiaircraft artillery is then concentrated on the airplanes continuing their flight--meanwhile the power-dive bombers complete their bombing missions.

The action of the power-dive bombers has been such as thoroughly to justify their existence. The successful action of bombardment aviation, however, calls for the combined employment of different methods in the execution of bombardment missions.

Krasnaya Zvyezda, 23 May 1940

(Translated at the Army War College, Washington, condensed by Col. F. M. Barrows, F.A., and reprinted from The Military Review of the Command and General Staff School.)

JUNGLE ...(Concluded) high daytime temperatures. The newly laid concrete was, therefore, cured by covering with water-soaked burlap, followed, after its initial set, by a coat of black asphalt emulsion. This latter spraying operation also reduces the sun glare reflected by the runway surface, which is an important construction detail to prevent blinding of the landing pilots.

Speed achieved on this project was largely due to the fact that the constructing quartermaster had planned for months in advance, and his force had accumulated a huge pile of rock at its own quarry. Roads had been hacked out from quarry to runway site, and from the cement plant to the work area; cement had been ordered from the States and arrangements made for its transportation from dockside via the Thatcher Ferry across the Canal and thence by truck to the storage sheds. These factors had an important bearing on the progress of the air field when the actual work was started.

Among the preliminary tasks accomplished by the Constructing Quartermaster's force were the clearing of about 1,000 acres of jungle underbrush; moving of 500,000 cubic yards of dirt, and the leveling of a long 27-foot hill to fill in the hollows. There were 32,000 cubic yards of rock mined at the Howard Field quarry and 14,000 cubic yards of sand scooped from the beach at Bruja Point. The task required 186,000 bags of cement.

Howard Field is one of a group of Army Air Force installations being constructed to supplement the vital defenses of the Canal Zone. It is very large, when completed having facilities to accommodate several thousand officers and enlisted men. Part of the construction program already has been completed, and some facilities are in use.

INSIDE THE BACK COVER

The cartoon on the inside of the back cover is one of a series being distributed by the hundreds of thousands by the British Government to emphasize the danger to national security of careless talk which reveals information of value to the enemy. Poster-size reproductions of the series (one of which will be carried in each issue of THE AIR CORPS NEWS LETTER) suitable for posting in barracks and elsewhere, may be obtained by station commanders on request to the Intelligence Division, Office of the Chief of the Air Corps, Washington.

SPANISH

American rearmament must include more than guns, at least in regard to Latin America. Hemisphere defense will depend on our ability to win the friendship of the Latin Americans. That is the assertion of Professor Henri Louis Gueydan, distinguished scholar and head of the Spanish Department at Barksdale Field, La.

Air bases in the South American countries and United States loans for armaments are important the professor grants, 'but they can be turned against us by enemies.'

Professor Gueydan's teaching includes more than mere Spanish grammar. In fact, he says, a knowledge of the language can be a dangerous instrument in a person's hands unless he understands the Latin temperament. [illegible] South American psychology is at least as important as an ability to converse. On this point the Germans are way ahead of us.

'The Germans thoroughly prepare their agents in Latin American psychology before they send them to that country, and they have badly undermined us down there,' the professor says.

His work at Barksdale is arranged to provide this background. Four classes of one hour each are held from 9:30 a.m. to 3:45 p.m. daily except Saturday and Sunday. But Professor Gueydan goes beyond mere classroom drill. He has initiated a series of open forum meetings which are held in the Barksdale Theater for his students, their families, and others who may be interested.

A meeting is held each Friday afternoon and

(Continued on page 26)

WE LEARNED... (Concluded) flights. Of the seven cross country trips taken, six terminated on airports. The average distance was 50 miles. The customary procedure was to cut loose from the tow plane at 3,000 feet. When thermal activity was encountered, the pilot would spiral, gaining all the altitude possible. He would then resume his course until the next thermal was encountered, when the spiraling would be repeated.

It sounds easy but required considerable practice. The advantages in landing on an airport at the termination of the flight are twofold. First, you are assured of a decent landing field without last-minute discoveries of ditches, power lines, cattle, etc. Secondly, the sailplane can be towed to the home airport by airplane tow with the resulting saving in trouble of dismantling the sailplane and trucking it back on a trailer.

LONDON..(Concluded) to exceed 250 to 300 meters. Action at greater range may be resorted to only where the aircraft are equipped with cannon. The best armed airplane so far has proved to be the machine-gun and cannon equipped pursuit plane.

In the case of the swift bomber, threat of pursuit craft machine guns is only from one direction--40 degress in the rear hemisphere--primarily against the lower portions of the bombers.

The modern night antiaircraft defense is suffering from a variety of important deficiencies; as a consequence, night raids have proven relatively safe. The Germans have transferred their efforts to night undertakings.

The value of the experience to be derived from the raids on London is exceptionally great, inasmuch as it has permitted the verification of a series of theoretical assumptions. Some of these may be now corrected, others as thoroughly refuted. Of equally vital importance is this experience in the construction of airplanes and motors.

From Krasnaya Zvyexda, 31 December 1940

(Translated at the Army War College, Washington, D.C., and condensed by Capt. O. C. Michelmann, Military Intelligence.

Reprinted from The Military Review of the Command and General Staff School, Fort Leavenworth, Kans.)

NEW TYPE..(Concluded) forces--particularly armored divisions. Coordinated action of armored ground forces, in constant communication by radio with cooperating dive bomber forces, has proved to be the deciding factor in many of the campaigns of the European war.

Early experiments with the technique of dive bombing were made in Haiti by the Marine Corps in 1920 and 1921, at a time when the entire Marine aviation group consisted of only 42 pilots. In these early efforts DH4's of World War fame were used, and both bombs and bomb racks were improvised.

Experiments with dive bombing by naval aviation between this time and 1927 were conducted mostly with Vought Corsairs and Curtiss Falcons, the latter an Army airplane. Theories of bomb fragmentation, angle of descent, optimum altitude, etc. were developed in this period. Complicated bomb sights which had been used earlier were discarded as increasingly steeper dives enabled more effective bombing to be accomplished merely by using the gun sights.

Results of this early development were first released to the public in 1927 at the first Miami Air Races, when targets placed in full view of the spectators were subjected to dive bombing attacks by naval aviation units in an impressive exhibition. At this time Navy and Marine Corps authorities decided to design a special plane for dive bombing, as the potentialities of this method of warfare had become so evident. This first dive bomber was the famous Curtiss "Hell Diver," produced in 1929.

Dive bombing was employed extensively between 1927 and 1931 by Marine forces in Nicaragua against bandit and revolutionary factions in that country. Standard planes were used, with 30-pound fragmentation "personnel" bombs.

Their use by the Germans, who picked up the idea in this country, was particularly effective in the Lowlands campaign and in France.

SPANISH..a South American country is discussed. A short address is made by Professor Gueydan, in which he relates native anecdotes and draws from his experience a picture of the psychology of the people. A film obtained from the Pan American Union at Washington, D.C., illustrates each talk, and the music of the country is played on a phonograph. The lectures are given to afford the officers a good look into what makes the Latins tick, a knowledge that is indispensable, the professor insists.

ALASKA RESCUE

Down on Island

The pilot of a B-18A landed on a tiny island in the Alaskan wilds last month when the right engine quit while he was flying in a six-ship formation after completing a photographic mission. Members of the crew escaped unscathed.

Mr. Sgt. Barron C. Powers and Tech. Sgt. Ralph S. Davis, members of the First Photo Section at Maxwell Field, described the forced landing when they returned to the Southeast Air Corps Training Center recently, after spending a month on the photo mission in Alaska.

"We had accomplished our mission and had taken off from Juneau on the way back," they said. "It was 1 P. M. when the right motor said 'whoof' and quit at 5,300 feet. The pilot feathered the propeller.

"We sat quiet, buckling on safety belts. We were a six-ship formation of B-18A's. The other five ships wheeled over us. We were headed down. Some jagged mountain peaks were coming up. The Pacific was out on one side.

"We were losing altitude fast. The pilot took over for the co-pilot. I heard him tell the flight commander we were going down. Not a word was said that wasn't an order. We were down to 800 feet and the mountain tops were looming up at us.

"There were several choices. We could 'chute out. We could mush down without wheels, but there was a lot of gas in the belly tanks of the ship. We could plane down on the water but there was the chance of submerging. Suddenly we were clear of the mountains and saw a little island out in the ocean. It turned out to be 165 paces long...about one tenth as wide. We saw driftwood and timber in its middle.

"We hit on one end of the island and bounced 50 feet high. The jagged timber we would have hit if we hadn't bounced, slipped underneath us. We hit again, bounced, and stopped. I stepped off from the place the plane hit to the edge of the island. It was exactly 165 paces. That plane had travelled 164. Two feet away was deep water. At high tide there wouldn't have been an island.

"And the tide was changing when we hit. We salvaged the radio and some other things before the water rushed over the ship. We built a fire on the one little strip of ground the inrushing water left. We ate some canned goods. We were shivering, and built a fire although it wasn't cold.

"The other five ships in the formation roared low, and we signaled nobody was hurt. We began to hear the putt-putt of a motor launch. A Canadian doctor out fishing had seen us go down. He went for help. In seven hours some men from the Canadian Royal Air Force base at Prince Rupert, came for us in a larger launch.

"We had bacon and eggs at the Prince Rupert barracks that night...and say, if those RCAF fliers were any nicer to us, they would have had to dress and undress us. They treated us like kings.

"All the Canadians were like that...hospitable. Once we landed at a place called Prince George, and the entire population of 1,500 turned out and ran or rode bicycles seven miles just to greet us. (Gas there costs 57 cents a gallon). At the village of White Horse on the Yukon, they gave us moose steak."

HOUSING

Noncommissioned officers assigned to the New Orleans Army Air Base, who are authorized to live off the post, now can obtain apartments in the low-rent housing projects of the city of New Orleans at rents ranging from $8.25 to $22 per month, all utilities included.

Lieut. Col. Clarence H. Welch, base commander, completed arrangements July 1 with the local housing body, which operates under the Federal Housing Authority, whereby rental paid by noncommissioned officers, will depend upon the soldier's income, including both pay and allowances.

Rent paid in the housing projects includes all utilities--water, electricity for lights and refrigeration, and gas for cooking and hot water. Each home is equipped with an electric refrigerator, four-burner gas range, hot water heater, combination sink and laundry tray.

Rent schedules are arranged according to income and the space required by the family. It thus might be that a three-bedroom home might cost the occupant considerably less than another tenant would pay for a one-bedroom home. In other words, a staff sergeant with no children, requiring only one bedroom but enjoying a certain income, would pay more for an apartment of that size than a sergeant with three children and a smaller income would pay for an apartment with three bedrooms.

FACILITIES... (Concluded) tween Sherman and Denison, Texas. The third site has not received fromal War Department approval. It is expected that this school will be located in central Texas, probably in the vicinity of Waco.

Two advanced flying schools have been functioning throughout the expansion program, Kelly and Brooks. Two additional advanced flying schools, Ellington Field and a field at Victoria, Texas, are under construction. Ellington Field, a combination twin engine pilot training school and bombardier school, is almost ready for occupancy. The single engine pursuit training school at Victoria will start operations in early fall.

New single engine advanced flying fields will be established in the near future at Lake Charles, La., and Mission, Texas. Midland, Texas, will be the site of a multi-engine pilot school and bombardier school. Lubbock, Texas, has been chosen as the location for another twin engine school. Rounding out the training facilities organization will be a gunnery school at Harlington, Texas, and bombing and aerial gunnery ranges along the Texas coast. Matagorda Island and Matagorda Peninsula will be the center of this activity.

Kelly Field, in addition to operating as an advanced flying school, also will be the replacement center for all student pilots in the Gulf Coast area. Facilities for handling approximately 2,500 aviation cadets now are under construction at that station. Future Air Forces pilots will get a four-week indoctrination course there before starting actual flight training.

Ellington Field will be the replacement center for bombardier students. The 1,000 airplane observers to be trained in the Gulf Coast Air Corps Training Center area will be schooled at Brooks Field along with twin engine pilots.

Nearly 50,000 soldiers, mechanics, aviation cadets and officers will be stationed in the Gulf Coast Air Corps Training Center area at the peak of the training program. Of these there will be 3,000 Air Corps officers, 10,000 cadets, 34,000 soldiers, and auxiliary personnel, such as medical and dental officers, ordnance, signal corps and quartermaster officers, and contingents of the Army Nurse Corps.

Kelly Field will be the largest station within the area in point of cadets, with more than 3,000 being assigned to that airdrome at all times. This figure includes the cadets in the replacement center. Ellington Field, with 1,444 student pilots, bombardiers, and cadets in the Bombardier Replacement Center will be second in size. Randolph Field will have the largest number actually engaged in flight training, with 900 future pilots receiving basic instruction at all times.

In announcing the details of the expanded training program, General Brant pointed out that 4,236 pilots were trained by the Army in the 17-year period from 1921, when the modern training system went into effect, until the summer of 1939, when the first Air Corps expansion got under way. In the fiscal year 1939, total pilot output was about 325.

Discussing the $55,000,000 worth of new construction, General Brant pointed out that $40,000,000 already has been authorized by the War Department and that the additional funds should be forthcoming as detailed plans are completed. These figures do not include the construction costs of the six new civilian primary flying schools.

Texas, long the center of military aviation contimues to hold her place with 23 of the 32 Gulf Coast Air Corps Training Center flying schools being located in the Lone Star state. Oklahoma ranks second with five schools. Arkansas, Louisiana, Missouri and Illinois have one each.

The ten original primary flying schools in the GCACTC are located at Stamford, Cuero, Corsicana, and Fort Worth, all in Texas; Oklahoma City, Tulsa and Muskogee, in Oklahoma; Pine Bluff, Arkansas; Sikeston, Missouri, and East St. Louis, Illinois.

Randolph Field and Goodfellow Field, San Angelo, Texas, are the two military basic flying schools in operation. Brady, Texas, is the site of the only civilian operated basic flying school in the area.

Thirteen autogiros of a new design have been ordered by the War Department for test by the Field Artillery (cooperating with the Infantry, Cavalry and Armored Force) as "flying observation posts." The tests will be conducted during maneuvers after a squadron has been formed.

The ships will be of the jump take-off type, and will be capable of descending almost vertically. They will be employed only over territory in the hands of friendly troops, the Field Artillery believing that "enemy fighting ships cruising at low speed would run head on into ground fire or be attacked by our own fighters" if they attempted to attack the autogiros.

Keep the Record Straight

By Major Waddell F. Smith

Many claims by dependents of military personnel for Government Insurance, National Service Life Insurance, pensions, compensation, six months' gratuity and arrears of pay are unduly delayed because of not having at hand properly certified copies of birth and marriage certificates and divorce decrees.

Probably 75 per cent of people over the age of 35 are under the impression that they cannot obtain a birth certificate. Most all of these people can obtain a birth certificate if they write to the proper office of record.

Officers and enlisted men themselves do not need birth certificates except for passport purposes. However, it is always desirable to have one. It is paramount, however, that all military personnel should have on file authentic certified copies of the record of birth of wife and children and a certified copy of the record of marriage. If either husband or wife has been previously married, no certificate of that marriage is required but a certified copy of the record of the divorce is required.

Whenever a certified copy of the record of birth or marriage may be obtained, then no governmental agency charged with settling a claim will accept anything in its place. From this it may be seen that church records, records of family Bibles, affidavits of parents, affidavits of people who knew the parents at time of birth, affidavits of individuals who witnessed a marriage, ministers' certificates of having performed a marriage, etc., are all refused.

From the foregoing it may be seen that the first step is to determine if there is available a public record in the state, county or city in which born and in which married. Military personnel should write immediately to the proper authorities to obtain these documents. As the United States Veterans Bureau has been constantly called upon to advise claimants where to obtain certified copies of these public records, Mr. Luther E. Ellis, of the Veterans' Administration compiled the names and addresses in all states and possessions of the offices charged with keeping the public records of birth and marriage.

The book is of such great utility that the United States Social Security Board asked permission to reproduce it. The author is glad to be able to advise that this book, under the name of "Custodians of Public Records" is in the hands of each of 477 field offices of the Social Security Board. These field offices are all being advised to make the information in the book available to Air Corps personnel who can visit any of the field offices.

In this volume will be found a separate listing for each state and where to write and how far back the records of marriages and births go. Where it is found that state records were not kept previous to certain dates it will show what county and city authorities may be written to to obtain the records locally. The book also advises on records of deaths and divorces.

Obtaining these necessary certified copies of the public records is very easy to put off. However, it must be remembered that it is much easier for the records to be obtained now than to leave the job to dependents, years later. The payment of many claims for Government insurance, pensions and compensation have been held up because of delay in obtaining certificates, frequently occasioning much financial embarrassment to dependents. Even when it is found that no state records are kept, many cities and counties have bureaus of vital statistics available and it always should be the rule to write to the bureau of vital statistics of your city or county, when no state records are available.

Much bad information and misunderstanding is extant about birth and marriage certificates. For example, in order to marry, a license must be obtained--but that is not sufficient to support a claim, for the marriage might not even have been performed. But let's assume that it was. Then the minister or church official who performed the service furnished a very beautifully engraved certificate that he did on a certain day perform said marriage. That still is not sufficient. However, the minister or church official, after performing the ceremony, makes a return affidavit with the license to the bureau of vital statistics which is charged with keeping the record. That office then makes an official record of the [illegible] copy of that [illegible]

Whenever a birth occurs, all physicians, hospitals and institutions are required to report the birth along with the name of the child, its sex, names of parents, etc., to the bureau of vital statistics charged with maintaining the public record. The birth then is a part of the public record and a certified copy of that record, issued under seal by the office or bureau in charge is the document required to support a claim.

It must be recognized, however, that in some cases there are absolutely no available public records of births and marriages. In these cases then other proof will be accepted, but it will not, however, be accepted until or unless a certified statement is obtained from state or county officials verifying that no public record of the birth or marriage is obtainable for the period in which the birth or marriage occurred. That being established, it then is permissible to establish proof in other ways as follows:

PROOF OF AGE

1. A Certified Copy Of A Church Record If The Child Was Baptized In A Church. Many churches maintain such records and the present registrar of the church will make a sworn statement of the record.

2. Sworn Statement Of Doctor Who Officiated At The Birth Of The Child. In many cases this cannot be obtained, due to death of the doctor or removal from the community. If obtainable, the doctor must swear to it before a notary.

3. Sworn Statement Of Two Witnesses Present At The Time Of The Child's Birth. This affidavit must be made by individuals who knew both parents at the time of and before the birth, but they do not actually have had to be present at the birth itself, but must certify that they knew of the birth and of the naming of the child, etc.

4. Notarized Certificates From Entry In Family Bible Of The Birth. There are many avenues for fraud in making certificates from entries in family Bibles; therefore, such certificates may be refused and other proof required. Or the family Bible itself may have to be produced.

5. Request Veterans Administration To Obtain From Bureau Of Census The Record Of The Family From First Record Of The Census Which Was Made After Birth Of The Child. This method is only a last resort and is not requested by the Veterans' Administration unless they are convinced that no proof of age can be obtained as outlined under the previous steps. Then the Veterans' Administration must be requested to obtain it from the Census Bureau.

There is an unending delay in the settlement of claims, while awaiting proof of age and it is, therefore, incumbent upon all military personnel who are married to begin immediately to obtain acceptable records of birth of a wife and children. It will be noted that affidavits of parents to establish proof of age has not been listed as acceptable.

PROOF OF MARRIAGE

1. Certified Copy Of Church Record If Marriage Was Performed In A Church. See Proof of Age, No. 1.

2. Sworn Statement Of Minister Or Public Official Who Performed The Ceremony. See Proof of Age, No. 2.

3. Sworn Statement By Two Witnesses Who Were Present At The Performance Of Ceremony. See Proof of Age, No. 3.

4. A Notarized Certificate Made Up From Entry Of The Marriage In Family Bible.

DECREES OF DIVORCE

Whenever a widow is claiming pension or compensation for the death of a husband, and it is shown that either the deceased or the widow or both had a previous marriage, then a certified copy of the public record of the divorce proceedings must be obtained and submitted before the right of the claimant can be established.

In order to obtain copies of divorce decrees, a request should be addressed to the clerk of the court which granted the divorce. In a good many states, state records of divorces are kept, compiled from reports submitted by the county courts. Even though some states maintain records of divorces, they may not have any information other than the names of the principals and the date of dissolution of the marriage. For pension purposes a certified copy of the actual decree and the terms thereof is required; therefore, the copy of the decree should be obtained from the court which granted it.

The book, "Custodians of Public Records," also lists information for each state, giving the proper method of addressing the county courts and it also supplies information as to which states maintain state records of divorce.

Inasmuch as certified copies of divorce decrees must be presented in support of a claim, then they should be obtained at

once. Many cases are on record of court houses burning, resulting in destruction of records. Get them now when it is easiest. Dependents when making a claim are always badly unnerved and it is the duty of all military personnel to obtain these necessary supporting documents in advance.

Certified marriage certificates are not required for the settlement of United States Government Insurance, National Service Life Insurance or policies issued by commercial life insurance companies. However, as National Service Life Insurance is paid to the beneficiary only in installments, a certified copy of the record of birth must be submitted. Even if the beneficiary is under the age of 30 and receives the fixed installments of $5.51 per month on $1,000, for 20 years, a birth certificate is still necessary to establish that the age is under 30.

If the proceeds of either United States Government Insurance, or policies issued by commercial life insurance companies are to be paid as a life income to the beneficiary, then proof of age will be required as the amount of the income is based upon the age of the beneficiary.

A great deal of misunderstanding exists about photostats. Many individuals have had numbers of copies of birth certificates and marriage certificates photostated and it must be said that they are unacceptable. Actually the original itself in order to be acceptable would have to meet the requirements as set out in this article. Even if the original is acceptable, the photostats would not be.

Photostats are acceptable, however, when they are actually made from the public record by the bureau of vital statistics or other official agency in charge of the public record. It then is good only if before the photostat is made, a marginal indorsement is made certifying that it is an official photostat of the public record. It then must be signed under the seal of the issuing office.

Very recently the Office, Chief of Air Corps published a pamphlet titled, "Insurance, Estate and Wills," which is now in the process of distribution throughout the United States Army Air Forces. It was not possible in that to go into detail about birth and marriage certificates and divorce decrees; therefore, the material in this article may be considered as a part of or an addition to that publication.

This article is the ninth of a series which has been published in the Air Corps News Letter. Following publication of this article, all nine are to be combined into a compendium on insurance and printed for distribution throughout the United States Army Air Forces.

A year's intensive training in aeronautical engineering for six Air Corps officers ended July 31, when they received diplomas from Brig. Gen. George C. Kenney, Commandant of the Air Corps Engineering School, Wright Field.

In the graduating class were Lieuts. Evart W. Hedlund and Harold M. Keeffe, from the Fairfield Air Depot; Edward G. Kiehle, Duncan Field; Elmer E. McKesson and Bernard A. Schriever, Wright Field; and Ralph L. Wassell, Middletown Air Depot.

Courses taught at the Engineering School include basic theoretical instruction in aircraft, engine and propeller design; fundamental subjects such as mechanics, strength of materials, and aerodynamics; and practical work in the various laboratories and shops at Wright Field in armament, radio, electrical and miscellaneous equipment. Air Corps inspection methods, depot operation, and procurement procedure are additional practical subjects.

The new Air Corps Basic Flying School at Sebring, Fla., will be completed in approximately seven months.

One of the 33 flying schools operating or under construction in the Southeast Air Corps Training Center, the Sebring school upon its completion will house 217 officers, 475 cadets, 1,930 enlisted men and 15 nurses. When and at what stage of construction troops will be stationed at the new field has not been announced.

The estimated cost of the Sebring project is $3,627,640.00. Of this amount, construction projects costing $2,014,879.00 will be undertaken immediately, and the remainder at a later date when sufficient funds are made available. Like most of the other new fields in the training center, Sebring will be about four square miles in area. The buildings will be of the temporary wooden type of construction.

In the layout will be 32 barracks for enlisted men; 13 cadet barracks; one barracks for negroes; 11 day rooms of the Air Corps type; 11 supply rooms; mess halls for enlisted men, cadets and officers; one chapel (to include an organ); quarters for the commanding officer; three administrative buildings; one fire station; one guardhouse; one infirmary and nurses' quarters; and one officers' club.

SUPPORT ... (Concluded) delivered to the Army by the manufacturers.

Flexibility in the use of the air arm will be increased through the formation of the Support Commands, it was explained in Washington when the new organizations were announced. The measure assures effective air-ground teams, like the infantry-artillery combat teams in the ground forces, but the field armies and the Armored Force do not have to rely entirely on their own particular support command. If the situation requires it, additional aviation may be called into action.

Nor does the plan require any change in the principle that all types of units of the Air Force Combat Command must be trained and used in support of ground forces. When conditions make it necessary, air support aviation may be used for special Air Force missions, in conjunction with naval forces or with ground forces other than those to which they are specifically assigned for cooperative action. Thus it is possible to conceive of a squadron of dive bombers being directed to attack enemy destroyers which somehow had managed to approach within short range of a coast line.

Although the Support Commands will be confined to no particular geographical boundaries, their prime function requiring them only to operate where cooperation with their particular ground force makes it most efficient, they are assigned each to a broadly defined area. These conform generally to the areas in which the respective field armies function.

The First Air Support Command, for example, will operate in the area defined roughly as from Maine in the North to South Carolina in the South, and west as far as Ohio. The Second has the Great Lakes and Mississippi Valley region, including Ohio and Nebraska and as far south as Oklahoma and Arkansas. The Third is in the Gulf Coast and Georgia area, functioning as far west as Texas and including Florida. The Fourth includes the West Coast area, from Mexico as far north as Canada and on the east to Wyoming and Texas. These are only hazy boundaries and not, in fact, boundaries at all in the true sense of the word.

The Air Support Commands may be expected to function very much as the German aviation described by Capt. N. Krainev, of the Russian Army, in his description (starting on Page 9 of this issue) of dive bombers in the Battle of Poland. A chart showing the organization of the Support Commands, their relation to ground forces and other Air Forces units is on Page 21 of this issue.

Articles for News Letter

Expansion of the Army Air Forces from a relatively small, underequipped unit to a modern, streamlined fighting organization finally has had its effect upon the Air Corps News Letter. As readers may have noticed in this and the preceding issue, the News Letter has abandoned its small-town character for one of big-time journalism.

The personal note which seemed appropriate when the Air Corps community was restricted and static no longer is effective in keeping informed the greatly augmented Air Forces. There are just too many of us now to mention so many names. Consequently, the News Letter is being transformed, to meet the new requirements for information, by striving to present professional and technical articles in the field of military aviation.

As a professional journal the Air Corps News Letter will undertake (a) to stimulate high morale and an "esprit de corps" in the Army Air Forces, (b) to disseminate information of technical and professional interest to personnel of the Air Forces, and (c) to keep the Air Forces personnel advised of organization changes, policy revision and items of current interest.

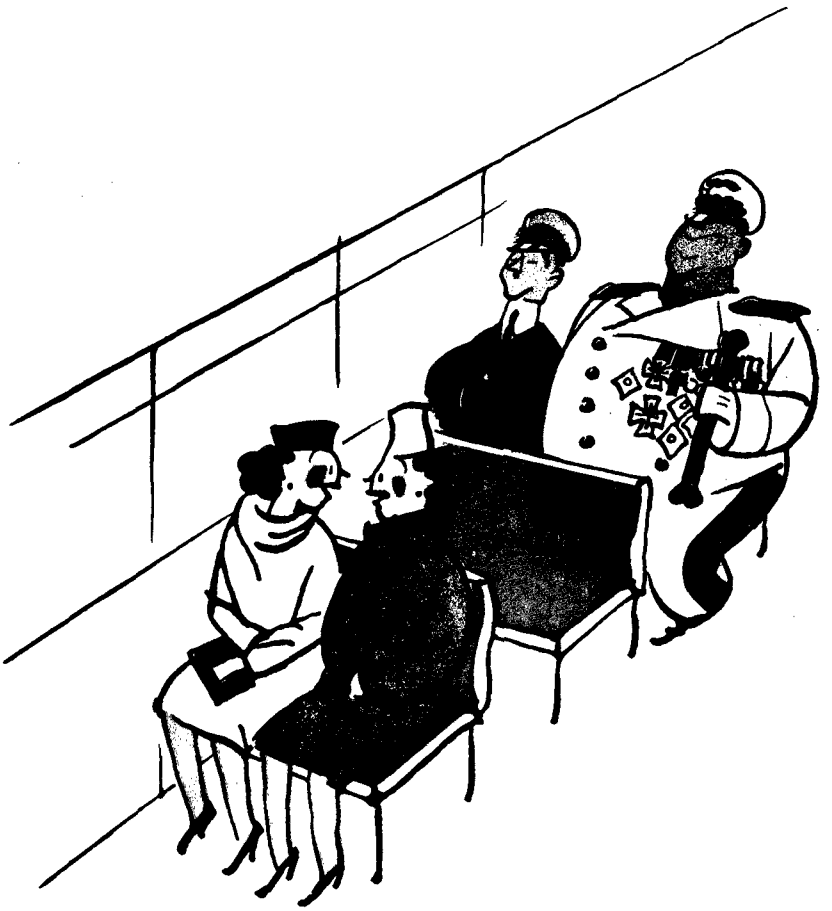
While differing from periodicals of general circulation, in that it is restricted to the subject of military aviation and related activities, the News Letter is like other journals in depending upon the cooperation of its readers for complete success. For that reason, correspondence from personnel in the field is welcomed.

Especially desired are technical and professional articles believed valuable to the training program of the Air Forces. Facilities are available for the publication of illustrative drawings and pictures, so such material should be included when possible. These can be sent to the Editor, Air Corps News Letter, Office of the Chief of the Air Corps, Washington.

The contents of this issue may be regarded broadly as a guide to the type of material desired. If a potential contributor desires additional information before starting preparation of an article, he may write to the editor in Washington.

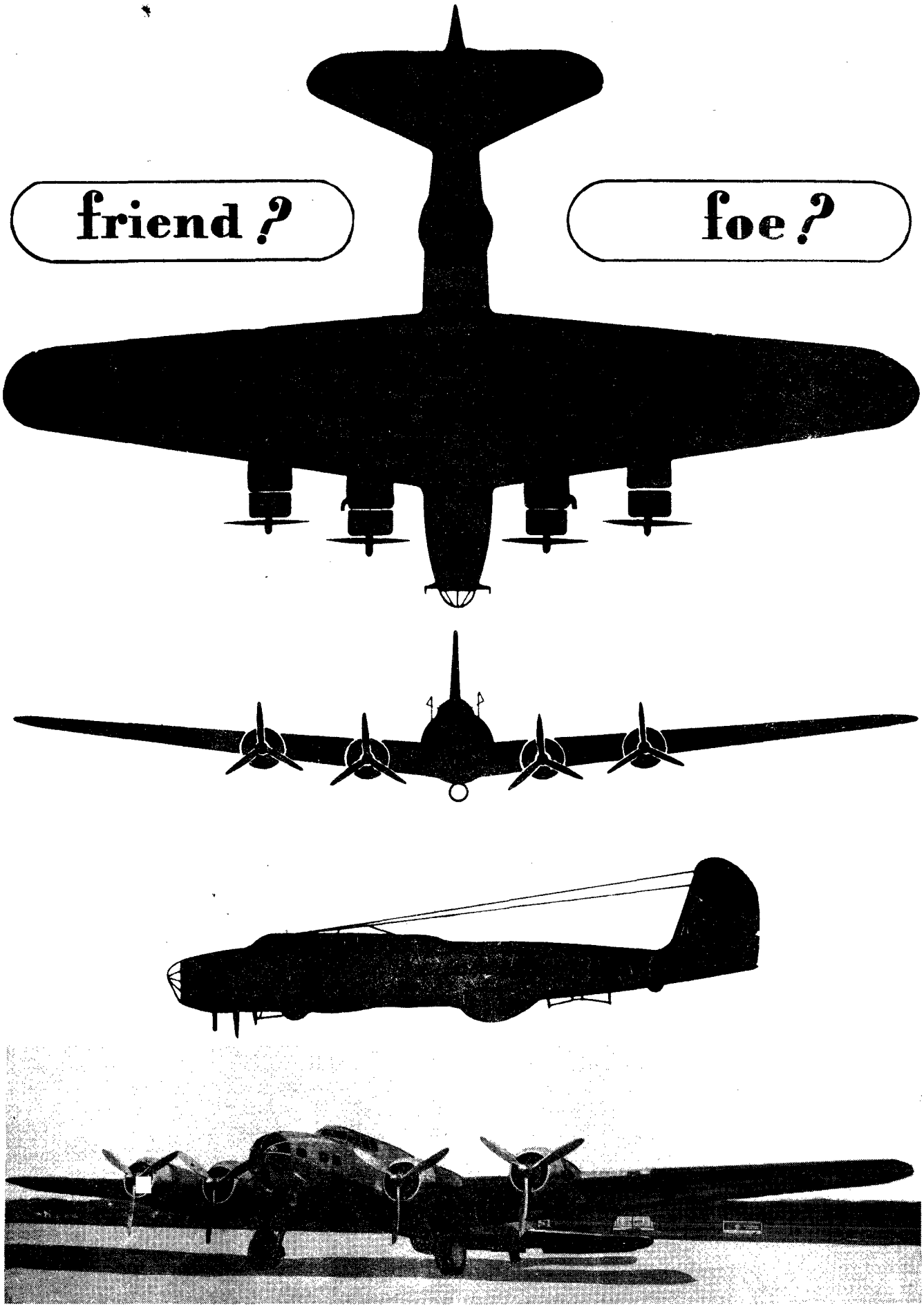
Army vehicles at Scott Field, Ill., traveled a distance equivalent to more than three times the circumference of the earth during the month of June.

Fougasse



You never know who's listening!

CARELESS TALK COSTS LIVES


friend ?
foe ?

AIR FORCES NEWS LETTER

SEPTEMBER 1941

HEADQUARTERS ARMY AIR FORCES WASHINGTON, D. C.

THE AIR FORCES NEWS LETTER

VOL. 24 SEPTEMBER, 1941 NO. 15

THE COVER

The first colors of the Regiment of Aviation Cadets, at Randolph Field, are presented to Aviation Cadet Robert E. Crowley, Cadet Regimental Captain, by Col. I. H. Edwards, commanding officer of the Texas flight center.

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THE BACK COVER

The silhouette this month is of the Curtiss P-40D, latest production model in the P-40 series. This ship, powered with an Allison liquid-cooled engine, outwardly appears very much the same as its predecessors, the principal differences being in armament and other interior changes which do not materially change the fighter's lines.

Photo Interpretation

MATA HARI WITH A GLASS EYE

By Lieut. Derryfield N. Smith

The aerial camera is causing a widespread technological unemployment among spies these days, for this one-eyed Mata Hari of the blitzkrieg era supplies an estimated 80 per cent of the military information by which modern strategy is decided. Oftimes the report of this high-flying mechanical spy is the sole basis for a GHQ decision on major tactical or strategic moves.

Often official communiques comment: "Enemy planes flew over but no damage was done." The damage is coming later. That was an aerial camera attack.

A human secret agent can direct his attention to only one objective at a time, while an aerial camera with a single wink of its eye can observe everything within a given number of square miles, and area varying with its particular equipment and altitude. Not only better than the human eye in daylight, it can also work the night shift without lessening its effectiveness, and can see through eye-baffling haze.

Without passport, false whiskers or invisible ink, the aerial camera, penetrating enemy territory at an altitude of two and one-half miles, can make an instantaneous record of all that goes on over an area of more than six square miles, on a single seven by nine inch photographic plate. Blinking the shutter eye as rapidly as once every six seconds, the camera super-spy may be able to turn in 500 or more accurate, complete, concentrated photographic reports from a single reconnaissance flight. Each report is an unposed, candid-camera portrait of a six square mile patch of the enemy, with its bony structure of hills, its river arteries, its clothing of verdure and farm crops, its nervous system of transmission and communications lines, its prominent features of factories, cities, mines and airports.

But while the aerial camera sees all, it is the photo interpreter who must know all and tell all. To the untrained eye, the aerial photograph is a confused patchwork of the landscape's major features reduced smaller than the Lord's Prayer on a pinhead. The photo interpreter must decode the camera's compact report and expand it into: 1) a photographic map, with vital spots marked more clearly than with x's, and 2) a verbal report, commenting on any unusual activity shown and conjecturing on its possible military significance.

Working behind the scenes of this modern war of multiple fronts and shifting objectives, the interpreter knows it may be less important to blow up a steel and concrete pillbox fort than to destroy the plants supplying the steel and the concrete.

By comparing photographs taken at intervals of 24 hours or several days, he can deduce that damaged armaments plants are in production again, or that railroad cars are being assembled to move supplies to the front. After sending the flying camera on a quick reconnaissance tour of railroad yards in certain key areas, he can discover that munitions and supplies are being moved toward the enemy's western frontier. On successive photographs of a compact area he can also spot where new batteries are being set up, oil depots established or tanks assembled.

By piecing together overlapping aerial photographs in a stereogram, he obtains a three-dimensional view, and can tell whether a certain dark line is a hedge, a path or a ravine. If it proves to be a ravine, he can tell how deep it is.

The precision which work on aerial photographs can achieve is exemplified by a computation based on the "highest" photograph ever made, the vertical photo made by Lieut. Col. A. W. Stevens at an altitude of 13.7 miles above the earth from the stratosphere balloon of the United States Army-National Geographic Stratosphere Expedition in 1935. Capt. B. B. Talley of the United States Engineers computed that the photograph was taken at an altitude of 72,290 feet, only 0.11 per cent less than official barograph readings.

The use of the lens as a secret agent, if not a secret weapon, has forced belligerents to develop camouflage to new heights of concealment and deception. What the aerial photo records as a hillside may be a hidden hangar. That innocent country crossroads may be merely whitewashed lines across the surface of a disguised airport. So the first duty of a photo interpreter is to suspect, as a counter-camouflage precaution. Even color photography has been enlisted to bring before his careful scrutiny, for instance, the slight difference in color between living foliage and wilted branches cut for camouflage.

The natural protection of darkness and blackout strategy has made it almost axiomatic for military leaders to make their important secret moves at night. Thanks to the experiments of the Materiel Division, great strides have been made in the field of night photography. It is now possible to penetrate the darkness with specially controlled flash

bombs and cameras, thus surprising the enemy red-handed in his most secret activities.

Without the all-seeing hawk eyes of the aerial reconnaissance units, the British would not have been able to smash every German concentration along the invasion front. The much vaunted coordination of the German armed forces would be impossible without proper exploitation of aerial intelligence. The role of aerial photography has played a very large part in the success of blitzkrieg tactics thus far.

Actual war operations show a natural division on this whole function of aerial photographic intelligence. All the activity involving the operation of photo planes, aerial cameras, processing of films and preparation of flight diagrams falls within the scope of the photographic reconnaissance tactical units of the Combat Command.

The other function of exploiting and developing the intelligence from the aerial photos falls within the sphere of photo interpretation units, placed so as to best serve the command echelons throughout the Air Forces. Initial steps have already been taken to establish a Photo Interpretation Unit in the Intelligence Division of the Office, Chief of Air Corps, in Washington, and throughout the Combat Command.

Interpretation has been described as the science of determining the nature of various objects shown on photographs, and the discovery of hidden objects which are either visible or known to exist. It is the practical application of the trained powers of deductive reasoning, with the aid of technical instruments, previous photographs and supplementary maps and information already collected about the territory being studied in the photograph.

By putting together in time and space the total results of aerial reconnaissance, the photo interpreter converts hindsight into foresight, and puts the secrets hidden in the picture into a form of information that can be rapidly used in preparation for future action.

The functions of a Photo Interpretation Unit are:

1) To receive, record and collate all aerial photographs from all sources.

2) To develop by interpretation the maximum accurate intelligence from aerial photos in the minimum time.

3) To prepare, arrange and reproduce this intelligence into the most concise and usable form.

4) To maintain a complete, current photolibrary and filing system with an adequate supply of all necessary technical instruments and aids to the task of interpretation.

5) To assist in the training of personnel in all phases of photo interpretation.

6) To conduct research to test and improve methods of interpretation.

Theoretically, the operation of a photo interpretation unit is illustrated in the accompanying animated chart.

"Shots" of tactical or strategic activity of the enemy, as depicted at point A, are transmitted to a mobile or stationary photographic laboratory (at point B), where the film is quickly processed. The interpretation officer (C), who has been studying all previous photos and other available intelligence, is prepared to analyze speedily the new photos and report any activity which affects "the day-to-day conduct of the war." His quick "first-phase" interpretation is immediately transmitted to all tactical units affected. The value of this operation depends on speed and accuracy, which are both of the utmost importance.

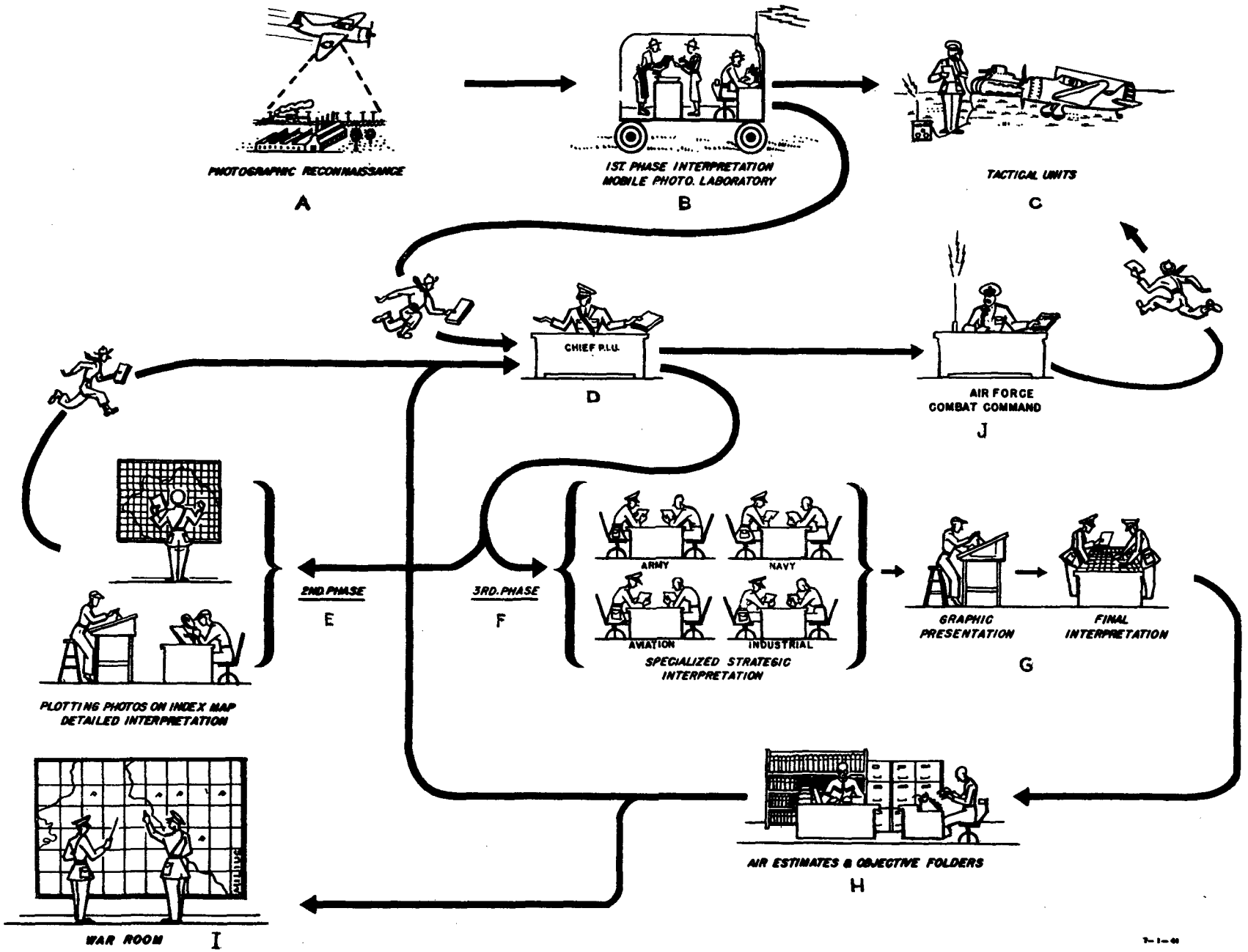
The films, prints and copies of the first-phase report are quickly forwarded to the Photo Interpretation Unit (point D). Copies of the prints go to points E and F for simultaneous processing. The "second-phase" interpretation, administered at E, involves the plotting of the photos on large index or situation maps. The first-phase report is here verified and greatly amplified, after which it is forwarded to the HQ of tactical units at G.

The final "third-phase" interpretation is a specialized strategic analysis. Officers and civilian specialists in various spheres go over each photo minutely to extract every grain of intelligence affecting their respective fields--for example, the Army, Navy, Air Forces or industrial fields.

Army specialists, for example, would offer their interpretation in the light of their knowledge of ground force tactics, army installations, equipment, ammunition dumps and barracks. Industrial specialists would be well versed in the appearance and importance of oil refineries, power stations, munitions industries, railroad center, all types of manufacturing, docks and shipping.

The results of their analyses are graphically illustrated and arranged into a final interpretation report by a staff of photogrammetric draftsmen and clerical assistants, comprising officers, enlisted men and civilians. These final interpretation reports provide valuable source material in the preparation of air estimate, objective and target folders (point H). They also play an essential role in the functions of the War Room and are given a limited distribution to the higher echelons of command.

The Army's first course in photo interpretation given in recent years was concluded July 22, 1941, at the Engineer's School, Fort Belvoir, Virginia. Seventy-five officers, including two from the Marine Corps, successfully completed the course and many are now taking steps to train personnel for photo interpretation units at their various stations.


PHOTOGRAPHIC RECONNAISSANCE
A
1ST. PHASE INTERPRETATION
MOBILE PHOTO. LABORATORY
B
TACTICAL UNITS
C
CHIEF P.I.U.
D
AIR FORCE
COMBAT COMMAND
J
2ND. PHASE
E
3RD. PHASE
F
ARMY
NAVY
AVIATION
INDUSTRIAL
SPECIALIZED STRATEGIC
INTERPRETATION
GRAPHIC
PRESENTATION
FINAL
INTERPRETATION
G
PLOTTING PHOTOS ON INDEX MAP
DETAILED INTERPRETATION
AIR ESTIMATES & OBJECTIVE FOLDERS
H
WAR ROOM
I

A second course in photo interpretation will start at Fort Belvoir about September 8. The class for the most part will consist of officers from the Air Force Combat Command and other Air Forces stations. The second course will be adapted to the particular problems of the Air Forces.

Plans are also being formulated for an Air Corps Intelligence School, to function by the first of the year, where the interpretation of aerial photographs will form a major part of the training. This projected school will undertake to supply the entire Army Air Forces with trained personnel for expansion of photo interpretation units to keep pace with the Army's rapidly accelerating photographic reconnaissance activities. The Air Forces confidently speak of marshalling a battery of 30,000 cameras specially designed for aerial intelligence duty.

PROPELLER VIBRATION TESTS

Every new propeller-engine combination must be tested for vibration. Other propeller tests are made, of course, but vibratory tests become more important as engine powers increase. With the development of an experimental engine, it is necessary to produce a propeller designed to absorb the full power of the new engine. A vibration test is made to determine whether the new combination of propeller and engine will work together without producing vibration stresses in the propeller that will cause failure of the propeller blades.

The propeller vibration tests conducted by the Air Corps are largely confined to new propeller types which are being tested for use in advance types of engines. The tests are conducted by suspending the propeller in an elastic sling and vibrating it under static conditions, to determine its natural vibration characteristics. The Materiel Division has propeller test rigs on which electric motors are used to whirl test new propellers. It also has engine test stands on which the experimental engine-propeller combination is mounted and tested. Complete vibration data call for a flight test of the new combination in the airplane. These tests consist of stress measurements of propeller blades under different conditions of flight.

In a flight test all sources of vibration peculiar to the particular installation are present, and the airplane can be tested in all the maneuvers which its military mission demands. The forces which excite vibration in the propeller are those caused by the engine and by air gusts and interference of air flow due to the blade passing near or in the wake of obstacles such as landing gears, fuselage, etc.

In a single-place pursuit, an engineer-observer cannot accompany the pilot, so the equipment used must function automatically. It consists of a number of resistance pick-ups, batteries, amplifier, oscillograph and collector rings.

Batteries, amplifier and oscillograph are stowed in the baggage compartment. A stationary brush plate is mounted behind the propeller hub; the revolving spin plate is mounted on the propeller hub so that it revolves with the propeller in contact with the brushes of the stationary plate.

The resistance pick-ups are carbon strips 7/8 of an inch or more in length. These are cemented on the propeller blades at the points where the stress is to be determined, usually along the center lines where stress is greatest. The fact of interest is that the linear dimension of a pick-up varies with vibratory stresses in the propeller and the resistance of the pick-up varies with changes in its linear dimension.

The equipment is then hooked up so that electrical circuits are established from the batteries, through the oscillograph and amplifier out through the spin plate to the resistance pick-ups. A switch near the pilot's left hand permits him to switch the equipment on and off as desired. An automatic counter at the switch indicates how much unused film remains in the oscillograph at any time during the flight.

When the pilot flips the switch, the electrical current passes through the pick-ups to the amplifier. Vibration of the propeller causes fluctuation of electric current through the amplifier. The impulses are recorded on the film in the oscillograph.

Normal slight vibration would be recorded in a regular shallow wavy line. If abnormal vibration develops, the line becomes a jagged series of peaks which increase in size as the vibration increases.

By measuring the lines on the developed film, engineers can determine the seriousness of the vibration. With experience they can often locate the source of vibration from the frequency and characteristics of the vibration lines on the film.

The story is told of serious propeller vibration developing in an engine-propeller combination which had been tested, approved and put into standard service. Using the method just described, flight tests were made for the purpose of investigating the trouble.

From the pattern of the vibration lines on the film, engineers were able to determine that the destructive vibration originated somewhere in the engine. The engine was torn down and it was discovered that the original gears had been replaced. The new gears had passed the engine tests satisfactorily, but varied from the original gears enough to cause a destructive propeller vibration during flight. When all of the questionable gears had been replaced, the trouble disappeared.

SEPT 1941

Our New Bases

Assignment to Newfoundland

By Lieut. John C. A. Watkins

Newfoundland is a grim, rugged island and duty with one of the Air Force Combat Command units stationed at such places as the Newfoundland Air Base--on the great transatlantic Newfoundland Airport in the interior of the island--is certain to entail some hardships.

On the other hand, service there will be unlike duty almost anywhere else within the scope of American operations, with some attractions and considerable interest. The hunting and fishing is excellent, for salmon and such big game as caribou and polar bears. Some of the most famous people in the world pass through the Newfoundland Air Base, on their way to England by air or coming to this country over the same route, and the officers stationed at the base come in close contact with them.

The Newfoundland Air Base is about 250 miles northwest of St. Johns, capital and largest city of Newfoundland. On the shores of long, deep Gander Lake, which never freezes, the Newfoundland Airport has been widely publicized not only for its isolation and almost complete inaccessibility by every means of transportation but air, but also for its astonishingly huge macadam runways.

The atmosphere of the base is grim, probably more so than at any other military air field on which American troops are stationed. One side of the great runways, where Canadian troops live and work, very definitely is at war. The other side is occupied by the American forces; each force has its own installations and manages its own affairs, although there is cooperation between the two.

All the buildings, from barracks to hangars, are provided by the Canadian Government and are erected under that Government's supervision. Consequently, the structures housing American troops are identical with those housing the Royal Canadian Air Force and Canadian army units on the field, and are of standard Canadian, rather than United States Army, construction and design. The barracks are well-built and attractive on the outside, more so than our own. Most of them are one story, with shingled outside walls. Naturally they are more carefully protected against the weather than buildings in warmer climates.

Inside, the barracks for enlisted men are about the same as any standard sleeping quarters for troops. So are those for officers, the general rule being that two officers share one small room. These rooms have hardwood floors, but no closets. A small shelf is provided on either side of the door, but any additional storage space that is required is built by the officers themselves from old packing cases. A few straight-backed chairs and tables are available, but the transportation problem is difficult and there is certain always to be a lack of furniture. Unmarried officers pay their rental allowance for their quarters; married ones do not.

Hangars and living quarters for the American and Canadian forces are being augmented by a large force of native Newfoundlanders, who live and eat in barracks provided for the labor gangs. These men are paid good wages and are allowed to work as long as they want. Many, apparently wishing to make enough money to last them through the next few long Newfoundland winters, are working almost around the clock. Trucks rumble by the barracks all night long, and frequently a lone Newfoundlander may be seen digging away in a ditch all by himself at four or five o'clock in the morning.

Visitors to the Newfoundland Air Base get an impression of isolation more complete than on a South Pacific island. The entire country is covered by thousands of ponds and lakes, interspersed with miles of a thick, tangled and virtually impenetrable mass of scrub spruce, birch and underbrush. Almost all of the island is a morass, and everywhere the sunlight glints on water beneath the thick green mat of vegetation as your airplane flies overhead. It seems that it would be almost impossible to walk anywhere, except along the coasts or in the rocky highlands, and if a pilot encounters engine trouble, he would do well to land wheels up along the shore line of a lake sufficiently big to permit a rescuing amphibian to land and take off again.

Practically the entire population, limited enough as it is, is concentrated along the coasts, and there are few communities of more than two or three houses in the interior. A Royal Air Force officer and the writer rode in the bombardier's position in the nose of a B-18 clear across the island, to the west coast, with the agreement that the first to sight a house, a man or a boat would be paid $1 by the other. In nearly two hours of flying, at only a few thousand feet in perfectly fine weather, neither of us even imagined that we had sighted anything resembling a house, a man or a boat.

The Newfoundland Air Base is set down right in the middle of such country. The nearest town is Grand Falls, a little community of about 6,000 people, about 65 miles away. It can be reached only by amphibian or on the narrow-gauge Newfoundland Railroad, on which a train goes from the base to the town one day and returns the next, taking approximately three and one-half hours for the one-way journey. There are no roads of any sort, except on the airport itself. All the trucks and other motor vehicles had to be brought in by train and will have to be taken out again in the same manner. A five-minute walk in any direction brings the hiker up against a wall of vegetation or swampy ground. There are two roads leading down to Gander Lake, about a mile and a half away, and several other roads which wander out into the bush a mile or so and then come to an abrupt halt. Consequently, private automobiles are completely useless even if the limited railroad facilities could be used to bring them to the base.

The climate isn't particularly pleasant, although there are some beautifully clear days and nights to compensate for some of the unpleasant weather. It rains and blows a lot in the summer, and the snowfall is heavy in the winter. An average of 15 feet of snow during a winter is not uncommon, and the natives say that there are five or six feet of snow on the ground all the time during the cold months, with drifts ranging from 15 to 20 feet deep. The winter season ranges roughly from November 1 to May 1, although frequently there is snow both before and after those dates.

The temperature ranges from as high as 85 degrees (F) during the short summer to as low as 30 degrees below 0 during the long winter. In the summer some nights are stuffy and muggy, but during most of what we call the summer months it is distinctly chilly and damp, especially at night, if not downright cold. Fogs are frequent, caused by the meeting of the Arctic Current and the Gulf Stream a short distance off the Newfoundland Coast. During August, when the writer was there, the weather was cold and rather rainy--cold enough for woolen shirts and leather jackets during the day, blouses and trench coats at night.

Incidentally, there is a maximum of about 19 hours of daylight daily during the height of the summer (June) and of about 18 hours of darkness in late December and January. When we were there, there were about 16 or 17 hours of daylight. The last motion picture show went on at 9 P.M. Newfoundland time (11:30 P.M. Greenwich Mean Time, on which the air base operates) and darkness did not come for at least half an hour after that time.

Officers assigned to the base should take with them plenty of winter clothing. The winter uniform is specified, in fact, and cotton clothing is not authorized. Trench coats are a necessity, because of the heavy rainfall, and both overshoes and mackinaws are needed. Leather or flying jackets are worn until supper call on weekdays and before noon on Sundays, after which time all officers are required to wear blouses.

Most of the officers work in GI slacks, which they purchase from the well-equipped Quartermaster stores, saving their more fragile and easily soiled pinks for special occasions. Similarly they wear heavy GI shoes, since there are no sidewalks to speak of and the soil (a curious combination of roots, rocks, shale and earth) wreaks havoc with "city" footgear. Civilian clothing isn't of much use, and is not authorized at all on the base. It is likely to take up more precious storage space in quarters than it is worth.

Laundry facilities at present are extremely limited and poor, although a Government laundry undoubtedly will be provided as quickly as possible, and enough shirts, underwear and the like should be taken along to last two or three weeks without replacement. The nearest "modern" laundry is at Grand Falls, and the prices are about three times what they are in the States. Theoretically, the laundry goes to Grand Falls one week and comes back the next; actually it takes about three weeks.

Since it costs 30¢ to get a GI shirt washed, most of the enlisted men and some of the officers do their own. Most of the officers wash their own underwear, handkerchiefs and socks and the shower rooms in the officers' quarters usually are cluttered at night with lines filled with drying garments. Dry cleaning is expensive and unsatisfactory. An enlisted man has set up a drycleaning and tailoring establishment in the Post Exchange, charging 15¢ to clean a shirt and 25¢ for a blouse, but his services are somewhat amateurish and not recommended for expensive uniforms. Some officers bring their uniforms to the States, when they come down on cross-country flights, and get them cleaned during their stay.

Recreational facilities are somewhat limited at the present time. The Army Motion Picture Service presents movies every night in a tent theater, and the choice of pictures is usually good, but there are more customers--including Canadian officers and enlisted men and civilian supervisors on the construction projects--than there is space for them. There is a small but excellent library, of about 150 volumes, obviously chosen by someone of very good taste.

The enlisted men have a recreation room, which had not been furnished completely when the writer was there, in which there were ping pong tables and dart boards. Adjoining the recreation room was the PX-operated canteen. The PX officer encourages the purchase of canned orange, tomato and grapefruit juice, chocolate bars and other such food and drink that goes over on the luxury side

of the ledger when the outskirts of civilization are reached. The regular American brands of cigarettes sell for 75¢ per carton in the Post Exchange, although the Canadians and Newfoundlanders pay 38¢ per pack for them in the only civilian store at the base.

At the present time the Officers' Club occupies a small room, same size as the bedrooms, in the officers' quarters, and is equipped only with an old radio-phonograph, a table and some straight chairs. However, a large combination mess and club was being completed and should be ready for occupancy this (September) month. It will have a lounge, reading and writing rooms and recreation rooms.

Fishing in the vicinity of the base is excellent, although some of the best streams and lakes are somewhat difficult to reach except by amphibian. Salmon are plentiful on the Gander River, and one fishing party came back recently with more than they could use, claiming that the game fish had to be fought off with clubs. Trout fishing also is good, but Gander Lake itself, curiously enough, seems to have no fish at all. The lake is very deep, soundings having been made to a depth of 6,000 feet without striking bottom, and this may be the reason.

The hunting laws in Newfoundland are very strict, but the hunting is said to be excellent. On the Northern Peninsula there are polar bears during the winter months, and caribou, moose, geese and black bears are plentiful. The nature of the terrain is such that hunting might be difficult before freezing weather sets in, but with snow on the ground the problem should not be serious. It is suggested that officers desiring to hunt bring along a rifle in the .303 or 30-30 class, or any other weapon suitable for big game, and at least a 20-gauge shotgun for skeet shooting.

Skiing and snowshoeing should be good in the winter, although the snow is said to be a little too damp for the very best skiing, and the Quartermaster stores are provided with hundreds of pairs of skis and snowshoes, which may be purchased. A very good arctic type Alaskan boot is available through the Quartermaster, as are heavy fur-lined coats and other cold weather clothing.

Swimming is out of the question, since the water is very cold, for all but the most rabid. Boating is possible on Gander Lake, which is a pretty big body of water, but it would be difficult getting a fair-sized boat to the base from the outside. There will be no golf, and conditions don't seem particularly suitable for tennis, but there will be baseball, volley ball and other such sports, soon we hope.

Radio reception is rather poor. Officers assigned to the base should bring a first-class short-wave set, or none at all, because the conventional long-wave instrument just won't do a good job. Portable phonographs are useful to those who like music.

Wives are out of the question. As far as the United States Army is concerned, the Newfoundland Air Base is strictly stag. In fact, there are only about eight women on the whole base--several wives of Canadian civil and military officials and a few nurses in the Canadian hospital. This hospital, incidentally, is used by the American troops and is said to be well-run and equipped.

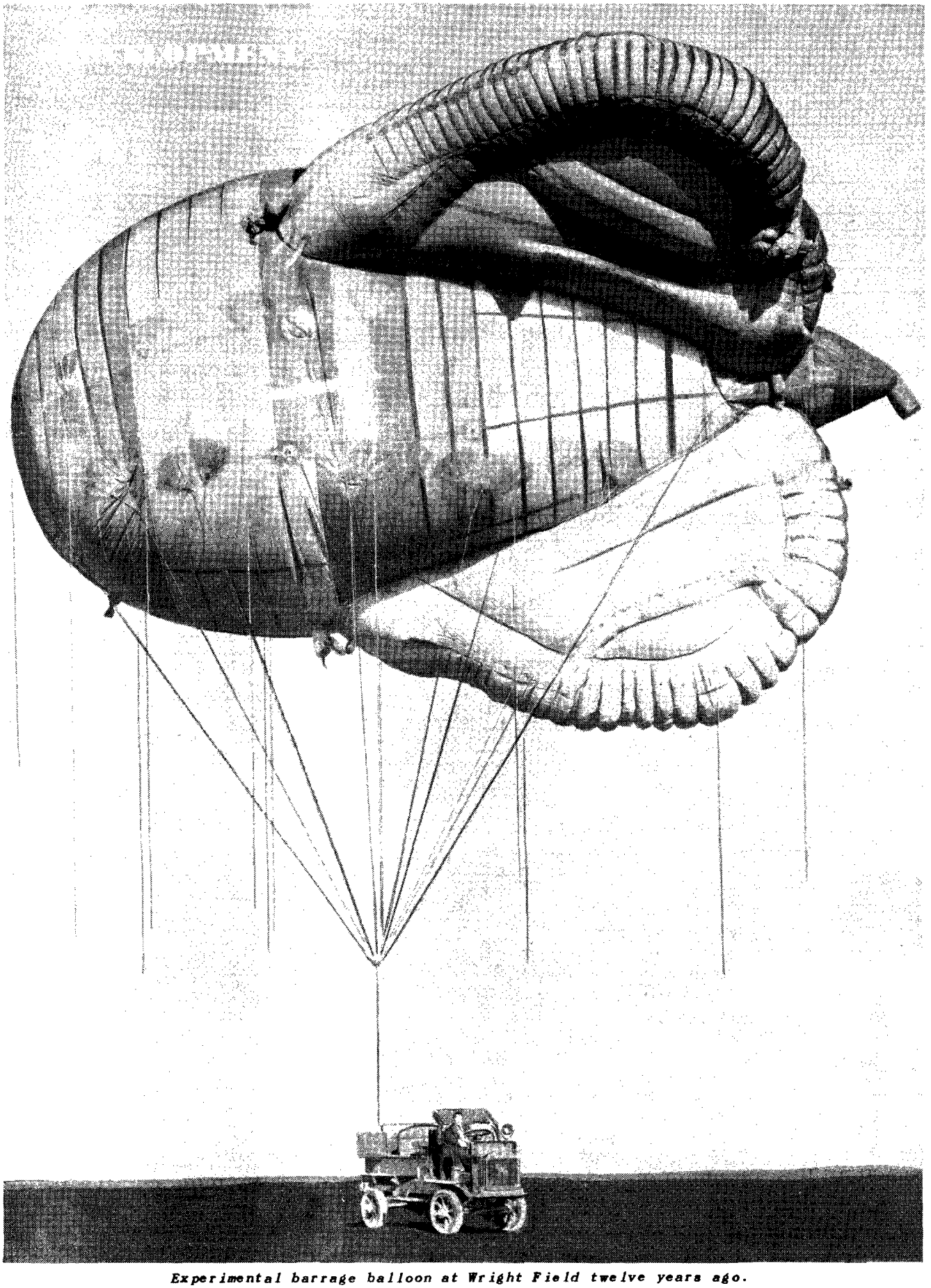
Every week an officer takes 25 enlisted men to Camp Alexander, at St. Johns, where the men spend the week having a good time in the Newfoundland capital. There are soda fountains, which are very popular, and dancing and swimming. The enlisted men also can get dates in the town, since, apparently like all the larger communities, there are plenty of single girls.

On the Professional side, the officer assigned to the Newfoundland Air Base will find his work similar to ordinary squadron duties anywhere, except that he is functioning under conditions closer to real war conditions than ordinarily, and may find his work more interesting for that reason. He will find many problems arising which might never arise on a field in the States, but that, too, probably will help make the time pass more quickly. Organizations will probably continue to be replaced at relatively short intervals.

His rudder control becoming jammed as the result of striking an unmarked high tension wire, causing the plane to persist in circling to the left, Lieut. Timothy A. Shea, 154th Observation Squadron, Post Field, Fort Sill, Okla., climbed for altitude, ordered his two passengers to "bail out," and then maneuvered his plane in ever widening circles until he managed to make a safe landing.

Lieut. Shea was making a test flight of his O-47 airplane in the twilight, his passengers being Lieut. Francis Holt and Staff Sgt. Eulon H. Weeks, of his organization. Flying in a low attack formation about 150 feet from the ground, his radio antenna was snapped off and the rudder was nearly torn off after striking the tension wire which was strung across an artificial lake. The jammed rudder caused the plane to start circling to the left.

After his passengers deserted the ship under orders, Lieut. Shea proceeded to figure out just how he was going to get down and out of his aerial merry-go-round. His rudder control useless, he began maneuvering his circles until they grew larger and larger like ripples in a pond. Finally, he included the Brownwood, Texas, airport in one of the circles and made a safe landing. Aside from the ripped tail assembly, there was but minor damage to the plane.



Experimental barrage balloon at Wright Field twelve years ago.

OVERSTUFFED AERIAL WATCHMEN

Barrage Balloons Stand Guard

Just as the role played by the barrage balloon in the great aerial Battle of Britain has largely been submerged by the more spectacular phases of the conflict, so the story of this country's preparations to give its cities, factories and defense installations balloon protection has remained to a large degree untold.

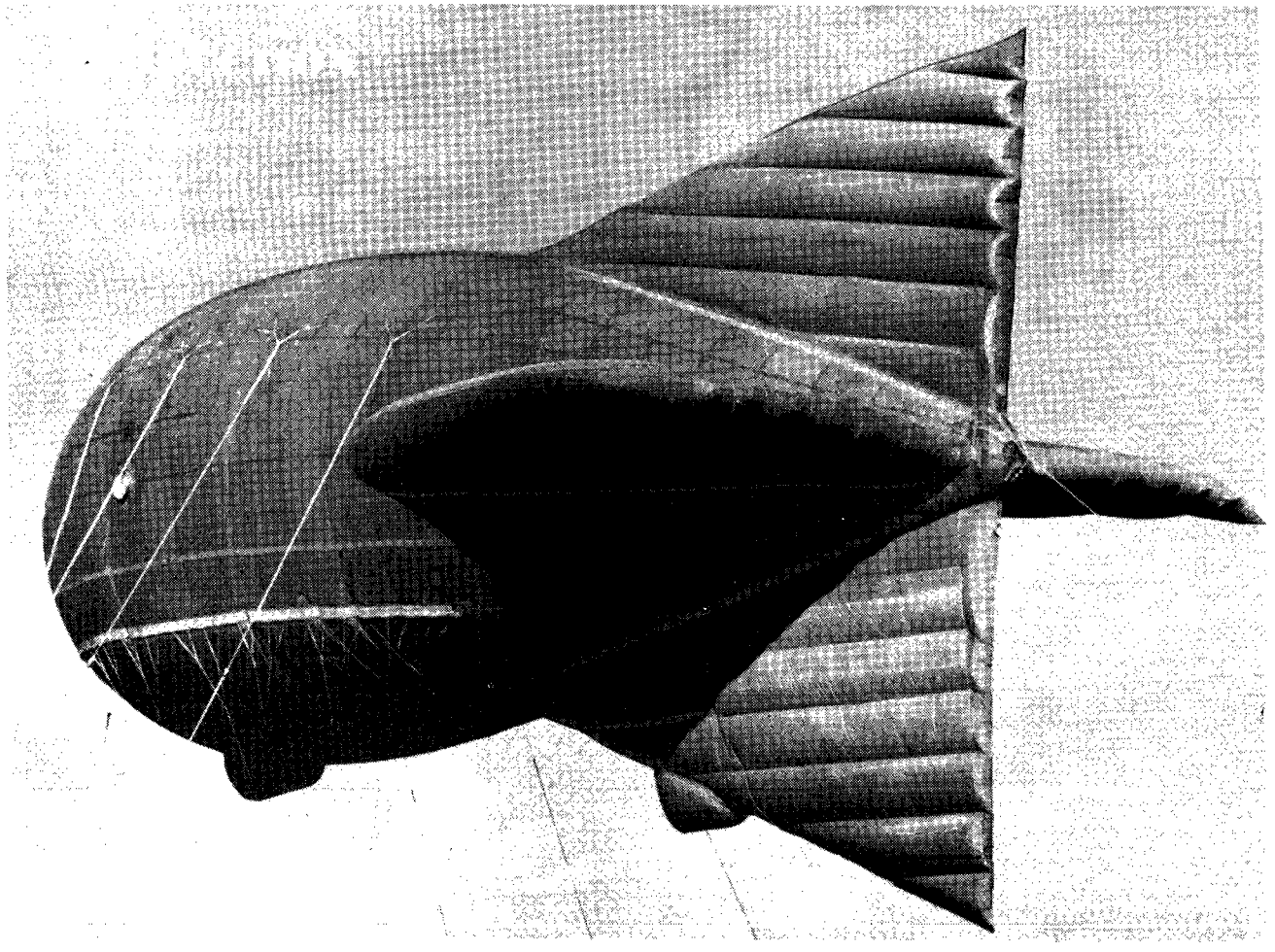
Barrage balloons don't make power dives at 600 miles per hour; they don't lay two-ton "eggs" deep in hostile territory, and they don't pack the firing power a pursuit ship needs to stop enemy bombers. But they do perform a vital, if unspectacular, job in keeping constant vigil against the aerial blitzkrieg tactics so much a part of modern warfare.

Proven valuable in actual combat in Great Britain, the balloon is not being neglected by this country as a vital feature of national defense. For many years the Air Corps has been experimenting with barrage balloons and recently has put certain types into production.

Up until May of this year barrage balloons were completely under the jurisdiction of the Air Corps, but at that time the job of operating them was turned over to the Coast Artillery Corps, which has organized the 301st Barrage Battalion to take care of the new function. As more men are trained and more equipment is procured, additional battalions will be organized.

The job of developing barrage balloons still is in the hands of the Air Corps, which maintains a Barrage Balloon Section (Materiel Division) and also the Third Barrage Balloon Squadron. Lieut. Col. Clarence B. Lober heads the section.

Balloon barrages are perhaps most effective when used in conjunction with anti-aircraft and defending pursuit and interceptor aviation. When used to supplement pursuit aircraft they serve to reduce the amount of airspace over vital objectives which need to be defended, and when used with anti-aircraft they tend to keep the enemy up in the strata where gunfire is most effective. In turn,



anti-aircraft and fighter activity affords valuable protection for the more or less vulnerable balloons.

At first glance many have contended that the London barrage balloon defense has failed because of the great damage which has been done the city through aerial bombardment. Closer scrutiny, however, shows that although tons of bombs have been dropped on London and its environs, some of the most vital defense installations of the area have so far come through unscathed. Some of these include such vital objectives as bridges, sources of power supply and harbors. Just how these have been defended is naturally not revealed, but it is the opinion of most military observers that the balloon has played a very important part.

As to the future, Maj. Gen. A.J. Green, Chief of the Coast Artillery Corps, has stated that a very considerable number of barrage balloon battalions can be organized from funds appropriated by Congress for this purpose. Furthermore, he has said that the necessary number of balloons will be ready as soon as troops can be trained in their use. In this connection there is being erected a great new balloon training center near Paris, Tennessee, which when completed will cover 1,000 acres and will have facilities for 7,000 men. Meanwhile training is being carried on at the Camp Davis training site in North Carolina, where more than 160 officers and 750 men, under the command of Col. Robert Arthur, Coast Artillery, are being prepared to staff the Army's barrage balloon battalions. These students, who were selected from the approximately 2,200 soldiers who have been conducting barrage balloon tests at Camp Davis for the past several months, are receiving instruction in six- and 12 week courses. Those who complete the courses successfully will be used to train additional personnel and to assist in the formation of new units.

Included in the current training program is a close study of the use and effectiveness of the balloons in Great Britain, possible new ways in which they may be utilized to advantage, and methods of coordinating balloon barrages with anti-aircraft and fighter plane defenses. All in all, the cooperative activities of the Air Corps and the Coast Artillery Corps seem to indicate that this country, will not be lacking in barrage balloon protec tion if and when it is ever needed.

In general there are two types of barrage balloons being produced currently. One is a ballonet, containing an air chamber which automatically adjusts pressure on the inside of the balloon to that of the outside air pressure at different altitudes. The other is known as the dilatable type. It is equipped with rubber shock absorber cords which permit the balloon to expand or contract as the outside pressure is changed.

Barrage balloons are also classified into mobile and fixed types, the former being operated from two and one-half ton trucks equipped with winches to raise and lower the inflated bags, and the latter being anchored in some stationary manner while in use. A further classification divides balloons into high-altitude and low-altitude categories, the former being so constructed that they automatically adjust themselves to the rarified atmosphere and low pressure of high altitudes.

Most modern training balloons are 35 feet in diameter and 87 feet in length, and are made of cotton fabric, impregnated with synthetic rubber This material has proved more satisfactory than natural rubber in holding lighter-than-air gases. Under existing methods of manufacture the outer fabric is generally manufactured in strips which are cemented together by a hand process of assembly.

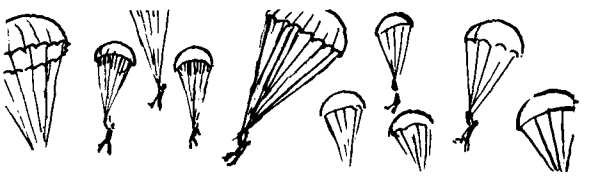
Although balloons are proving their value daily in Europe, the quiet nature of the role they play, and the relative scarcity of information concerning them has resulted in a popular lack of understanding of their function. Actually, reports from the war zone and experiments carried on in this country both reveal that balloon barrages are extremely valuable in the protection of small but vitally important targets such as factories, railway terminals and bridges, particularly when coordinated with the use of pursuit planes and anti-aircraft defenses. In the case of the United States it is the best opinion that balloons could be used to advantage in the defense of such vital and closely-cropped defense installations as the Panama Canal, Sault Saint Marie locks and fleet anchorages.

It is true that comparatively few airplanes are actually brought down by barrage balloons, although this has occurred when invading pilots have driven unsuspectingly into the heavy cables used to anchor the bags to the ground. The chief measure of the effectiveness of the balloon, however, is not in the number of enemy planes brought down, but rather the protection afforded vital ground installations through the keeping of invading aircraft at altitudes from which bombing cannot approach maximum accuracy. Particularly handicapped by the presence of balloons are dive bombers, ground strafers and other aircraft which rely upon low-flying tactics for effectiveness.

Two new types of military weapons have been developed and offered to the Army by enlisted men during recent weeks. The men are Robert Reid Stubbs, MacDill Field, Fla., who has developed a new bomb dispersal device, and Horace W. Dawson, Fort Lewis, Wash., inventor of a new type antiaircraft shell. Both Dawson, of the Tenth Field Artillery, and Stubbs, of the Forty-fourth Bombardment Group, have waived royalty considerations. They were commended for their patriotism.

Warriors from the Sky

By Oliver Townsend



"Look out below!" is a cry that is heard many times these days at Fort Benning, where the Army's Provisional Parachute Group is now in training. At present the Parachute Group consists of the Five Hundred and First and Five Hundred and Second Parachute Battalions, and the Five Hundred and Third, which has just been organized. One more, the Five Hundred and Fourth, is scheduled to be formed November 1. When complete, the four battalions will be manned by approximately 1,500 officers and men.

Although actually a part of the Infantry, parachute troop training is pertinent to the Air Forces, for airplanes must be used to transport paratroopers to the scene of their operations, and must protect them from enemy air power. Cargo planes being used for training purposes at the Benning training center are being supplied by the Fiftieth Transport Wing, under the command of Lieut. Col. Fred S. Borum.

Officers and men of the parachute battalions are rated as "Parachutists," and include volunteers from all branches of the Regular Army, National Guard and Officers' Reserve Corps. Parachutist officers are entitled to flying pay (temporary status), and the men as often as possible are being given Specialist First Class ratings.

Qualification requirements for parachutists are stiff. Not only must applicants pass a rigid physical examination, but they must also have a working knowledge of map reading, radio operations, sketching and the handling of explosives and demolitions. They must be unmarried, between 66 and 74 inches in height, must demonstrate outstanding personal initiative and must be between the ages of 21 and 32. Majors cannot be over 40 years old, captains and lieutenants not over 35.

In addition to the other requirements, enlisted applicants for transfer to the parachute battalions must have had at least six months service in the Regular Army, and at least one year of their enlistment to go. Regular Army officers must have had one year with troops, and reserves at least six months. In spite of the rigid requirements more than twice the number of men necessary to fill the four parachute battalions have already volunteered.

Just added to the Five Hundred and First and Five Hundred and Second Battalions have been two officers and 15 Medical Department enlisted men, chosen from an overflow list of volunteers on the basis of high standards of physical ability and professional attainments. This medical force, all of whom will be qualified parachutists, will accompany the regular parachute troops when they jump from airplanes, and will set up aid stations in the combat area to handle casualties until evacuated to hospitals.

Special medical equipment, which can be dropped without damage by parachute in standard air-delivery containers, will be used by the new medical detachment. It will include bandages, dressings, medicines, splints, blankets, surgical instruments, litters, sterilizers and other items necessary for the proper care of casualties in the field. Additional medical troops for the newly organized Five Hundred and Third Battalion are being selected at the present time.

One of the surest signs that the parachutist has become a definite part of the United States Army is the fact that he has been given his own special insignia. This is worn above the left breast pocket of the jacket or shirt, and consists of a replica of an open parachute placed between a set of silver wings which curve upward.

Parachute troop training is now being carried on under the direction of Lieut. Col. W.C. Lee, Inf., on a 900-acre tract of land adjoining Lawson Field at Ft. Benning. At present there are two buildings on the field, one for indoor training, and one for maintenance. Part of the indoor training program consists of making short jumps with the aid of suspension harness, designed to teach novices how to land properly in order to avoid shock. Since the paratrooper in actual combat drops at the rate of from 16 to 23 feet per second, depending upon the weight of his equipment, it is important that a proper understanding of the landing technique be gained at the very outset of his training.

In the Fort Benning maintenance building parachutes are dried, cleaned, mended and packed. Each man must pack his own parachute, and, since his life depends upon it, this is one of the most important parts of his early training. Parachutes are packed on the usual long, specially-constructed tables. An unusually painstaking task, it usually takes from four to five hours to complete.

The paratroop training program, which lasts six weeks, is divided into two parts--preliminary and advanced. Preliminary training, in addition to instruction in fundamentals, consists of several jumps from a 125-foot tower, and as many individual novice jumps from airplanes as are necessary. In the advanced training stage at least two mass pla-

toon jumps are included, usually from a considerably lower altitude than the novice jumps. Novice jumps are made from higher altitudes because of the safety factor involved.

Paratrooper equipment is surprisingly complete. Depending upon the circumstances, it may include rifles, light and heavy machine guns, 50 caliber antitank and antiaircraft machine guns, 37 mm. cannon, hand grenades, pistols, infantry mortars, sub-machine guns and demolition equipment. As much armament as possible is dropped with each individual soldier, the remainder being lowered separately. If the occasion demands, it has even been demonstrated as practicable to transport and lower 75 mm. howitzers. The Germans have even been known to drop collapsible bicycles, small bombs and knives with their parachute troops.

In addition to armament, parachutists must carry their own means of communication, as well as their own rations and supplies. Communication equipment includes portable radio sets, aircraft signal panels and pyrotechnics. Each soldier carries one ration on his person. Others are dropped in separate containers and are picked up after landing.

For head protection parachute troops are supplied with crash helmets. Special boots strongly reinforced at the ankle and at the calf are used to minimize the danger of leg injury.

Although the history of the parachutist is closely allied with the development of the modern blitz type of warfare, this does not mean that landing troops and equipment by parachute is a new military technique. As far back as 1929 the United States Army conducted one of the first successful experiments of this nature by landing a machine gun crew, complete with gun and ammunition, at Kelly Field in Texas. The 'chute used to lower the machine gun had been specially designed and developed by Sgt. (later Mr. Sgt.) Erwin H. Nichols, the "daddy" of Army parachutists.

Sergeant Nichols the fifth man in the world to make a parachute jump from an airplane, enlisted at Brooks Field during the World War, and, because of his special interest in this activity, soon became the first parachute instructor in the United States Army. For several years he was in charge of parachute training at Randolph Field. Sergeant Nichols was head of the parachute rigging department at Chanute Field, Ill., at the time of his death from a heart attack in 1931.

Probably the first conscious effort to experiment with the use of parachutists in mass proportions was by the Soviet Union during the several years which immediately preceded the outbreak of the present war. The Red Army first used its new technique in Bessarabia, and met with a moderate degree of success. Later on, however, when used in greater numbers in Finland, the paratroops failed almost completely.

From the standpoint of effectiveness in actual military combat, the Germans have so far been the most successful by far in the use of the parachutist. During the Polish campaign the device was used, but somewhat sparingly. In Poland the Germans used parachutes chiefly to drop saboteurs and "lone wolves" deep within hostile territory.

Again in Norway the parachutist was used by the Germans, this time in a more important role, and played a vital part in the capture of Oslo and in reinforcing the German Expeditionary Force in the wilder regions of Norway. Also valuable as an adjunct to the operations in Belgium and France, it was, however, at Waalhaven and later in Crete, that the German paratroopers achieved their most outstanding successes. At Waalhaven, the Rotterdam airport, a well-equipped, superbly coordinated force landed and captured the strongly fortified air field in less than a half-hour.

One of the main advantages in the use of parachute troops is that they can be used wherever aviation can operate, and yet they have the holding power of infantry, which air power alone completely lacks. In using paratroops the element of surprise is highly important, because of the vulnerability of the troops during the descent, and because of the time needed after landing to establish contacts and secure equipment. Once a foothold has been established additional numbers can be landed in a very short time.

The importance of the airplane's role in the use of parachute troops cannot be minimized. If the troops are to be used in any great numbers it is essential that aerial reconnaissance precede them, in order that a geographically suitable landing area can be located, and also to determine the approximate strength of possible opposition. Since the troops are transported in highly vulnerable military cargo planes it is necessary that a friendly air force establish local air superiority prior to the arrival of the transports.

There is a definite technique in the successful landing of a large group of parachutists. They must be dropped as near their objective, and as close together as possible, and must not be in the air long enough to become easy targets for ground troops. In order to accomplish these ends, both delayed openings and jumps from extremely low altitudes are used. The Germans in many instances have jumped from altitudes of less than 300 feet. From this altitude landing takes less than five seconds. Dangerous as this technique is, the speed and protection from ground defenses afforded by the swift descent is held to be more valuable than the danger of injuries.

In a well-balanced, well-equipped armed force there are many ways in which parachute troops may be utilized to a considerable degree of success,

(Concluded on Page 16)

RELATIVE RANK IN WORLD'S AIR FORCES

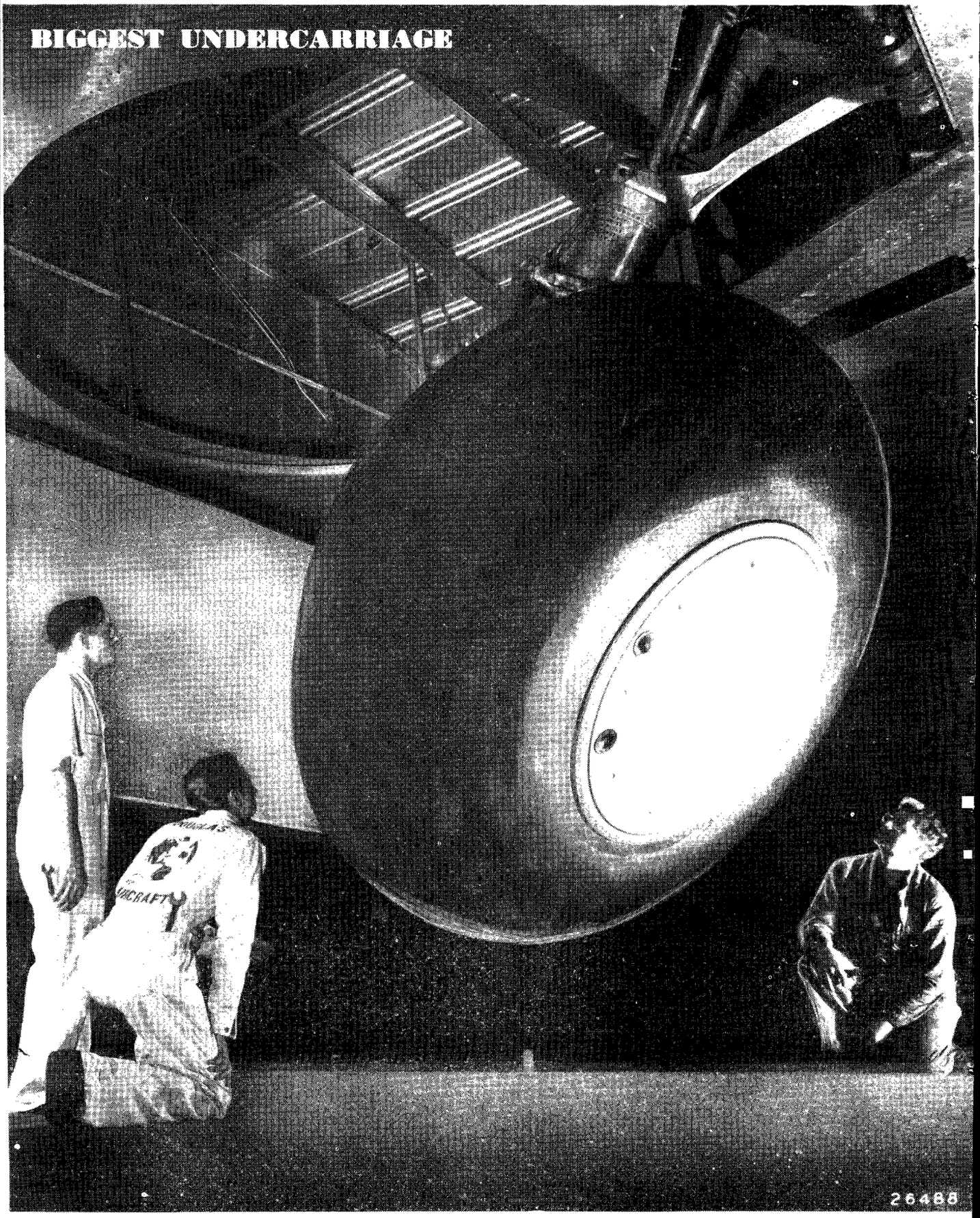
In the air forces of most of the nations of the world there are 11 commissioned grades, ranging from second lieutenant to field marshal. Tabulations are given below of the relative rank in the air forces of Argentine, Brazil, other Latin American countries, China, France, Germany, Great Britain, Italy, Japan, The Netherlands, Russia and Turkey.

GRADE	ARGENTINE	BRAZIL	LATIN AMERICA	CHINA
Field Marshal	-----	*Marechal	-----	-----
General	General	*General	General	Shang Chiang
Lieut. General	*Teniente General	*Tenente General	Teniente General	Chung Chiang
Major General	*General de Division	General de Divisao	General de Division	Shao Chiang
Brig. General	*General de Brigade	General de Brigada	General de Brigade	-----
Colonel	Coronel	Coronel	Coronel	Shang Hsiao
Lieut. Colonel	Teniente Coronel	Tenente Coronel	Teniente Coronel	Chung Hsiao
Major	Mayor	Major	Mayor	Shao Hsiao
Captain	Capitan	Capitao	Capitan	Shang Wei
1st Lieutenant	Teniente	1st Tenente	Teniente	Chung Wei
2nd Lieutenant	Subteniente	2nd Tenente	Subteniente	Shao Wei

GRADE	FRANCE	GERMANY	GREAT BRITAIN Air Force Ranks	JAPAN
Field Marshal	------	Feldmarschall	Marshal of the R.A.F.	Gensui
General	------	Generaloberst	Air Chief Marshal	Taishō
Lieut. General	------	General of Aviation	Air Marshal	Chūjō
Major General	General de Division	Generalleutnant	Air Vice-Marshal	Shōshō
Brig. General	General de Brigade	Generalmajor	Air Commodore	-----
Colonel	Colonel	Oberst	Group Captain	Taisa
Lieut. Colonel	Lieut. Colonel	Oberstleutnant	Wing Commander	Chūsa
Major	Commandant	Major	Squadron Leader	Shōsa
Captain	Capitaine	Hauptmann	Flight Lieutenant	Taii
1st Lieutenant	Lieutenant	Oberleutnant	Flying Officer	Chūi
2nd Lieutenant	Sous Lieutenant	Leutnant	Pilot Officer	Shōi

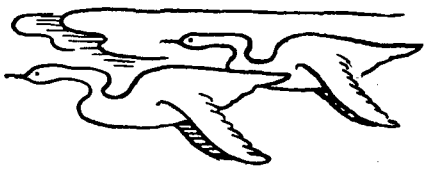
GRADE	ITALY - AIR FORCE	THE NETHERLANDS	RUSSIA	TURKEY
Field Marshal	Maresciallo	*Veldmaarschalk	Marshal Sovetskogo Soyuza	Ferik
General	Generale di Armata Aerea	Generaal	Komandarm, 1-go Ranga Komandarm, 2-go Ranga	Pasha -----
Lieut. General	Generale di Squadra Aerea	Luitenant-Generaal	Komkor	-----
Major General	General di Divisione Aerea	Generaal-Majoor	Komdiv	Mir-Liva
Brig. General	Generale di Brigata Aerea	-----	Kombrig	-----
Colonel	Colonnello	Kolonel	Nolkovnik	Mir-Alai
Lieut. Colonel	Tenente Colonnello	Luitenant-Kolonel	-----	Kolaasi
Major	Maggiore	Majoor	Maior	Binbashi
Captain	Capitano	Kapitein	Kapitan	Yoosbashi
1st Lieutenant	Tenente	Eerste-Luitenant	Starshii Leitnant	Muliazim-evel
2nd Lieutenant	Sottotenente	Tweede-Luitenant	Leitnant Mladshii Leitnant	Muliazim-Sany

NOTE: An asterisk preceding rank indicates that it is non existent in the peace-time organization. Where is part of the Army, the grades also apply to the Army.


BIGGEST UNDERCARRIAGE
26488

Development of Retractable Landing Gear

THEY TUCK THEMSELVES AWAY



It is a curious fact that a number of inventors worked out versions of retractable landing gear for airplanes before there were any airplanes. Drawings in the Patent Office show a variety of designs, from one that looks like retractable bed slats to a single-wheeled technical triumph which must have required that the pilot part his hair in the middle to accomplish a safe landing even in theory.

The completely retractable tricycle landing gear of the XB-19, with 24-ply tires 96 inches in diameter and wheel assemblies that weigh 2,700 pounds apiece, presents an extreme contrast.

If the giant landing gear of the XB-19 could not be retracted and tucked away into the airplane flush with the surface, the 7,750-mile range of this monster would be shortened by hundreds of miles. The fact that its huge gear can be retracted is a demonstration that the landing gear unit of the experimental section at Wright Field has special skill in this phase of aircraft development.

Widespread use of retractable landing gear is not old. One of the first successful applications was the Air Corps installation in its 1920 Dayton-Wright Gordon Bennett Racer. Employing a nut working on a threaded shaft, and a bicycle chain, the pilot cranked the wheels up and down by hand.

By 1932, six Army airplanes had retractable landing gear. With the swing to low-wing monoplanes, designers devoted more attention to the possibilities of retraction, and gradually were rewarded with higher speeds, longer ranges and fuel saving.

Since retractable landing gear always weighs more than fixed landing gear with fairing for the same airplane (due to the added weight of the retracting and actuating mechanism), the Air Corps does not install it in airplanes having speeds less than 175 m.p.h., except on trainers designed to acquaint student pilots with its operation. Slow liaison and primary training airplanes are the only production types still equipped with fixed landing gear.

For each pound that is added to the landing gear, about 15 pounds must be added to the whole airplane, because the wings or fuselage must be strengthened if the landing gear is retracted into them. Other complications in fabrication, cost, maintenance and operation appear with the introduction of retraction. All these penalties cause designers to wince even though they ultimately show a handsome aerodynamic profit by retracting the landing gear of all high performance types, military and commercial.

With the present aircraft engines, speeds above 300 m.p.h. would be next to impossible with fixed landing gear. Retraction of the tail wheel on airplanes above the 225-250 m.p.h. class may increase the high speed as much as two per cent. Another important advantage is that smaller cooling area can be used when the drag is reduced by retracting the landing gear.

Airplanes weighing over 16,000 pounds nearly all have a central power system which actuates gun turrets, controls, flaps, bomb bay doors, brakes and retraction. But the emergency retraction systems, for use when the main system fails, are operated by hand. A new trend will see compressed gases substituted for hand operation.

The main power systems consist of an aero-engine coupling to a hydraulic pump, or an electric motor and mechanical coupling or hydraulic pump. The manually operated secondary systems are cable and pulley, screw and nut, worm and other gears, or hydraulic. The latter usually consists of a pump unit with operating handle, control valve for changing direction of the flow, and hydraulic jacks for movement of the undercarrage structure.

Complete reliance on a purely mechanical system disappeared with aviators who wore their caps backwards. As primary systems they could not generate enough power to do the job on big airplanes. And while they were simple, quick acting and cheap, they required too much of the pilot's attention. During formation take-offs and landings, these hand-operated systems were about as convenient as a telephone which compels the caller to go to the other end of the line and ring the bell on the phone of the person being called.

To observe the landing gear on a pursuit airplane, a primary trainer and a bomber is to realize that each airplane must have a landing gear designed expressly for it.

E. K. Lasswell, civilian chief of the alighting gear unit at Wright Field, explained how the designer proceeds step by step to work out a retractable landing gear system for a new airplane, attaining maximum simplicity and efficiency at the lowest possible cost in weight, bearing in mind that the airplane will receive hard military use in the field so that both operation and maintenance must be kept as simple as possible. In short, a designer of landing gear at the Materiel Division

could outdo Rube Goldberg. He has the mechanical tricks to retract the wheels in any direction, and could take them over the wings and down into the pilot's lap if the only limitation was mechanical.

But, intent on simplicity and ruggedness, the designer proceeds as follows:

The preliminary plans of the new airplane furnish information about its landing speed, whether a nose or tail wheel will be used, and the gross weight. From these, the designer calculates the braking capacity demanded, which dictates the size of the wheel needed to house the brakes. From the size of the wheels and the gross weight, the tire size is determined depending on a selection of a soft, medium or high-pressure tire.

Necessary clearances govern the length of the landing gear. Propeller tips must clear the ground by at least nine inches. Structural clearances of the fuselage, or loads suspended beneath it such as bombs, smoke or gas tanks, have to be watched carefully.

The first stage of the design is completed when the over-all size of the landing gear is calculated.

Then the designer starts to look the airplane over, hoping to find enough space to house the landing gear completely when it is returned. If the retraction wells are located in the fuselage, valuable space near the center of gravity is stolen from military requirements for pilot, equipment, gas tanks, armament or cameras. The short landing gear structures of small low-wing monoplanes can usually retract into the thick section of the wings. The outboard engine nacelles of multi-engine models provide an ideal answer in larger airplanes. This is a very efficient installation since little fairing is required, and automatically a wide tread for lateral stability results.

After the location of the wells is decided, the lifting, and, sometimes, folding and rotating mechanism which carry the wheels to the wells, is designed.

The final step in the landing gear design is to choose a power unit to actuate the landing gear system. In some late designs of airplanes, doors which cover the retraction wells when the wheels are down as well as when up in the retracted position, necessitated doubling the power units. These doors materially reduce the drag during take-off, in some instances decreasing the take-off run by 15 per cent, and boost initial climb. Also, they protect the interior of the airplane structure from mud and other foreign material thrown up by the wheels.

The Air Corps requires that wheels retract in 20 seconds, and drop and lock in landing position in 15 seconds. Requirements of the Civil Aeronautics Authority are up in 60 seconds, down in 30 seconds.

Keel structures are now built into high performance airplanes which reduce the potential seriousness of belly landings. Air Corps pilots usually start to retract the landing gear as soon as the point is passed from which a straight-ahead landing can be made in the same field.

Inside the cockpit, visual and audible instruments aid the pilot in the operation of retractable landing gear. The visual indicator, mounted on the instrument board, has a small airplane on the dial. Its wheels follow the exact movement of the real wheels, giving the pilot exact position at a glance, while a pin-point light glows when the lock-pins which anchor the wheels in position drop home. An audible warning horn connected to the throttle honks in protest if the pilot closes the throttle when coming in to land with wheels still up.

In addition to design, the alighting gear unit is continuously engaged in development projects for airplane wheels, tires, tubes, brakes; shock absorbers; fluids, valves and lines for the hydraulic systems, and other related projects.

PARATROOPS *(Continued from Page Twelve)*

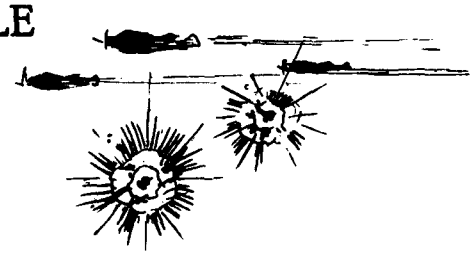
particularly when accompanied by unquestionably superior air power. It is known that they can immobilize enemy ground troops many times their number, that they can capture key points in the rear of the enemy, complete envelopment maneuvers and operate from five to 15 miles in front of fast-moving panzer divisions.

Parachute troops are also valuable when operating independently of ground forces. They can make quick attacks in isolated areas, can relieve, supply and reinforce units already located in such terrain and can be used to spread confusion and apprehension behind the enemy's lines. They are useful for sabotage purposes, for capturing vital installations such as supply stores, power plants, railway yards, docks and factories, and are valuable from a reconnaissance standpoint in that they can locate and signal to friendly aircraft the location of important targets.

Perhaps more than any other infantryman the paratrooper needs individual initiative and resourcefulness. His mission may be accomplished alone, in small numbers, or with several platoons. In any case, the parachutist is on his own to a considerable degree. In addition to personal skill and initiative and close coordination with his fellows, the parachutist also needs the support of strong air power. As far as the United States Army's paratroopers are concerned, they will have it.

Maneuvers Under Way in South

AIR FORCES PLAYING MAJOR ROLE



By Capt. Joseph S. Edgerton

Units of the newly created Army Air Forces are receiving their "baptism of fire" under the most realistic possible conditions in connection with the Louisiana maneuvers and the subsequent maneuvers in the Carolina area which will continue through November.

The Air Forces, through the Air Corps and the Air Force Combat Command, are playing a major role in the training of more than a half-million officers and men of the expanding armies in the tactics and technique of joint air-ground operations. As the Louisiana ground maneuvers are the largest in American military history, air cooperation is on the largest scale in the military history of this nation.

To play its part in the maneuvers, the Air Force Combat Command has established two "Air Task Forces," the Second and Third, to cooperate respectively with the Second and Third Armies. "Housekeeping" for the two task forces has been chiefly a responsibility of the Third Air Force. Virtually every department of the newly organized Air Forces set-up has been involved in some phase of the maneuver preparations or operations. New units, such as the Fourth Air Depot Group, will make their debut in connection with the maneuvers.

The Air Task Forces have drawn a major part of their combat units from the First and Second Air Forces. Many of the newer types of combat aircraft are to be engaged and a Group of P-39's (Bell "Airacobras") will be pitted against a Group of (Curtiss) P-40 pursuits.

Among the major units of the Second Air Task Force are the Sixth Pursuit Wing, Brig. Gen. Carlyle H. Wash; the Thirty-first Pursuit Group, Maj. John R. Hawkins; the Eighth Pursuit Group, Maj. Frederic H. Smith, Jr.; the Seventeenth Bombardment Wing, Brig. Gen. Follett Bradley; the Seventeenth Bombardment Group (medium), Lieut. Col. Walter A. Peck, and the Third Bombardment Group, Lieut. Col. Paul L. Williams.

In the Third Air Task Force will be included the Tenth Pursuit Wing, Brig. Gen. William O. Ryan; the Twentieth Pursuit Group, Col. Ira C. Eaker; the First Pursuit Group, Maj. Robert S. Israel, Jr.; the Second Bombardment Wing, Brig. Gen. Arnold N. Krogstad; the Twenty-second Bombardment Group, Lieut. Col. Louis M. Merrick, and the Twenty-seventh Bombardment Group, Lieut. Col. Guy L. McNeil.

Eighteen observation squadrons, organized provisionally into groups, have been assigned to the task forces, together with necessary air base groups, materiel and transport squadrons and units of the attached arms and services.

The United States Navy is cooperating, assigning a mixed air group to the Third Air Task Force and a mixed Marine Corps air group to the Second Air Task Force. The Navy Group is composed of two fighter squadrons, one scout bomber squadron and one torpedo bomber squadron. Marine Corps Aviation is represented by one fighter squadron; two scout bomber squadrons, one dive bomber squadron and one observation squadron.

The Air Task Forces passed from control of the Air Force Combat Command to their own commanders, Maj. Gen. Millard F. Harmon, Second Air Task Force, and Maj. Gen. Herbert A. Dargue, Third Air Task Force, at 12:91 A.M., August 31. At that time the movement of ground elements of the task forces into the maneuver area was virtually completed and the movement of the tactical units began on September 1.

The task force units were assigned to airdromes scattered through Louisiana and parts of Texas and Mississippi. The maneuver area extends over a widely varied terrain, ranging from the dry, rolling lands of Western Louisiana and Eastern Texas to the swamps bordering the Gulf of Mexico. The zone measures roughly 150 by 195 miles.

The task forces commanded by Generals Harmon and Dargue faced each other under combat conditions the realism of which, for air forces of this character, is easily achieved. No element of combat operations was lacking save the actual use of bombs and ammunition. Records of reconnaissance, ground fire, bomb targets and gunnery by camera guns and other devices, however, make up much of the lack of live ammunition and bombs.

After a period of preliminary exercises intended to shake down the new task forces and develop them into combat teams, the Air Task Forces on September 14 passed to the command of the commanding generals of the Second and Third Armies and became parts of joint ground-air combat teams. The resulting set-up provided these armies with the greatest air support received by any ground forces in American military history. The Second Air Task Force had an authorized maneuver strength of 825 officers

and approximately 5,700 enlisted men; the Third Air Task Force, 1,019 officers and approximately 6,600 enlisted men.

Following the Louisiana maneuvers, it is planned to send these air task forces to the Carolina area to participate in exercises for which details are to be announced later and for maneuvers, first with elements of the First Army and the First Army Corps, reinforced, and later with the First Army and the Fourth Army Corps. The movement to the Fort Bragg, N.C., area is planned during the period October 3-8, with exercises during the period October 9-November 1 and maneuvers with the First Army and First Army Corps November 2-13. The final maneuver period is scheduled for November 14-30.

To meet the increasing demands of the modern army for the highest possible degree of mobility, especially for all units of the Army Air Forces, the Army Air Corps has created its first permanent mobile repair and supply depot and assigned it to duty in connection with the Louisiana maneuvers.

The new unit, the Fourth Air Depot Group, has been stationed at Jackson, Miss., and is serving aviation units of both task forces. While decreasing to some extent the reality of the maneuvers, this arrangement has been made necessary by the fact that the Fourth Air Depot Group is the only one of its kind and it is desired to give the unit the utmost in the way of service testing.

The Fourth Air Depot Group was organized and now has permanent station at Patterson Field, Fairfield, Ohio. The maneuver strength of the group is five officers and 467 enlisted men. The trip to maneuver station was made by motor, the train including wrecking trucks, mobile machine shops, stores of airplane and engine parts and other supplies.

The new group, although highly mobile and capable of being moved into undeveloped areas and set up rapidly, is equipped to handle the heavy work of reclaiming and salvaging damaged airplanes and engines, of replacing worn or damaged parts and of carrying on emergency repair work of the many types required if aviation units in the field are to be maintained in operating condition away from fixed depots.

The Fourth Air Depot Group may be the forerunner of others intended to equip The Army Air Forces for extended action in any theater of operations. Such mobile depots will form a part of the Maintenance Command and will serve as a link between the combat forces in the field and the Zone of Interior depots.

Although, for obvious reasons, it is impossible to employ bombs or aerial gunnery in connection with the maneuvers, it was planned to make good this lack of actual striking power by holding bombardment and aerial gunnery demonstrations at Barksdale Field. Squadrons of the Third Bombardment Group and the Eighth Pursuit Group were assigned to carry on these demonstrations, using B-17's (Boeing Flying Fortresses) and (Douglas) B-18's for light and heavy bombing at altitudes up to more than 15,000 feet. For these demonstrations, it was planned to lay out an area target with approximate dimensions of 1,000 by 2,000 feet, containing two precision targets with a diameter of 100 feet.

The maneuvers are a trial by fire for The Army Air Forces in more ways than one. There has been little actual public knowledge of the size or state of training of components of The Air Forces. There has been less knowledge concerning the numbers and effectiveness of the aircraft available. These maneuvers are being watched by the public more earnestly than ever before to provide answers to these vital questions. Military and defense experts are covering them. Leading military correspondents have been assigned by such newspapers as *The New York Times*, the *Chicago Tribune* and major newspapers and news syndicates in the various large cities. The mission of these correspondents is to compare the American Army, in all its parts, with the forces of other world powers. They are paying particular attention to three elements of modern warfare which have been constantly and continuously drummed into the consciousness of the public--the airplane, the parachute trooper and the tank.

It was not possible to announce in advance the number of airplanes which would be available, since these strengths are contingent on factory deliveries, depot and factory repair schedules, etc. Every effort has been made to have available and in commission all combat airplanes assigned to the units participating. Many of the participating squadrons left personnel at home to pick up aircraft on delivery and rejoin their outfits in the field. Obviously, under such an arrangement, it was necessary to make the utmost possible use of the preliminary exercise period before the opening of maneuvers to build up squadron strengths and to work the new equipment into the operations picture.

Airplanes of the Second Task Force have been designated by a red cross, painted with water paint on the lower surface of each wing. White crosses were used to designate the planes of the Third Task Force. Airplanes not already camouflaged are being camouflaged with water paint prior to departure from home stations, using the standard color scheme now being put on at factories.

Oxygen equipment is mandatory for all units except those equipped with the A-24 airplane. All units have been required to make arrangements to safeguard their equipment in the field in event of high winds and violent weather.

Two Air Engineer Companies have been assigned to the maneuvers, to assist in camouflage work, airdrome repair, construction of revetments for airplanes and the preparation of ground defense works for local defense of airdromes.

AIRMANSHIP IN ENGLAND

Or, After You, Sir Sydney

Q. What is the correct procedure after a forced landing?

A. The pilot, after extricating himself from the wreckage, should summon the nearest onlooker, borrow a cigarette and inquire as to his whereabouts. If he has landed in an onion field he should fill his pockets with this rare and exotic fruit, explaining that the Air Ministry will pay for everything. By this time, a Home Guard will have arrived. The pilot should explain in simple language that he is not an enemy parachutist and point out the more obvious irregularities in the Home Guard's uniform. He should then ask to be directed to the nearest house containing a telephone, a well stocked cellar and a pretty daughter who has not yet met the R.A.F. It is as well to ring up one's C.O. the next morning to have the staff car sent around.

Q. Why should extreme care always be exercised when taxiing?

A. Because if you are involved in a collision the other participant is bound to be a senior officer, so you will be in the wrong.

Q. You are flying above sea at an altitude of 20 feet, visibility zero-zero. The nearest land is 400 miles to starboard and you are suffering from cramp. Suddenly both your engines fail and the port wing drops off. What is your immediate action?

A. Make out in triplicate a request to be granted six days' compassionate leave.

Q. What action should a pilot take before a flight?

A. First of all ask yourself whether you really wish to fly that day or not. On deciding that you do, or having it decided for you, the next step is to choose an airplane. The wise pilot will choose one of a type which he has flown before and will ensure that his particular choice has not recently had its engines removed for inspection. You must now ask an airman if he will be good enough to wind the thing up and sit yourself in the cockpit. By the time you have arranged the parachute and harness to your satisfaction, the airman should have primed the engine and be winding like a mad thing, casting occasional reproachful glances at the cockpit. Choose a moment when he is not looking to turn on the gasoline. When the engine starts, throttle back before running into the hangar and tie a knot in your rip cord to remind you that next time you must use chocks. Cast a rapid glance around your instruments to make sure that they are all there and then wave the airman away. (You do not know, of course, that he fell off when the engine started and is now struggling from under the tail wheel.) Having surmounted the obstruction offered by his writhing legs, taxi smartly into the wind, turn downwind and take off. THE SKY IS YOURS.

Q. What precaution should be taken when landing on a strange aerodrome?

A. Dive to within 20 feet of the Control Tower to wake up the Duty Pilot and pull out on a climbing roll. (Note:-Pilots in twin-engined aircraft may execute a stalled turn instead; it will have the same effect.) Carry out a wrong circuit to let them know that you are a visitor and land as near the mess as possible.

From PUNCH

Sept 41

Wanted: More Pilots

RESERVE OFFICERS GET FLIGHT TRAINING

Applications from reserve officer personnel for participation in Air Corps pilot training courses are being accepted by the Office of the Chief of the Air Corps, according to a new War Department policy.

Almost at the same time as the new officer-training policy went into effect is was announced that another group of potential pilots, the first class of enlisted aviation students, had begun training to win warrants as Staff Sergeant Pilots.

Although applications for pilot training are being accepted from reserve officers at present, no definite plans have yet been announced concerning the form the training will take, where it will be given or the number of officers to be accepted.

In order to qualify for flying training in grade, applicants must be physically qualified, must be recommended by their military superiors for such duty, must have an efficiency rating of "excellent" or better, must not have passed their 27th birthday and must have been citizens of the United States for not less than 10 years.

Officers accepted for flight training must agree to serve three years on extended active duty with the Air Corps after successful completion of their course of instruction. If they have ever been eliminated from a service flying school for failure in flying, or if they have ever completed the course of instruction of a service flying school they will not be considered eligible.

Enlisted men receiving pilot training at present number 188. Of these, 125 are in training at the Spartan School of Aeronautics, Muskogee, Okla., and 63 at the Brayton Flying School, Cuero, Texas.

Two other War Department decisions affecting reserve officers of the Air Corps were made during the past month. One of these held that the recent announcement that reserve officers would not be required to remain on active duty upon the completion of one year's service did not apply to the Air Corps.

The other provided that, due to the emergency, reserve officers who have served on extended active duty since January 1, 1940, or who were on extended active duty on or after August 15, 1941, are relieved of the Army Extension Courses requirement for a certificate of capacity for promotion.

In response to requests being made for the security cartoons on the inside back cover, steps now are being taken to obtain poster-size reproductions in sufficient quantities to meet the demand.

GEN. BRETT VISITING WAR ZONE TO STUDY R.A.F. MAINTENANCE

A close-hand survey of Royal Air Force materiel problems on the various war fronts is being made personally by Maj. Gen. George H. Brett, Chief of the Air Corps, and a group of assistants who are touring the war zone in an army airplane.

General Brett's tour of the African, Near East, Mediterranean and Atlantic war fronts is being made for two principal purposes. First, it will give him and his special staff a first-hand opportunity to determine the needs of the British for air equipment manufactured by the United States. Second, he will be able to study two particularly pressing problems--the maintenance and repair of air equipment and the question of supply.

General Brett is accompanied by Col. R.A. Dunn, Air Corps; Col. J.B. Newman, Jr., Corps of Engineers; Lieut. Jack W. Perry, Air Corps, and Mr. Harry C. Short, of the Middletown Air Depot. Col. Caleb V. Haynes, Air Corps, has command of the airplane crew. Lieut. Col. E.M. Powers, Maj. James H. Doolittle and Lieut. Col. K.G. Boyd are on a similar tour and will meet the other party at various places in the war zone.

The supply and maintenance of American aircraft in the war zones has been made more difficult because of personnel familiar with these aircraft and American equipment. One of the important features of General Brett's studies will be that of the maintenance personnel problem. Spare parts and supplies must be provided in the proper proportions.

Provisions must be made for supplying and training the necessary personnel in the maintenance and use of American equipment. Different procedures must be set up for each zone due to local conditions. Which method or combination of methods is to be adopted must be determined.

General Brett is making his personal survey of the situation with the assistance of a staff selected from personnel familiar with all phases of the production, delivery, maintenance, supply and training problems involved. Additional staff assistants will meet him en route during the trip for special studies at particular points.

From the personal knowledge of the subject gained by General Brett and members of his special staffs during the present tour, it will be possible for the Air Corps and allied military and industrial organizations to plan efficiently and intelligently for the future.

Air Power Holds the Key

Command of the Ocean Approaches

By Lieut. Col. Thomas R. Phillips
General Staff Corps

Even if the United States had no harbor defenses it would be impregnable to invasion. And this still would be true if our Navy were inferior to that of an invading power. In spite of this, a great program of harbor-defense construction is proposed and is partially under way. One wonders if this program has been devised with full realization of the ability of air power to perform many functions of harbor-defense installations.

Harbor defenses are supported by the argument that they will prevent invasion of the United States. Actually, they never were intended to prevent invasion. If the need for harbor defenses depended upon their ability to protect the United States from invasion, it would be very simple to prove that no harbor defenses are necessary. Land-based air power has made the United States impregnable to a sea-borne invasion.

The attempted counterinvasion of Norway by the British supplied the factual proof of the well-established theory that sea-borne invasions are impossible against land-based air power. This particular operation took place under the most favorable circumstances possible for the British: The Norwegians welcomed their coming and desired their help; the British did not have to contend with any harbor defenses nor enemy forces when they made their landings at Aandalsnes and Namsos--there was nothing to oppose them until they had marched a considerable distance into Norway where they met advanced detachments of the German Army; nevertheless, the invasion failed.

Prime Minister Churchill gave as explanation for this failure "intense, continuous bombings of the bases at Namsos and Aandalsnes which prevented the landing in those small fishing ports of any large reenforcements and even of artillery for the infantry already landed. It, therefore, was necessary to withdraw the troops or to leave them to be destroyed by overwhelming forces. The decision to withdraw was undoubtedly sound. The withdrawal of these 12,000 men--less than a division--was accomplished with very great skill and, I must add, very good luck."

In other words, nothing but the "intense, continuous bombings" prevented the success of the British counter invasion of Norway. There were no harbor-defense guns to fire against the British nor were any German troops at the harbors to give the slightest opposition to the landings. This was purely a victory of air power over a sea-borne invasion which had no aerial support.

On the German side, the means to repel the invasion were quite inadequate. Germany had occupied the airdromes at Oslo and Stavanger. Oslo is 326 miles from Namsos and 220 miles from Aandalsnes. Stavanger is 260 miles from Aandalsnes and 420 miles from Namsos. Thus the German air forces operating against the British invasion bases had to operate from considerable distances. Not only that, but they were very limited in numbers--to the numbers that could be placed on four rather inadequate airdromes--and were engaged primarily in supporting the ground operations of the German troops who were driving through the Norwegian valleys in an effort to reach the British.

Another factor of great importance in favor of the British was the short distance that the expeditionary forces had to go to reach Norway and the fact that their ships could approach the Norwegian coast beyond range of German bombers closely enough so that the final run to the coast could be made in darkness and without fear of bombing. Bombing was possible only after the ships reached the harbors.

It might be thought rash to conclude from a single example that impregnability to a sea-borne invasion could be considered as proved. The British effort in Norway was a very special case, however, in which every factor, except readiness, perhaps, favored the invader. If the conditions under which an invasion would have to be attempted against the United States are visualized, it will be seen that the problem of invading this country would be infinitely more difficult than was the British problem of landing troops in Norway. Leaving aside naval interference, imagine a convoy of 40 or 50 troopships crossing the 3,000 miles of the Atlantic Ocean toward the United States. The departure of such an invading force could not be kept secret. Our defending bombers would start attacking it a thousand miles from the coast. The attacks would grow in intensity as the convoy approached. The invasion might not be stopped before it reached the coast, but it would be badly damaged.

Imagine, then, this convoy attempting to come into a harbor and remaining practically stationary for days in narrow waters with the entire bombing force available to the United States working on it. The picture is incredible. The invasion

would be doomed. No military leader would ever think of making such an attempt. The presence or absence of harbor defenses along the American coast would be of no importance whatsoever against a sea-borne invasion, as long as we possess ample land-based air power.

It may be argued that naval vessels have not been driven off the seas within bombing range in the North Sea and the Mediterranean, and that convoys are operating occasionally even in the English Channel. The reasons that this is possible will be considered in more detail later. It suffices for the present to note that these ships are subject to bombing raids for relatively short periods of time, that they first must be discovered, and that they are not tied up at docks nor subject to bombardment for long periods. None of these favorable factors applies to an effort to unload troop transports nor to the continuing supply and reenforcement of troops already landed. In Norway, the British landed their first troops but could not reenforce them once the bases were discovered and watched and bombed constantly.

What leader would be willing to risk thousands of men packed like sardines in a transport under the bombing conditions that can be visualized? Churchill would not. And if these transports had to come across an ocean to be met with enormously more intense bombing, no leader would consider it. The whole business of invasion across the sea against ample land-based air power no longer is in the book of possibilities.

Almost no other event in the history of warfare equals this in importance. For the United States, particularly, the conclusion is transcendental. It makes it possible for this country to insure not only its own continental territory from invasion but, by the provision of a suitable air-base and airways system, to insure the impregnability of all North and South America. If this country takes advantage of the defensive powers given to it by the bombardment airplane, its impregnability to military invasion is assured in the foreseeable future.

The successful German invasion of Norway through its principal harbors--Oslo, Stavanger, Trondheim, Narvik--has been cited to prove that had Norway been supplied with adequate harbor defenses, or if those defenses had not been tricked into impotence, Norway could not have been invaded by the Germans. To quote one protagonist: "The salient fact was that the Germans went on in unopposed, tied up at the docks, put their men and supplies ashore, and proceeded to overrun the country." From this was deduced proof that had the Norwegian harbor defenses functioned effectively, the invasion could not have succeeded. Historically, however, most landings on hostile shore have been made away from harbors, and the troops have proceeded overland to capture from the rear the harbor defenses and the cities they protected. Norway did have harbor defenses, and good ones, at Trondheim and Oslo. It was easy to trick them, and once the Germans were within the harbors, these defenses no longer had any value.

Much more important was the fact that Norway had no air force. Had a Norwegian air force been in existence, it would have been able to block the German invasion of Norwegian harbors just as effectively as the German air force later blocked the British invasion of Norwegian harbors. And this would be true whether or not Norway had any harbor defenses. In the case of the ports distant from Germany--Trondheim and Narvik--an ample Norwegian air force would have made German operations in these ports impossible. They were too distant for hostile operations to be protected by German air power based in Denmark or Germany. Even Oslo is 200 miles from the Aalborg airport used by the Germans in Denmark, and a small air force should have been able to best much larger German fighter forces that might have been used to protect the landing in Oslo. The Norwegian harbor defenses were made impotent by false messages or treachery. Within an hour, their usefulness had vanished because German forces had passed them. The air forces might have been tricked for a short time, but since air bases usually are back from the coast, their impotence would have been of short duration.

Air power has still another advantage as a defensive force. This is its ability to assemble and concentrate its entire power for operations against a single point. Harbor defenses are immovable, and the individual forts can give no assistance to the forts 50 or 200 miles away. But all the bombing planes in the nation can be concentrated so as to apply their power at the single threatened point, and this concentration can take place with almost incredible rapidity--in a day or two at the most.

Prime Minister Churchill explained the failure of the British fleet to operate in the Skagerrak on German communications to Norway as follows: "But immense enemy air strength, which can be brought to bear on our patrolling craft, makes this method far too costly to be adopted. Important forces would have to be employed in order to maintain a steady surface patrol and the losses which would have been inflicted on the patrol from the air would undoubtedly very soon constitute a naval disaster." In other words, the British patrolling vessels would have had to remain on duty in the Skagerrak subject to continuous bombing by immense air forces. The operation was impossible, and the British were correct in not making the effort.

Prime Minister Churchill's objections to operating in the Skagerrak were abundantly proved when the British fleet operated under similar conditions in attempting to prevent the invasion of Crete.

After the loss of four cruisers and seven destroyers, the fleet withdrew. Here the real factors in the question of air power versus sea power were demonstrated in one operation; namely, immense bombing forces and the fact that the ships would have to remain subject to bombing.

Malta also shows the impossibility of a fleet remaining within range of large bombing forces. It is only 60 miles from Italy and is untenable as a fleet base. The fact that the British still hold it is of minor importance. It is no longer a base--it is just a piece of land. On the other hand, Gibraltar--750 miles from Italy--hardly has been bothered by bombing. The distance is too great for bombardment operations to be carried on with the necessary mass and continuity. Gibraltar is protected from massive and continuous bombing by distance.

Convoys operating in the North Sea, the English Channel, and the Mediterranean gain partial protection from the time element. By making use of darkness to pass the more dangerous areas, the convoys are within effective bombing range too short a time to be disastrously endangered, unless massive bombing forces are on hand to operate against them. There have been many ships lost and other ships injured, but the damage has not been great enough to prevent occasional passage. Scapa Flow, 300 miles from Norway, has been made untenable as a fleet base by the bombing threat. In this case, Germany has a sufficient number of bombing planes based closely enough to make the danger of remaining at the base too great for the possible military advantages that would be obtained.

In the Mediterranean, Italian air operations originally appeared to give the lie to all these contentions. Failure of the Italian Air Force to be more successful in preventing British convoy and fleet operations close to Italian and Libyan coasts was one of the major mysteries of the war. The British even penetrated the Adriatic (at night), December 19-20, 1940, and bombarded the Albanian seaport of Valona without aerial interference by the Italians. It is now apparent that Italian air power was not operating in sufficient mass in these waters to perform its missions effectively. When it was reenforced by German squadrons, the last British convoy to pass through suffered such extensive losses that no more convoys have been attempted. The war has showed one fact conclusively--air power dominates sea power in narrow seas and near the coasts.

Was not the insufficiency of Italian air power in the Mediterranean one of the inherent weaknesses of air power? And if air power is depended upon, are we not apt to find that it may be unavailable at the critical time? Harbor defenses are so comforting. The big ugly-muzzled guns are always there, ready and waiting--a definite assurance of protection for one little spot for all time. Doubt as to the availability of air power can be dismissed as far as the United States is concerned. We shall always have it in the future in ample quantity. And instead of a dozen or two dozen guns defending a harbor, we shall have 2,000 or 4,000 bombers ready to be concentrated for the defense of any point, not of harbors alone, but of all the beaches and all the coasts.

Harbor defenses in the past were constructed to perform the following functions: first, to permit movement of our naval forces in and out of harbors; secondly, to protect harbor facilities and ships in the harbor from naval gunfire and torpedoes; thirdly, to prevent enemy ships from entering the harbor; fourthly, to furnish incidental support to defense against landing attacks within range of the defense guns.

What has air power done to these missions? If a hostile fleet cannot remain on guard outside a harbor to prevent the exit or ingress of our own fleet because of the threat of bombing, then no harbor defenses are necessary for that purpose alone. Except for hostile air power the British fleet might have been maintained close to the Skagerrak or to the Kiel Canal or to Heligoland. This mission of harbor defenses is ended. Air power can perform this mission far more effectively than guns ever could, since guns never had the necessary range to provide ample maneuver room for a fleet leaving a harbor.

Protection of ships and harbor facilities from naval gunfire and torpedoes is still as necessary a function of harbor defense as ever. The European war has shown that ships can stay within bombing range at night long enough to make raids on shore installations. The French and British both raided Italian shore installations and escaped with minor damage. The British have raided the Dodecanese and the Libyan coast and have escaped without serious injury. The British bombarded the German-held airdromes at Stavanger from cruisers for several hours. Thus the experience of the European war seems to prove that air power is not yet sufficiently strong to prevent raids and naval bombardments. Harbor defenses must be provided for this purpose.

Whether or not air power can deny enemy ships access to harbors and adjacent waters depends upon the nature of the harbor. In such a harbor as Puget Sound, where hostile ships would have to steam 300 or more miles to get in and out, and where they never could be lost sight of in the narrow waters, air power should suffice to entrap the raiders. They might get in, but they never could get out. In the case of shallow harbors easy of access, the problem would be similar to that of a naval raid: some guns would be required to prevent a raid, but air power would be ample to prevent the continued use of the harbor.

The question of the ability of air power to prevent invasion already has been discussed. Harbor defenses never were built primarily with that end in view, and this question certainly needs no consideration in their construction in the future. This affirmation, however, applies only when the defensive air power is immeasurably superior to that which can be brought against it. The case of a German invasion of Great Britain across the narrow English Channel is different from an invasion across the Ocean, since, in the former case, the invader's air force can operate from land bases. Against some of our foreign possessions an attacking naval force might be able to bring superior air power on carriers; hence all the old missions of harbor defense apply with full force to them.

In the July-August 1941 issue of ARMY ORDNANCE (Vol. XXII, No. 127, p. 46), General Hagood gave a 13-point program for coast defense on which $200,000,000 would be spent. There was little to cavil at in this program except that it appears to have been based on the obsolete missions of harbor defenses. For example, General Hagood recommended new harbor defenses in the Houston-Beaumont area of Texas with special reference to the protection of the oil fields. Beaumont and Houston are inland ports with narrow channels leading to them. No naval force or transports could live for 24 hours in these channels under bombing attack.

This proposal obviously was intended to prevent a sea-borne invasion from capturing the oil fields, since they are not close enough to the coast to be bombarded. Air power not only has made such an operation impossible, but new American defenses closing the gaps into the Caribbean through the Greater and Lesser Antilles will make this sea, through which the Gulf ports of the United States must be approached, a trap which no hostile naval force or transports ever would dare to enter.

The West Indies, if fully exploited to close the Caribbean, furnish complete protection for the American Gulf Coast. Not only are no new harbor defenses needed, but those now in existence have little further reason for being maintained. And not only do American defenses along the Antilles protect the Gulf Coast, but they also secure the northern shores of Venezuela and Colombia, the Panama Canal and the eastern coast of Central America and Mexico.

On the other hand, many new seacoast-gun installations for the protection of factories and bases from naval bombardment might very well have been recommended. Naval air-patrol stations will be constructed at many new points in continental United States and the Caribbean Sea; since these are for seaplanes and are close to the coast, they are subject to naval bombardment during raids, and must have seacoast guns to keep enemy raiders beyond range.

Air power has not superseded coast defenses, but it can perform some of their functions more effectively than guns ever did. On the other hand, the increase in naval air installations on the shore, together with acceptance of bombardment of nonmilitary installations as legitimate targets, makes more harbor defenses necessary for their protection. Any harbor defenses constructed or modernized should take into account the ability of the bombing plane to perform certain of the old missions.

The bomber has made the American coast impregnable to invasion. This is the most important military fact that can be deduced from the European war. If new harbor defenses are to be constructed, let them be built with our eyes on today and tomorrow and not on yesterday.

Condensed from ARMY ORDNANCE September-October 1941.

INTERCEPTOR EXERCISES

Aided by thousands of volunteer civilians, Air Force Combat Command units will carry out exercises during October to test the alertness and effectiveness of the Eastern seaboard defense against hostile air operations.

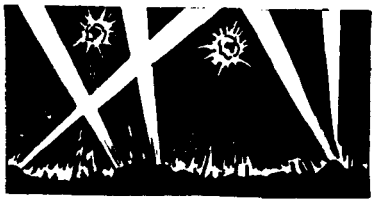
The First Interceptor Command with headquarters at Mitchel Field, Long Island, New York, will conduct exercises from October 9 to 16, covering the northern part of the seaboard from the Virginia-North Carolina line to Boston. The Third Interceptor Command, with headquarters at Drew Field, Tampa, Florida, will conduct similar exercises in the southern region of the seacoast from October 20 to 25. This area includes North and South Carolina and Georgia.

Each of the Interceptor Commands will have available at least four pursuit groups, and two or three bombardment groups and reconnaissance units. The bombardment units, which will include both medium bombers and the longer range heavy bombers, will simulate "attacks" on the various regions to be included in the defense exercises. Pursuit ships of the latest type will be used to intercept these "threats" to military objectives along the seacoast that are so vital to the national defense. The Aircraft Warning Service, which functions with the aid of the many civilian observers stationed at strategically located points throughout the area taking part will play a vital role.

Civilian spotters will be alerted for the exercises throughout areas approximately 125 to 150 miles inland from the seacoast. These persons will be constantly on the lookout during the exercises to report the number of planes, the type and the direction of flight. Flights that might be made by "enemy bombers" from ships at sea will be spotted from patrols of Army aircraft and by other means.

Ground Defense

PROTECTING THE AIR BASE



The Army Air Forces do not intend to be caught napping when it comes to the protection of air bases from possible attack. Such is indicated by recently announced War Department policies for the ground defense of these vital installations.

In training circular No. 47 the general aspects of the new program are described. This publication states that the ground defense of an air base should comprise "all practicable passive and active defense means, carefully coordinated," that it requires local ground defense forces, plus adequate mobile reserves, "and that such protection is an integral part of the defense of the entire area in which the base is located."

The job of putting the new policies into effect is the responsibility of local air base commanders, who are charged with the operation of local defenses; and of theater, or territorial, commanders, who are charged with the allocation of ground defense troops to localized defense areas.

Broad as the new plans are, they have not been created without attention to the details involved. For this reason there is included in the circular a careful evaluation of the various possible methods of attack, and a general description of the defenses which have been developed to combat them. Measures listed provide protection from almost every known military danger, including aerial bombardment, aerial gunnery, air-landing operations, use of chemicals, direct ground assaults, parachute troops, and sabotage.

Defense plans in general have been divided into two categories--active and passive. Active defenses are those which are brought into play during an actual military encounter, and comprise the antiaircraft installations, machine guns, and searchlights which are used against attacking aircraft; and the field artillery, armored forces, and motorized units used against ground attacks, air-landing operations, and parachute troops. Types of weapons to be used include, among others, antiaircraft guns, 37 mm antiaircraft and antitank guns, .30 caliber automatic and semi-automatic weapons, and antiaircraft and motorized artillery.

Also classified as active are the field fortifications and emplacements which will surround Army air bases. Pill boxes, trenches, and redoubts are all provided for in an "inward and outward perimeter defense" which guarantees effective coordination and adequate fire coverage for allapproaches. Often the number and quality of these installations determines to a large degree the success of the entire air base defense effort, and for this reason they are not left out of the Army's plans.

While not so obvious as the active defenses, passive defense measures included in the new policies play a very important role in the successful protection of air bases from attack. Not actively utilized during military engagements, they still play a vital preventive role by minimizing the damage an attacking force can do, and by enabling the active defenses to be used with more effective results.

Some of the most important of the passive defense measures come under the general heading of "damage control". These include the preparation and employment of fire-fighting plans and equipment, the dispersion of vital installations, and the construction of protective bunkers and barbed wire. Other passive defenses to be utilized include dummy fields, camouflage, artificial smoke and fog, shelters, obstructions, chemical decontamination equipment, and alarm systems.

Of the above, dummy fields are the most elaborate. They are erected for the purpose of diverting hostile air attacks from real objectives, and for this reason will be built to resemble actual fields as closely as possible. In order best to serve their purpose, dummy fields will show signs of use, activity, and attempted concealment.

Closely allied to the use of dummy fields is the protection of real fields through the use of camouflage. According to the War Department's recent training circular, every effort will be made to conceal from the air all indications of the presence of air fields through the use of this device, and also through the utilization of artificial fog and smoke. When used correctly these force hostile aircraft to resort to area bombardment, thus decreasing the probability of damage to vital installations.

An example of the Army's utilization of the technique of camouflage was brought out recently in the New York Times, where the method of concealment of a New England airport is described. According to the article, trees, grass and plowed areas will preserve the rural appearance of the area, and some of the visible barracks will be built along the lines of tobacco barns and painted the same dull-red color.

"The latest in chain roadside restaurants will be simulated for a mess hall and certain buildings will be given churchlike spires," the article goes on to say, and "these latter will even have make-

believe cemeteries, complete with headstones." To complete the picture a false railroad track will be laid, and existing roads will be allowed to meander as before.

Splinterproof shelters are also included in present plans. These will be used for the protection of personnel, fuel, bombs, ammunition and such vital locations as radio and control rooms, repair shops and operations offices. Dispersion of the shelters will be accomplished whenever possible in order to afford maximum protection.

Military obstructions to be used are in general of two types--those which impede the operation of ground forces, and those which prevent the landing of aircraft. Fences, barbed wire, road blocks, mines and vehicles which are not in use are all valuable in preventing the landing of enemy aircraft, and also for use against parachute and air-landed troops making direct ground assaults.

The alarm system called for under the new program will consist of a vast network of warning stations which, in the continental United States, have been placed under the supervision of the Commanding General of the Air Force Combat Command. In oversea possessions and bases alarm systems will be established by the territorial commander of each area. Local alarms will be provided at individual stations in order that all personnel may be warned and in their assigned locations by the time the attack occurs.

Just as much a part of the air base defense effort as some of the more active measures is the communication system. This must be kept in operation if the other defense activities of the base are to be coordinated and directed. In order to guarantee that communications will be held open such measures as concealed underground cables, radio and protechnic signals will be used.

Vital and important as most of the above defense measures are, if the air base is to be successfully defended against sustained attack it is essential that reserves in sufficient quantity be available, and in as short a time as possible. For this reason Army plans call for the location of reserve forces where they will be able to intervene rapidly in enemy action on or near air bases. They will be highly mobile, and will be strong in armored vehicles and artillery.

So many of the former National Guard observation squadrons are losing their experienced officers to newly organized units of the Army Air Forces that at least one, the 108th (which based "before the war" in Chicago) has started a weekly news letter to keep "you guys out there" informed of what "all of us back here" are doing.

CADETS GET NEW UNIFORMS

The familiar slate-blue uniform for aviation cadets is to be discarded and the students soon will be supplied with an olive-drab uniform that needs only officer's insignia to be suitable for official wear after the cadet graduates and receives his commission.

The new uniform will be identical to the regular Army Air Forces officer's garb except that it will not have the braided sleeve and the shoulder insignia. It will be of elastique, with dark blouse and lighter slacks, and the conventional metal U.S. and propeller-and-wings insignia will be worn on the lapels.

While the wearer is a cadet, the regular cadet's gold thread, wings-and-propeller on a circle of blue cloth will be worn on the sleeve. Upon graduation and commissioning, he will remove this and substitute sleeve braid and second lieutenant's bars.

This step is similar to that taken by the Navy some years ago, when the blue serge uniform of the regiment of midshipmen was altered to make it possible for the Annapolis students to add insignia and wear the uniform after they had graduated and received their commissions.

All slate-blue uniforms already acquired by the Quartermaster Department are being concentrated at Randolph Field, where they will be issued to cadets in that training area until the present supply is exhausted--probably in a month or two. At other flying schools, however, all cadets entering the basic stage in the future will be issued the new officer-type uniforms. Both woolen O.D. and cotton khaki, depending upon the locality and season, will be issued.

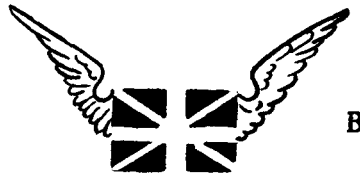
The uselessness of the slate-blue uniform after graduation, resulting in a waste of valuable wool, and a production problem resulting from the enormous expansion of The Army Air Forces contributed to the War Department's decision to make the change. The blue uniform is completely useless to a graduated cadet, except for working about his quarters, wear to masquerades or for other miscellaneous purposes.

To eliminate waste of expensive equipment, the new uniforms are not being issued to cadets until they have passed out of the primary or "maximum elimination" period and have entered the basic stage. During the primary stage, cadets will continue to wear comparatively inexpensive coveralls.

Cadets apparently will continue to receive the uniform allowance of $150, which they get upon graduation, despite the new system. This is based upon the fact that the uniform allowance is part of an Act of Congress (the insurance bill) and an amendment of the act would be required to eliminate the allowance.

AMERICANS ABROAD

U. S. Pilots With the Empire Forces



WITH THE R. A. F.
By Lieut. J. B. Holst

When asked how many of us were in the group which came to the Royal Air Force from the Air Forces as observers, my answer was thirteen. All the RAF pilots expressed amazement at our apparent lack of superstition. It was always amusing to see the reactions to that answer. But at the time of this writing all of us have returned safe and sound to the good old U.S.A.

Most of us experienced a bombing or two and some went through real blitzes. None suffered any injury except the author and that during the blackout when riding on the back of a motorcycle driven by an absentminded Canadian who tried to pass a truck on the left side instead of the right. Water on the knee is not much fun, but the knee eventually becomes usable again.

My friends expected me to return starved to the point of collapse. The idea that most Americans have about the terrible food shortage in England is all wrong. On the contrary, we had four meals a day: breakfast, lunch, tea and dinner. Of course, I'll admit that one does become tired of eating cabbage and potatoes three times a day, in spite of the fact that when served for breakfast mixed together and fried it is called "bubble and squeak." There are plenty of such breakfast foods as shredded wheat and corn flakes, but eggs are practically nonexistent and butter a thing of the past. It was suggested that a man with a little business acumen and a few thousand chickens could make a killing in England, but, then, there is no grain to feed the chickens.

Even though the food in the officers' messes and in the average man's home was rather limited with respect to variety, practically any dish could be obtained in most of the better restaurants and clubs in London--even fresh peaches at three shillings six pence each, which at the present rate of exchange amounts to about seventy cents.

Living expenses were negligible as long as we stayed on the station because, since the war, the pay of the officers in the RAF has been cut about in half. Naturally, a man cannot be expected to pay more than he earns just for living expenses. Living in town, on the other hand, would cost more than it would in the States because of heavy taxes on everything.

(Continued on Next Page)

WITH THE R. C. A. F.
By Lieut. Reed R. De Rouen

My experiences with the Royal Canadian Air Force began shortly after I left the United States Army Air Corps as a flying cadet in October, 1940. I had "washed out" after five and a half months training here and to keep flying I enlisted in the R.C.A.F. at Ottawa, Ontario.

Entrance requirements for the R.C.A.F. are virtually the same as they are here with the exception the British require airmen to have only one year of college work which is taken in high school and is referred to as "senior matric."

In the British air force all enlistees, both for air and ground crews, are rated AC2, aircraftsmen second class, similar to our private's rating. Men who cannot pass the physical or mental requirements for air work are assigned to ground crews. Uniform worn by both groups is exactly the same except for a white cloth insignia attached to the overseas cap of the airmen.

After enlisting I was sent to Toronto's No. 1 Manning Pool, an air force reception center. A group of us arrived at Manning Pool at 1 A.M. and found the outside cold and deserted, although the interior literally buzzed with activity.

Processing began immediately and by reveille we had gone through the mill, taking typhoid shots, smallpox vaccination and drawing our complete uniform kit. Next day we discovered that Manning Pool was a huge military encampment built on the site of the Canadian National Exhibition Grounds. Approximately 6,000 air force men were lodged in the coliseum, which was partitioned off for sleeping quarters, mess hall, medical and dental clinics, supply rooms and a central tanbark area for drill.

For 10 days we were given close order army drill and then were sent to Eglington Hunt Club, No. 1 Initial Training School, on the other side of Toronto. There men were qualified as pilots, gunners and observers by a series of examinations and short courses in visual Link Trainers, coordination tests, the Banting Altitude Chamber Test, originated by the late Sir Frederick Banting, who was killed recently while on a flight from Canada to England, and a mathematics test including solid geometry and algebra. Many of the fellows purposely failed to get good grades in "math" for fear of being made observers.

(Continued on Page 30)

The officers' mess on the RAF station is very much different from an officers' club in the Air Forces, in that the RAF mess is a government institution operated by RAF and Woman's Auxiliary Air Force personnel. No women are allowed in the mess except on special occasions or in the ladies' room which is open to officers' wives and guests at certain hours.

Officers' mess buildings are laid out on one standard floor plan, the dining room, ante room, bar, billiard room, and so forth, having their own respective places in every mess throughout the RAF. There are a few exceptions to this rule at some of the older stations.

The English officers were most kind to us and as generous as anyone could be. They took real pleasure in inviting us out and entertaining us in the best fashion according to the locality. There was nothing too good for us and anything that was theirs we could have for the asking. We Americans found more in common with the Canadians and Australians than with the English, probably, because Canada and Australia are more like America than England.

RAF pilots receive their wings after about six months of training, the first half of which is performed in a very light biplane of less than 100 hp. The last half is done is the Harvard, which is their name for our BC-1. At the end of this training the pilot is sent to an Operational Training Unit, where he undergoes further training before entering actual combat.

In fighter command, these pilots do their training on either Hurricanes or Spitfires after about an hour or two of transition on a Fairey Battle, which is a two-seated plane having the same engine as the Spitfire.

In bomber command, the pilot meets the other crew members who have just graduated from their respective schools and are undergoing their final training before going into operations against the enemy.

The OTU I attended was equipped with Wellington bombers of which there seem to be more in the RAF than any other bomber. The Wellington (nicknamed Wimpy because of "J. Wellington Wimpy's" middle name) is a heavy, two-engined bomber, mounting power operated turrets in the nose and tail, and capable of carrying 4,500 pounds of bombs. It has about the same power as a B-18, but feels like a much heavier aeroplane.

The pilots are given a few hours of dual instruction before being allowed to go solo. Only the training planes have dual controls. After the pilot has put in a few hours on "circuits and bumps" he flies as pilot on training missions for the other members of the crew. The observer in the RAF does most of the work while on a mission. He is navigator, bomb aimer and photographer. The fighter pilots graduating from the OTU are not required to know dead reckoning navigation or bombing. The training is based on specialization, and each man is required to know his job and know it well. All crew members are trained in gunnery so that in cases of emergency while in action they can act as substitutes.

After some weeks in the OTU, during which time all crew members put in time in flying and in ground school and synthetic training devices designed to simulate actual flight, the students are graduated and posted to an operational squadron, where they meet the enemy on nightly missions.

As far as possible in an operational heavy bomber squadron each pilot has his own plane, his own combat crew and his own ground crew. They always work together.

The morale of the officers and men is very good, and they never seem apprehensive about a coming sortie. After a quota of operational flights, they are taken off of operations and given a ground duty or sent to an OTU as an instructor for about six months before going back on operations.

Officers of the RAF are allowed 60 days of leave a year or about a week in every six weeks. Everyone seems to be taking life easy and not complaining about what he lacks. Nothing seems to excite or perturb him, and there is no question as to whom will win the war.

Fighter O. T. U.

Final training at an Operational Training Unit is an innovation of this war, and takes the place of what was known in 1914-18 as the Fighter School. Previous to being posted to an O.T.U. the pilots have already completed their training at an Initial Training Wing and Elementary Flying Training School and at a Service Flying Training School. At the S.F.T.S. they have been awarded the coveted "Wings." They arrive as good pilots, probably a trifle over-disciplined. The instructors' work at the Fighter O.T.U. is to turn them into fighter pilots with the necessary offensive spirit; disciplined, yet full of spirit; careful of nothing and yet efficient.

The O.T.U. which we visited is equipped with Spitfires as the training mounts, and the pilots, after their period of training here, are usually posted to squadrons using the same type. Other O.T.U.'s have, or will have, the job of turning out Hurricane, Defiant, Havoc, Beau-fighter, Whirlwind, Tornado and Typhoon pilots. What is most astounding about the whole system of training, from the I.T.W. upwards, is that in a few months young men are taken from civil life and taught to handle, with the utmost confidence and skill, machines which a few years ago would have taken the world's speed record in the skilled hands of only the most experienced pilots.

Generally speaking, the most advanced types the embryo fighter pilots have flown before arrival at the O.T.U. are North American Harvards and Miles Masters. In some cases, however, a few hours on early makes of Hurricanes have also been put in. The psychological effect of flying the Spitfire for the first time is as great--if not greater than--the first solo. For months it has been dreamed of, talked about and pondered over. It is little wonder that there is some nervous apprehension when at last the day comes and the pupil finds himself with his hand on the Merlin throttle with a blank expanse of aerodrome and sky showing through the bulletproof windscreen.

On a lower scale the transition from a trainer to an operational type is rather like going from a pedal cycle to motor bicycle. There is a dreadful feeling of being left behind, of being controlled instead of controlling, and of arriving everywhere much too soon. This last effect is most noticeable in the early landings.

About 90 per cent of the training crashes are due to overshooting the aerodrome or forgetting, in the excitement of the moment, to drop the undercarriage. The overshooting fault has now been reduced to a minimum by putting a marker plane in the appropriate position on the aerodrome and instructing the pupils to make another circuit if the wheels are not already on the ground as they pass the marker.

Mental aberrations with undercarriages are cured by hours of cockpit drill in jacked-up planes on the tarmac and in the Hawarden Trainer. The Hawarden Trainer is a sawn-off fuselage--usually salved from a crash--of the type employed by the O.T.U., complete in every respect, including radio. From each control electric leads are connected to a series of lighted panels at the stub end of the fuselage. Thus, for instance, when controls are put in position to raise the undercarriage a light appears behind a panel bearing the words "wheels up." The instructor takes the place of the ground controller and orders passed by radio telephony to the pupil are checked against the lights which appear as the various controls are brought into play.

Taking up the whole of the vision in front of the machine is a picture of cloudland. Out of this come enemy aircraft which have to be immediately recognized and the reflector sight adjusted according to the estimated span of the enemy aircraft and the distance from which fire is to be opened.

Frequently a mistake occurs at this stage which would certainly not happen in the real thing. The pupil, having quickly recognized the type of aircraft and altered his gun sight to the appropriate aircraft span, then forgets to press the gun trigger. This is just one small drawback in otherwise completely successful synthetic training.

Another phase of the training which is of particular interest is the employment of 16 mm. cine-camera-gun films. Camera guns, it will be remembered, were carried in the leading edges of the fighters in the Battle of Britain last autumn. Special cuts from the films obtained during the air fighting have been pieced together with expert comment and excerpts from the original pilots' reports. Battles can be fought over and over again, perfect shooting practiced, and mistakes pointed out.

As is to be expected in the training of a fighter pilot, aerobatics take quite a large share in the curriculum. Apart from the obvious advantage of being able to put an aeroplane in any position or recover from one, confidence in the pilot himself and the aeroplane he flies is built up.

Another new experience for the pilot is high-speed low flying. To bat along at "no feet" at somewhere over the 350 mark is no ordinary thrill. Movement is very perceptible, and excellent judgment is required. Over the sea, even when there is a fair modicum of height between the aircraft and the water, there is always the feeling and the visual illusion that the lower wing tip will dig in on a turn. So long as sea-level flying remains a favorite ruse of the Luftwaffe for getting away, low flying will be studied by the Royal Air Force.

On the station is a Link Trainer, and this has been adapted for specialized fighter-pilot training. The pilot "flies" entirely by instruments and is presumed to be on patrol over a certain sector. By radio he is told to fly on such and such a bearing to attack an enemy machine in that area. On apparent arrival he is given other bearings and eventually returns to his base on the "homing" device. All these bearings and the distance travelled are shown by the path of the "crab" of the instrument as it traverses a map on the instructor's table.

Pilots at the O.T.U. enjoy the experience for the first time of pressing the button to set eight Browning machine guns going in the wings. Air firing is a most important feature of the training, for it is not until a man is accustomed to the racket produced by multiple armament that he can make proper use of it. Air to ground firing--otherwise known as ground strafing--is carried out, paradoxically, over the sea, and while this practice is in progress protection patrols of fighters keep watch in case Fritz tries to spoil the lesson.

Condensed from FLIGHT

Q. What signals are displayed to denote that an aerodrome is unserviceable?

A. Several aircraft stuck on their noses in the mud and cries of "two no trumps" floating from the flight offices.

CANADIANS... *(Continued from Page 27)*

Americans maintained very good relations with the British airmen, who were from all parts of the Empire. No effort was made to segregate the various groups, and, as a matter of fact, I was quartered with 14 Britishers from the Argentine, all of whom were three generations removed from Britain but had been educated in England.

Completing six weeks' instruction I was rated a Leading Aircraftsman, or student pilot, and was sent to Mt. Hope Elementary Training Flying School at Hamilton, Ontario. These schools are civilian owned and operated but are under air force regulations and are commanded by air force officers.

There we were given 60 hours of flight and passed final examinations in navigation, airmanship, theory of flight, wireless, air frames (structures), engines and armament. Planes used were Fleet Finches powered with Kinner B-5, 125 h.p. radial engines. It is an excellent little training craft, easy to maneuver and it really "sits on a landing." I noticed, however, that on humid days if one didn't watch the manifold heat while practicing forced landings, the motor might cut out.

Instruction I received at Mt. Hope was virtually identical to training I had as a flying cadet at the Spartan Primary Flying School, Tulsa. The three months' course of study was just as thorough and the percentage of "washouts" just as bad if not worse. A student who washes out is usually sent to an observer or gunnery school if he qualifies.

On graduating I was designated a bomber pilot and reported to No. 5 ServiceTraining Flying School, Brantford, Ontario, where pilots are given two and a half months' training on twin-engine Avro-Anson bombers, and advanced courses in meteorology, navigation, airmanship, wireless and gunnery. Average flying time before the first solo is two and a half hours.

A medium-sized bomber powered by two 500 h.p. radial engines, the Avro-Anson is still in use in Africa and on quieter fronts.

Avro-Ansons are called "flying greenhouses" because of the large windows in the fuselage, which is extra spacious, the British sacrificing streamlining in these planes for equipment space. Inside is a large table for the navigator who also has his own air speed and R.P.M. indicators, altimeter and P-4 compass. Remainder of the space is for radio equipment, bomb and chute racks, and back halfway to the tail is a turret for the air gunner. A door leads to it and, strangely enough, the gunner's seat is an ordinary bicycle saddle.

After about 100 hours in the bombers the ship appears to be very suitable for training bomber pilots. It is equipped with hydraulic brakes manually operated, retractable undercarriage, which takes 109 turns by hand to wind up, and Fowler-flaps.

The British lay great stress on the tarmac check which on the Anson goes like this: H-T-M-P; hydraulic's "O.K.," tabs (flap indicator), "O.K.," mixture control in takeoff position and pitch "O.K." Avro-Ansons do not have pitch air screw nor do they have carburetor heat. Following the tarmac check you proceed with the instruments and check from left to right. The Anson has a cruising speed of about 120 miles per hour, climbs at about 90 miles and glides at the same speed. Initial landing speed is about 60 m.p.h.

Instruction on the bomber is given with the instructor sitting on the student's right. Sequences in instruction were takeoffs, landings, circuit flying, medium and steep turns. Instructors placed great stress on single engine forced landings and the students practiced them constantly. Toughest job in flying the Anson is operating manually the undercarriage. The ship, however, is very stable and responds remarkably well for its size and underpower.

My instructor on the bombers was a 19-year-old Englishman, Squadron Leader Waterhouse, who had 13 Germans to his credit and was the holder of the Distinguished Flying Cross. Rather frail and a clerk in civilian life, he had been through the Polish and Norwegian campaigns as well as the Flanders retreat. Waterhouse, whose rank corresponds to that of major in the United States Army, had been sent to Canada for a rest. Pilots remain in service in England for six months and are then shipped somewhere, usually to Canada, to recuperate.

One day when we were coming in for a landing one engine cut out and we almost hit some farm machinery in a field. I thought it would be a nasty landing, but we made it all right. After we got out he turned to me and said, "I say, De Rouen, this flying is a filthy racket."

After about 10 hours' flying on the Ansons, students start solo cross-country trips, one day acting as navigator and the next time as pilot. Remainder of the course included cross-country trips, night flying and a great deal of instrument hood flying. The Link Trainer course of instruction is very complete. I had 18 hours on the "Link," much of which time was spent practicing triangular cross-country courses. The "Links" we used were equipped with wheel control as we were training to be bomber pilots.

Service flying school differs from our basic flying school in that student pilots receive definite status as twin-engine or single-engine flyers and are trained as such. I might mention here that single-engine schools use Harvard and Yale trainers manufactured by the North American Aircraft Co., and are practically the same as the U.S. Army's basic trainers, the BT-14 and BT-19. It is interesting to note that the first Harvards to ar-

rive in Canada were equipped with French instruments, having been made for shipment to France before that country capitulated.

Part of our instruction included viewing actual moving pictures of dogfights and you could see tracer fire gain on and finally hit and demolish a plane. Most of the enemy planes shot down in the films I saw were Heinkel, twin-engine bombers.

The course of training I received in the R.C.A.F. is typical of that given every Leading Aircraftsman who goes through the Empire training scheme in Canada. It lasts about seven months from entry at the induction station to graduation, with actual flying time a little more than five months.

Ground courses are very methodical and call for sound knowledge of the subjects studied before candidates are put on operations. Flight instruction is excellent and the best of equipment is used. During flying courses we flew seven days a week, weather permitting, although there was no ground school on Saturday or Sunday. Pay, which was the least of our worries, was $40 a month before flying and $70 a month thereafter.

A summary of air instruction in Canada and here indicates a great deal of similarity. However, the British sometimes use different methods to obtain the same objective. All airmen, whomever they may be and there were members of the nobility as well as sons of poor families, start from scratch. It depends on the individual how far he goes.

Upon graduation from Brantford we were presented the King's Wings by Air Marshal "Billy" Bishop, famed flyer of the First World War. That day 30 per cent of the class was given commissions as pilot officers in the R.C.A.F. They were chosen for their excellent records based upon ground school and flying record, discipline, bearing and neatness, all of which the British take into consideration in selecting officers. The remaining 70 per cent became sergeant-pilots with the promise that 20 per cent more would be commissioned overseas. Ages of the men ranged from 17 to 31, the average being about 23 years.

Following graduation men are given 15 days' leave and on returning become eligible for overseas service, go into coastal reconnaissance, or are turned back as instructors. Those going overseas have not completed their training. Once in England they go to an Operations Training Unit. Here pilots choose their crews and are sent out with experienced men on minor operational work along the French coast.

Commissioned a pilot-officer, I was sent as a drag pilot to the Bombing and Gunnery School at Jarvis, Ontario. Here I dragged sleeve targets on 600 foot cables for antiaircraft batteries. I did expect, however, to get overseas at a later date. My chief pleasure at Jarvis was flying the Fairey Battle dive bombers that had been so useful to the British in the fighting over Dunkirk. These planes are powered with 1,150 h.p. Rolls-Royce Merlin engines, the same engine used by the Spitfires and Hurricanes. Lines of the Fairey conform to the Hurricane but are larger.

In June I got my orders to report for active duty as a second lieutenant of Infantry, attached to the Army Air Forces. At the present time I am Plans and Training Officer for the Three Hundred and Fifty-seventh School Squadron at Jefferson Barracks, Mo.

ATLANTIC FERRY BASES IN MAINE

Two air bases in the State of Maine for use by the Air Corps Ferrying Command, one at Presque Isle and the other at Holton, were recently authorized by the War Department. Estimated to cost $5,498,000, construction is being deferred pending the acquisition of the necessary land from the cities involved.

Both American and British ferry crews are scheduled to be stationed at these two bases, some 229 officers and 486 enlisted men at Houlton and 469 officers and 728 enlisted men at Presque Isle. The facilities, such as barracks, quarters, warehouses, etc., will be identical at both bases and along the lines of those usually provided at Air Corps bases. As is to be expected, they will feature storage space for a large supply of gasoline.

Six Air Corps construction projects are contemplated in the State of Texas, a basic flying school at Waco; an advanced twin-engine flying school at Lubbock; a flexible gunnery school at Harlingen, with a 27,500-acre bombing range in connection therewith in the vicinity of Padre Island; an aviation mechanics' school at Wichita Falls, and the construction of a drainage system and necessary grading and paving work at Ellington Field, near Houston.

The site for the school near Waco embraces an area of 1,100 acres, and the total cost of the project, dependent upon satisfactory acquisition of the required real estate, is estimated at $4,363,000. Listed among the various buildings included in the construction plans are 29 barracks for enlisted men and 11 for aviation cadets, 10 administration buildings, seven operations buildings, also mess halls for officers, enlisted men and cadets, recreation buildings, etc.

The construction project at Harlingen, which includes 152 miscellaneous buildings, railroad spurs, paving aprons, runways, taxi strips, and various utilities, involves a total cost of $4,138,229.

With the award of a supplemental contract in the amount of $7,555,565.49 for the construction of barracks, mess halls, hangars and other buildings

(Continued on Next Page)

for the school at Wichita Falls, the total cost of this project has been brought up to $12,442,455.88.

The contract for the construction of the necessary temporary buildings and facilities for the flying school at Lubbock amounts to $3,973,365.58, while the contract for the additional work at Ellington Field calls for $1,877,794.85.

History is repeating itself at Lake Charles, La. During World War 1 days, Gerstner Field, located in its vicinity, was the site of an advanced flying school for pursuit pilot training. Just recently, the War Department awarded a contract in the amount of $1,604,236 for the construction of an advanced single-engine flying school at Lake Charles, the project including 125 temporary buildings, with fencing, railroad spur, roads and the necessary utilities.

Gerstner Field was literally torn apart during the early part of August, 1918, for it happened to be in the path of a violent hurricane. When the Gulf storm hit the field, the wind velocity was 80 miles per hour. Several hours later, an inspection of the wind meter (a whirling anemometer) disclosed that its bearings had overheated and did not register higher than 120 miles an hour wind velocity. Personnel at the field, imperiled by falling timbers, sheet metal roofs, and sundry pieces of flying wreckage, managed after a hard struggle to reach some gravel cars on a railroad siding back of the barracks and there, pelted by the hard driving rain, watched the field pass by in review.

Robbed of their contents by the wind, which neatly scooped the sand and gravel and sent it skyward, the gravel cars started rocking violently, causing much apprehension among the refugees. Suffice it to say, the hurricane left a scene of utter ruin and desolation.

At Wellston, Ga., about 13 miles south of Macon, a depot is to be constructed on a tract of approximately 2,200 acres. The construction contract, amounting to $10,625,654. covers a complete air field, 23 industrial buildings, 38 military buildings, a sewer system, sewage disposal plant, locomotive storage, railroad sidings, and other utilities.

Vichy, Mo. (not France) will be the site of the station of the 124th Observation Squadron, dependent upon satisfactory acquisition of the real estate involved, some 1,300 acres. Construction of the usual necessary buildings are planned. This squadron, although under command of the Air Force Combat Command, will support the Sixth Division, located nearby at Rolla, Mo., by furnishing its aerial observation.

At Muroc Dry Lake, where the ancient sands of a prehistoric lake bed provided for a number of years target sites for Air Corps bombing and gunnery prowess, there is to be constructed an armament and instrument inspection and adjustment building at an estimated cost of $176,000. This building will contain tools and instruments for testing machine guns and bomb sights, bomb releases and bomb racks. Medium, light, heavy and dive bombers are all used at the Muroc bombing range. Targets are built as requirements demand or outlined on the ground in lime or white paint.

On a 62-acre tract of land adjoining Scott Field, Ill., a reception center for the Sixth Corps Area will be constructed at an estimated cost of $546,000. About 1,000 men will be garrisoned at this reception center, where 22 barracks and other necessary buildings will be constructed.

Enid, Okla., will be the site of a basic flying school, the contract for construction of 136 miscellaneous buildings and utilities involving the sum of $3,940,000.

Due to the sharply increased activities at Bolling Field, D.C., occasioned by the transfer there of the Air Force Combat Command and a large unit of the Maintenance Command, the construction there of a post headquarters and operations building at an estimated cost of $300,000 was authorized. The building will be of cantonment type, occupying approximately 820,000 cubic feet of space. There will be some 3,300 square yards of concrete approaches, walks and parking areas.

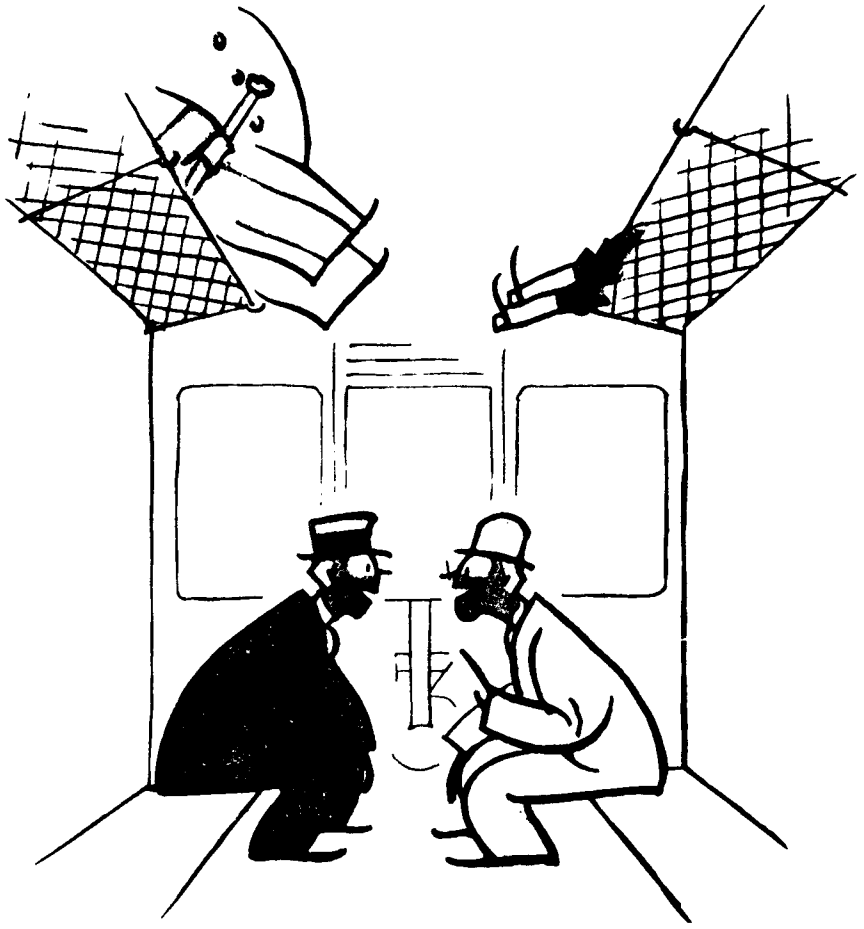
For the construction for an air field at Pine Camp, N.Y., of housing and miscellaneous facilities required for the observation squadron in connection with the Fourth Armored Division, a contract in the sum of $758,500 was awarded.

The laying of solid, durable roads in a hurry and at low cost is a problem which is expected to be solved through the introduction of a new type of paving material which is being tested at Baer Field, Fort Wayne, Indiana. A soil cement is made from a mixture of natural materials and cement, and the road can be used almost immediately after paving, eliminating the necessity of long-distance hauling of sand and gravel.

If this type of paving proves successful it will prove invaluable in the laying of airport runways and roads at defense bases in the island possessions.

Soil cement, nearer actual cement than many other materials the Army is using, is made by mixing cement with soil during a process of plowing, harrowing, discing, dragging and then rolling. The surface is then sprinkled, covered with straw and left to cure for about a week before it is opened to traffic.

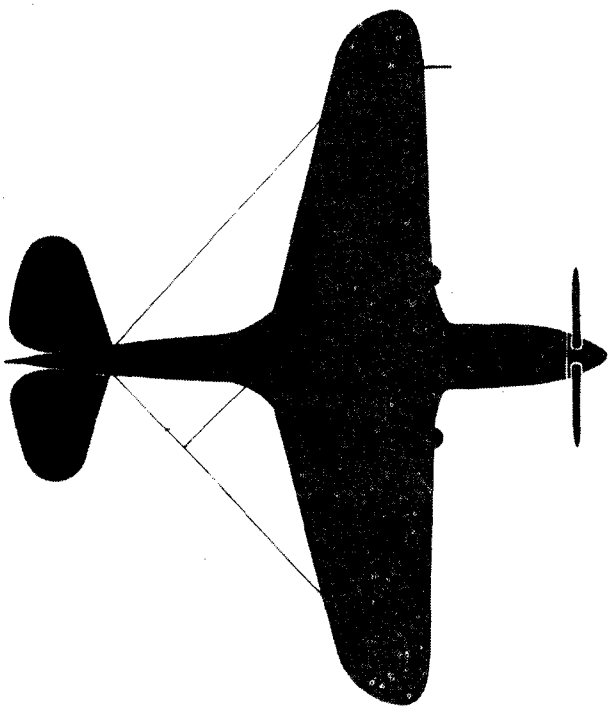
Runways being built at Baer Field will have two 100-foot strips of this soil cement on either side of a 100-foot strip of solid cement. Twenty-five thousand square feet of road will be put down at this field.

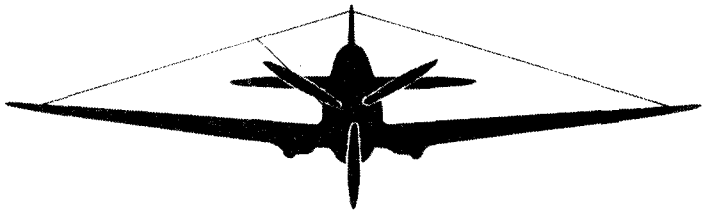


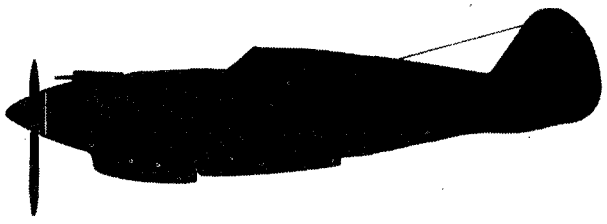
"..... but of course it must it go any further!"

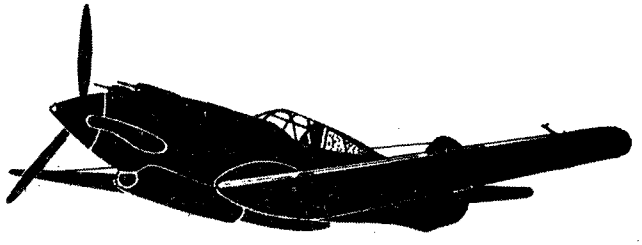
CARELESS TALK COSTS LIVES

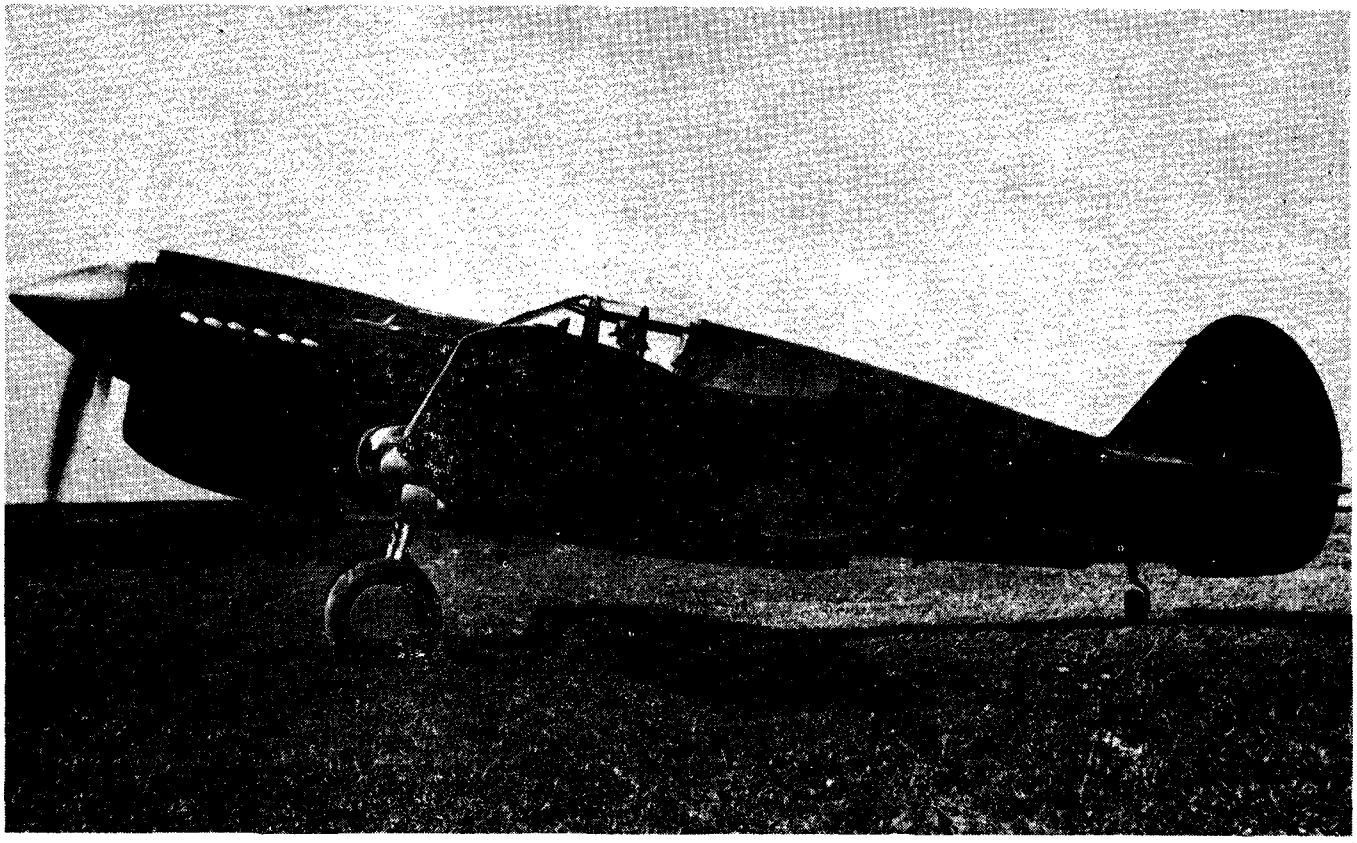
SUPPLY DIVISION











KNOW YOUR AIRCRAFT

AIR FORCES NEWS LETTER

16

HEADQUARTERS ARMY AIR FORCES WASHINGTON, D. C.

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THE BACK COVER

The silhouette this month is of the Douglas A-20A, light bomber used extensively by the Army Air Forces and, as both a light bomber and a highly successful night fighter, by the Royal Air Force. The ship is an all-metal, midwing monoplane powered with two air-cooled engines, and carries a crew of three. It has a single vertical fin and retractable tricycle landing gear.

Louisiana Maneuvers End

Support Commands Show Their Stuff

By Capt. Joseph S. Edgerton

AMERICAN air defense today is stronger and more realistic because of the participation of units of the Army Air Forces in the recently completed Louisiana maneuvers of the Second and Third Armies.

Here, for the first time, the "task force" idea was carried to a logical conclusion with the creation of the Second and Third Air Task Forces, to support the Second and Third Armies, respectively. These task forces, composed of mixed aviation units, were organized to provide air activity of whatever character might be required to support the work of the ground forces. The resulting air-ground teams were an American version--not a replica--of the famous German "Blitz" teams. They were, in no sense, servile copies of foreign developments. They were an American development, created by logical processes to meet our own problems but embodying the valuable experiences of the belligerents in the European wars.

The maneuvers proved not only the soundness of coordinated training and operation of air-ground teams, but they also provided a baptism of fire for a number of the newest and fastest of American warplanes, under actual field conditions, and a test of the organization which has been built up by the Army Air Forces, the Air Force Combat Command and the Air Corps to operate, maintain and supply these new and far advanced fighting planes.

Too Early To Weigh Results

Although the maneuvers have been concluded, it still is too early to accurately weigh the results. They will be reflected in improvements in design, operation and maintenance of aircraft, perhaps well into the future. They will have an influence on air and ground training. They will dictate changes in communications. They will have an important bearing on the future of the five Air Support Commands which now are in process of organization to provide permanent air support for the four Armies and the Armored Force.

It may be well to review at this point comments of the various maneuver commanders concerning the air or air-ground activities.

"The bringing together of the Army, Navy and Marine Air Squadrons provided valuable experience to all in air-ground cooperation. and the vital role which aviation plays in the military team," Lieut. Gen. Lesley J. McNair, Chief of Staff of General Headquarters and maneuver director, said in a statement at the close of the Louisiana show. "The results obtained were surprisingly effective.

"Supply services had tremendous problems keeping up with the fast moving situations and they performed their job well.

"GHQ feels that the maneuver was highly successful as culmination of a strenuous training program and highly beneficial to all ranks of the two armies engaged.

"We can never be entirely satisfied with the performance of our troops, but the soldier of 1941 will give a better account of himself than the soldier of any other period in our history."

"Beyond Criticism"

Lieut. Gen. Walter Krueger, commanding general of the Third Army, at the conclusion of the first phase of the maneuvers, said that coordination of ground-air operations "proved to be technically beyond criticism and worked with a new speed and accuracy."

Lieut. Gen. Delos C. Emmons, chief of the Air Force Combat Command, was a personal observer of much of the maneuver activity on the part of both armies and both supporting Air Task Forces. In summarizing his impressions of the maneuvers, General Emmons said:

"Air power played an important part in the first phase of the very *realistic* war between the Red and Blue armies. I underscore the word 'realistic' because this make-believe conflict had all the elements of real combat conditions short of a 'shooting war.'

"While the mock battles were chiefly staged as training courses for high-ranking officers in all branches of the Army, I can truly say that everyone in the air forces, from senior officers to young pilot officers, went through a highly valuable course of intense training. Among other things, air personnel learned, through actual experience, some of the problems of the ground forces with whom they were cooperating. Similarly, the ground forces were able to see for themselves how Army, Navy and Marine Aviation, in the field of pursuit, light and medium bombing, can be used in cooperation with their own war efforts.

"The question asked most frequently since the first phase of these maneuvers closed is: 'Which side won?'

"My answer is: 'Victory went to those who learned

the most.'

"This trial war is the largest ever staged in this country and it gave military aviation vast opportunity to demonstrate its usefulness. About 850 Army, Navy and Marine Corps planes took part. It was a severe test of men and machines and I am happy to say that they stood up well under the grueling grind of day and night operations, in many cases from small airdromes and under emergency conditions.

"In the first phase, these planes flew 40,000 hours and covered about 8,000,000 miles on between 3,000 and 4,000 airplane missions. During this phase alone, the planes consumed about 4,000,000 gallons of gasoline. Had they been carrying real bombs and firing real bullets, they would have dropped some 10,000,000 pounds of bombs and shot approximately 7,500,000 rounds of ammunition.

"There were, it is true, a few accidents and some unfortunate fatalities. But considering the large scale operation in small fields and the fact that many of the pilots have only recently graduated from training centers, the accident rate so far has been extremely low.

Improved Technique

"During the maneuver, members of the Air Force also had an opportunity to improve their technique in many phases of aerial warfare. For instance, the officers and men operating the new secret interceptor command radio locaters were able to track large numbers of planes for the first time. Operations of the air support control and the bomber units, wherein liaison officers with ground forces ask by radio for aviation support, were also carried out under conditions similar to those of actual war-time. The observation units, operating with divisions and corps, acted as the eyes of the Army and much valuable experience for both ground and air units was obtained.

"Another outstanding experience of this first phase was the mass attack by parachute troops. Pursuit units were assigned to protect the parachutists, while others were ordered to 'destroy' the air-borne troops before they could go into action.

"All in all, there is every reason for the Air Force Combat Command to feel pleased with the lessons learned in these exercises. We still have much to learn, but it is only through simulated war conditions such as these that we can test and develop tactics and theories for the real thing if it should ever come."

"Splendid Conduct"

Maj. Gen. Millard F. Harmon, commanding the Second Air Task Forces, in a message of congratulations to officers and men of the Army, Navy and Marine Corps units of his command, praised them for "their splendid conduct and high order of discipline." He said that leadership in all echelons was excellent and missions were conducted in a highly efficient manner and on time. Gen. Harmon expressed gratification with the work of the service command, the engineers, medical and signal units and the staffs of the Task Force, Wings and Groups.

"Due to the necessary dispersion of airdromes and squadrons with the consequent problems of supply of such essentials as food and clothing and the handling of a tremendous tonnage of bombs and ammunition involved, an efficient, well organized service command is an absolute essential for successful operations," General Harmon said.

"The service command of the Second Air Task Force organized and established under the supervision of the Third Air Force and commanded by Lieut.Col. L.L. Koontz, functioned throughout the maneuver with a high degree of efficiency."

One of the outstanding lessons learned from the maneuvers, General Harmon said, is that "proper indoctrination of combat units to insure uniformity of method and procedure in tactics and technique is most essential in order that orders and directives of the commander may be translated into action by the combat units."

"The members of these units should have a full concept of the purpose and method intended to insure proper execution with a minimum of detailed instructions," General Harmon explained.

Pursuit Forces Necessary

General Harmon also stressed the fact that the necessity for security that can only be provided by adequate pursuit forces has been "forcibly emphasized" during the maneuvers.

Speaking of the serviceability of the newer types of airplanes used on the maneuver, specifically such airplanes as the B-25 medium bomber, the A-20A light bomber and the P-39 pursuit, General Harmon said:

"The performance of these planes was very gratifying, as was the ability of young and relatively inexperienced officers in handling this equipment, in taking off, in the air and in landing."

General Harmon emphasized the value of cooperation between the Army and Navy-Marine Corps units during the maneuver and said of the Navy and Marine Corps personnel that "they are greatly to be admired for the adaptability which they have shown in functioning with the land components and in their willingness to extend themselves to make the war games successful from an air standpoint."

The purpose of the Task Forces created for the Louisiana maneuvers was explained by Maj. Gen. Herbert A. Dargue, commanding the Third Air Task Force, as follows:

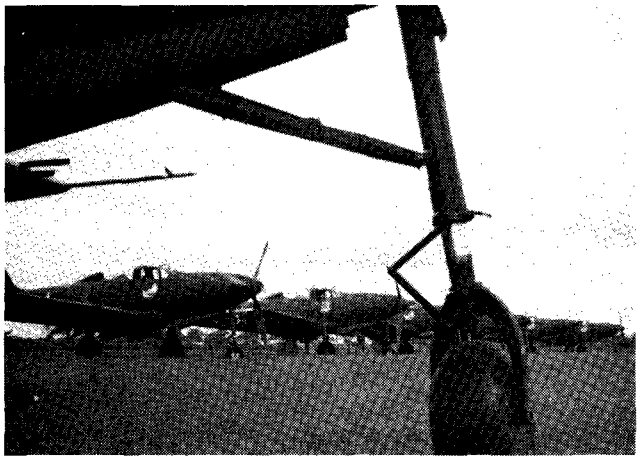
"What is the Third Air Task Force? It is simply an organization of air and ground units of the Army Air Forces and, more particularly of the Air

IN THE FIELD WITH THE ARMY AIR FORCES

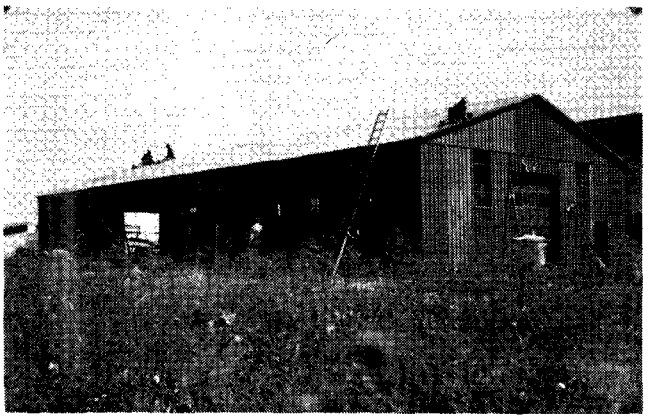
Pictures from the Louisiana "Front"

TARGETS
Just before the battle

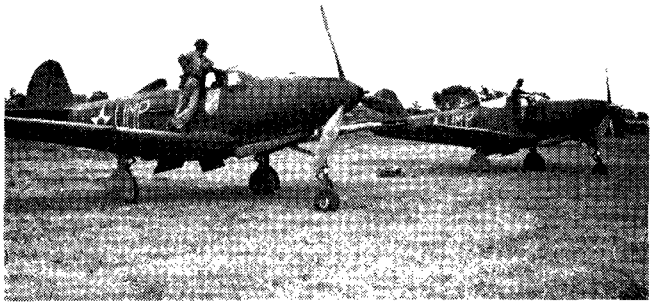
BIGWIGS ARRIVE
General Emmons, General Harmon, Mr. Lovett, and General Arnold



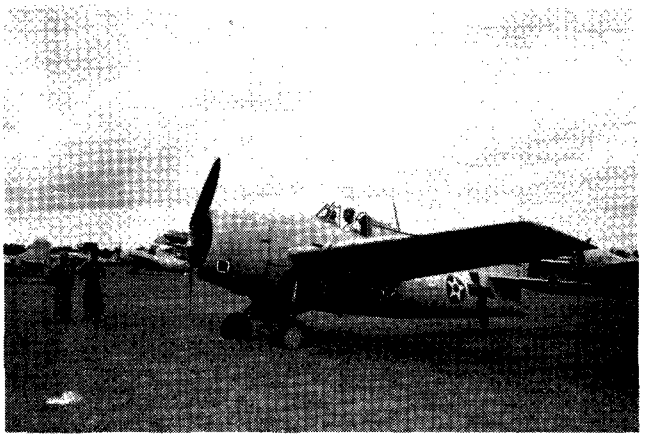
AIRACOBRAS
Awaiting "go" signal



QUICK WORK
This warehouse erected in 11 hours



AERIAL UMPIRES
They picked the winners



LEATHERNECK
One of the Marine planes participating

Force Combat Command, which has been brought together to do a particular job. This job is to support the Third Army. We are more than an Air Force team; we have become part of a team which includes all of the other Arms and Services. We are still a part, individually and together, of the Air Force Combat Command, under the leadership of Lieut. Gen. Delos C. Emmons. But, for the time being, we are more than that, we are a part of the Third Army, commanded by Lieut. Gen. Walter Krueger.

"Historical Importance"

"The combat exercises and the battle problems in support of that Army have historical importance. These are peace-time maneuvers, to be sure, but they are conducted under war time conditions. Many of us would have liked more time to prepare. But war doesn't wait and ask: 'Are you ready?'

"On the other hand, real war, or maneuvers carried out conscientiously under war conditions should give you--and I know that it will give you the soldier's spirit of fighting through everything; of overcoming all obstacles by the sheer weight of determination to get the job done. It is a task which calls for the maximum of enterprise, resourcefulness and team work on the part of every one of us."

The maneuvers in Louisiana are a part of a Summer and Fall series of maneuvers involving units of all four of the ground Armies. They were the first maneuvers, however, to involve large-scale air participation. The two Air Task Forces set up for the Louisiana maneuvers are to be perpetuated long enough to take part in the Carolina maneuvers which already are getting under way and are to continue through December 5. It is hoped to preserve the two Task Forces in substantially the same form and strength of the Carolina show.

After participation in these two strenuous and extremely realistic air-ground exercises, the units composing the two Task Forces are expected to be in the pink of condition for any type of field service in response to any emergency which may arise.

The Louisiana maneuvers provided a grueling test in all kinds of weather of the stamina of planes, pilots and maintenance personnel and equipment. Handicaps of poor fields, soft runways, lack of shelter, very bad weather and a difficult, arduous tactical problem gave the combat squadrons a real workout.

Not Bound By Convention

Improvisation played an important part in the use of the aviation components, particularly of the Third Army. General Dargue refused to be bound by convention in his use of the revolutionary new types of aircraft available to American combat pilots for the first time in maneuvers. Curtiss P-40 pursuit airplanes were employed as dive bombers. Sixty-five of them, each carrying a 500-pound demolition bomb, played a vital part in the smashing of a Red tank attack during a critical phase of the maneuvers. The new Bell P-39 Airocobra, with its 37-millimeter cannon and battery of machine guns, was used freely to strafe mechanized ground forces. The new Martin B-26 medium bomber, least-known quantity among the new air weapons, acquitted itself so well that one of General Dargue's staff officers expressed the belief that it has "put a new sting in the tail of American air defense." The Lockheed-P-38 two-engined pursuit, wrote a good record for itself against the Louisiana skies.

The most important use of his aviation components by General Krueger was in the canalizing and isolating of major portions of the Red forces. After the first few hours of the war, the Red and Sabine Rivers were converted into virtually impassable barriers by the blowing up of permanent bridges throughout the maneuver area and the frequent, repeated destruction of pontoon bridges. Road bridges and defiles were bombed with the most disastrous effects upon Red mobility.

Aviation contributed largely to the successful effort to cut off the Reds from their fuel supplies and communications. This destruction of supply lines contributed materially to the Red defeat in the first phase of the maneuvers.

Contrast In Maneuvers

The contrast between the earlier Arkansas-Louisiana maneuvers, in which aviation played no part, and the Louisiana maneuvers between the Second and Third Armies, in which aviation was very strong, has been striking. During the early maneuvers, rivers were treated, and properly so, as merely temporary obstacles. They ceased to become obstacles just as soon as artillery could be brought up, bridgeheads established and secured and pontoon bridges constructed. The whole strategy was based upon this concept of rivers as nothing more than temporary obstacles.

With the arrival of aviation on the scene, this concept was shattered. Commanders of the ground forces found to their sorrow that, so long as they lacked absolute command of the air, rivers were barriers nearly as insurmountable as the oceans. Repeated and fruitless efforts were made to throw pontoon bridges across the Red and Sabine Rivers and to maintain them. With disheartening regularity, the bombers and dive bombers appeared and the bridges went out. With them went much of the vital Red strategy. Parts of the Red strength were operating, to all intents and purposes, upon separated islands and could not be effectively united. Then, when the vital highway communications also were severed, the fate of the highly mechanized Red Army was sealed.

The Third Air Task Force made available to General Krueger a total of 447 tactical airplanes,

(Continued on Page 32)

THE WINGED "O" FOR THE EYES OF THE ARMY

By Oliver Townsend

THE eyes of the Army--that's what more than 600 officer-students of the Aerial Observation School at Brooks Field, Texas, will be by the end of FY 1942.

Observer students at Brooks are officers selected from arms and services other than the Air Forces, and from among non-flying Air Forces personnel. They are chosen by commanding officers for their special attributes, such as mature judgment, ability to think quickly, high sense of duty and determination. In a course lasting ten weeks these specially-chosen officers are taught how to carry out visual and photographic reconnaissance missions, and how to work in close conjunction with observation pilots of the Air Forces.

The school is still relatively new, so its quota of students is not completely filled at the present time. Under existing plans, two classes of approximately 100 students each will be in training constantly, one being graduated every five weeks. This means that when the anticipated training rate is reached, 200 observers will be stationed continuously at Brooks Field. Although this rate probably will not be reached for some time, it is expected that more than 600 trained observers will be produced by the end of FY 1942.

Qualification requirements for students are the same as for aviation cadets. In other words, each candidate must possess the equivalent of two years' college education and must be in Class I physically. Reserve and National Guard officers designated for aerial observation training are required to accept a one-year extension of active duty in order to qualify.

Candidates recommended by commanding officers for observation training are appointed in the following ratio: 10 per cent. field officers, 24 per cent. captains and 66 per cent. lieutenants. Field officers must be Regular Army officers, others may be members of the Officers' Reserve Corps or the National Guard.

10-Week Program

The preliminary stage of the 10-week training program lasts two weeks. During this time each student is given concentrated practice in code transmission and the use of aircraft radio for air-ground communication.

After completion of preliminary instruction each student observer is assigned to a pilot. These two, throughout the advanced flying phase of the course, operate as a combat team designed to teach both how to work in close conjunction. In order to complete the course successfully each observer must spend at least 60 hours in the air as part of a combat team.

Pilots used in the training of aerial observers are recently-commissioned graduates of the Advanced Twin-Engine Training School at Brooks Field. A plan whereby these pilots are held over at Brooks for five weeks prior to being assigned to combat units enables the Observer Training School to utilize completely-trained officer-pilots as part of its combat teams.

For training purposes combat teams are organized into flights--four teams to a flight. Each flight is under the personal supervision of a flight commander, who, usually a recent graduate of the Observer School, assigns students a grade at the completion of each day's work.

In addition to the time spent in the air, the advanced portion of the course also includes an intensive academic phase. This phase is covered in 128 hours of ground school instruction, which consists of lectures on subjects of particular importance to aerial observers. The most important ground school subjects, such as photography, navigation and artillery, are taught by specially-qualified instructors who supervise each student's progress in the actual performance of flying missions after the academic work is completed.

Communication Stressed

Also stressed throughout the course is the problem of communication, in all its phases. Study in this field includes the learning of the International Morse code with a speed of 15 words per minute, operation of aircraft radio and the use of prescribed radio procedure.

Upon the successful completion of the observer training course graduates are returned to their old arm or service. Henceforth, they remain available for assignment to observation squadrons of the Air Forces upon the recommendation of commanding officers.

In order to keep up with the latest developments in observation technique, Lt. Col. S.T. Smith, commanding officer of Brooks Field; Maj. E.H. Underhill, director of training, and Maj. R.C. Lindsay, assistant director of training, are kept constantly advised of such improvements by combat units in the field.

The great amount of attention which is given to aerial observer training is the result of the extremely important role played by aerial reconnaissance in modern warfare. It is the principal agent by which the commanders of all air and ground forces obtain information, and it is the original reason for the development of military aeronautics. Without it armies are blind.

Reconnaissance missions, if executed correctly, reveal the location of the enemy's forces, show activity in the rear of the enemy lines, disclose the nature of the terrain "over the hill," spot suitable objectives for artillery and air forces, show the results of air attacks and enable commanders to follow the progress of the battle. With the increasing use of mechanized *panzer* divisions, still another use of aerial observation has developed. In fact one of the chief purposes of the Brooks school is to train officers in the art of speeding up the Army's *panzer* divisions through direction from the air.

Reconnaissance Usually Visual

Air reconnaissance may be executed by either visual or photographic means. Usually it is visual, but photographs are often used to reveal details not visible to the naked eye, and to preserve certain scenes for permanent record. Cameras used for training purposes are large, not too complicated, and are just as efficient in many different types of situations. They are designed to take a clear photograph from a distance of only a few feet or from an altitude of several miles.

Although most missions are carried out during daylight, it is also possible to conduct both visual and photographic reconnaissance by night. When this is done, flares are used to illuminate the objective. These light up an area of about a quarter of a mile in diameter when fired from a height of approximately 1,000 feet.

Five principal types of photographs are used in carrying out aerial reconnaissance. Each one has its own special employment. Simplest of all is the "pinpoint," which is a single vertical photograph of an objective, procured for the purpose of locating the objective with respect to the surrounding terrain. Next are the "stereo-pairs," which consist of two or more overlapping photos of an objective with much the same purpose as the pinpoint. However these give, in a more finished form, a greater sense of depth and less distortion.

The Reconnaissance Strip

For picturing such long, narrow objectives as railroads and highways a group of overlapping photographs, known as a "reconnaissance strip," is used. When it is desired to make a photographic map of an area, a number of these reconnaissance strips are taken and arranged in a series. This makes it possible to cover large areas which could not be included in the other, more simple, types of photography.

One of the most common of all types of aerial reconnaissance photography is the "oblique." This is taken at an angle which reveals depth, size and the construction type of the objective much better than the other methods. It is also valuable in that it minimizes the effects of camouflage.

All of the latest techniques developed in connection with these methods of photography are taught at Brooks Field, this work being under the supervision of the Photographic Section. This section also turns out about 300 mosaics, 100 pinpoints and 100 publicity photographs daily; and 1,500 student identification pictures every 30 days.

Operated in conjunction with the Observer Training School at Brooks Field is the Advanced Twin-Engine Flying School, which includes more than 350 aviation cadets at the present time. Here cadets who have successfully completed courses in basic schools learn the advanced technique of formation flying, instrument flying, interception problems and day and night cross-country flights.

Brooks is one of the Army's oldest air fields, having been established on December 8, 1917. During the World War some flying instructors and a few combat pilots were trained there. After the war it was used as a "lighter-than-air" base for a number of years, and in 1922 became a primary flying school. In February, 1940, Brooks became a sub-base for the Kelly Field Advanced Flying School, and was established as an independent advanced school on January 1, 1941.

RECORD FLIGHT FROM GEIGER

Two officers of the Twelfth Reconnaissance Squadron (Geiger Field, Spokane) last month established two records for flights between the continental United States and Alaska. Flying a B-17C, they made the first nonstop hop from Spokane to Fairbanks and the fastest recorded trip from Anchorage to Spokane.

Maj. Ronald R. Walker, commanding officer of the squadron, was pilot. His copilot-navigator was Lieut. Harvard W. Powell. They flew from Spokane to Fairbanks in slightly more than 11 hours, bucking headwinds up the Alaskan coast. The Anchorage-Spokane hop took 7 hours 15 minutes, although no attempt was made to push the ship beyond normal cruising.

The crew included Tech. Sgt. John B. Crouse, Staff Sgt. J. Gordon Drake, Sgt. John Parker and Pvt. First Class Cecil R. Herman. Others aboard were members of a group which was making an inspection of Alaskan airports.

Air Operations in Alaska

By Lieut. John C. A. Watkins

ANY air base where a soldier may spend his off-duty hours prospecting for and actually finding gold--or where he might saunter out after supper and shoot a moose--certainly is an air base with some definite attractions.

There are such Army Air Forces stations--in Alaska, which has been a part of the United States for so long that it cannot accurately be described as a "new base" but which has become recently, for obvious reasons, one of the nation's new military frontiers.

Soldiers stationed at the new fields there really are finding gold in their off-duty hours (not all of them, but some; not much, but a little) and the statement about bagging a moose after supper wouldn't be very much of an exaggeration were it not for a local policy which prevents the troops on duty in the territory from enjoying a very large share in some of the best hunting in the world.

Looking at it from all angles, it would be possible to claim, with some justification, that soldiers stationed at a place where fresh cucumbers cost 39¢ each, and a bowl of chili 75¢, might feel it necessary to spend all their spare time looking for gold. There is no question about the attractiveness of certain phases of duty in Alaska, but neither is there much doubt that it is the most expensive place under the American flag where an Air Forces officer or enlisted man could be stationed.

A group of officers from A.A.F. headquarters, in Washington, stopped in a Fairbanks restaurant while on a recent inspection trip through the territory. While they were eating (no cucumbers), a man came up, introduced himself and said that he had been a carpenter at Ladd Field, near the little inland mining town. He had quit, however, because he wasn't making enough money. No future in it. Thereupon a brash young second lieutenant in the group asked him just how much he had been making.

"Oh, $85 a week," the local citizen replied in an off-hand manner, tossing a handful of silver dollars down and ordering a round of the best for the gentlemen.

Two typical stations to which our personnel may be assigned are Ladd Field, which is about 150 miles south of the Arctic Circle, and just as cold, and Elmendorf Field, at Fort Richardson near the little seaport of Anchorage, just about as far south and down below a chain of mountains which includes historic and magnificent Mount McKinley. Saying that Elmendorf Field is part of Fort Richardson seems to the casual observer like saying that the dog is part of his tail, since the air base is very large and dominates the whole station, but that's the official designation.

The two fields, one very cold and one with a fairly mild climate--comparatively speaking--have a great many things in common.

LADD FIELD

Ladd Field is a cold weather experimental station for the Army Air Forces, commanded by Lieut. Col. Dale V. Gaffney, and for this reason, duty there differs in some respects from duty elsewhere in Alaska. Comparing it broadly to Elmendorf, it is a much more attractive post. It has permanent quarters for its enlisted men, as compared to the typical cantonment-type barracks at the field farther south, and a few permanent and, on the inside, very attractive quarters for married and bachelor officers. There are not enough of these to go around, however, and many of the officers who bring their wives to Alaska (at their own expense, although it is a three-year tour) must pay stiff prices for houses or apartments in Fairbanks.

Ladd is situated in the middle of what appears to be a glacial plain. In fact, a glacial stream, or slough, meanders through the reservation. Miles away, snow-covered mountains may be seen on clear days, but most of the territory around the field is fairly flat and covered with a thick growth of aspens and evergreens. The ground consists of a surface of muskeg--a mattress-like, thick, springy mass of vegetation which probably will be peat in another 1,000 years or so--with gravel and ice underneath. Ice is everywhere beneath a few feet of muskeg and gravel, and the trees consequently wither and die when their roots have passed down through this areable blanket. The result is that the expanse of woods is a vast patchwork of yellow and green from the air, with the dying trees toppling over when they reach a certain growth and the muskeg no longer is able to bear their weight and pulls loose from the gravel beneath.

"Summer" extends from late May until late September, with the temperature averaging around 65 degrees. The days are fairly warm, but a blouse or jacket usually is necessary in the evenings and early mornings. During the winter, the temperature has dropped as low as 70 degrees below

zero, although the average is said to be around 20 degrees below. There isn't a "great deal" of snow--about eight inches on the ground all the time. The weather usually is fine--a clear, dry cold--and flying is practicable virtually the year around. There are close to 24 hours of daylight in June, 24 hours of darkness in December. A midnight summer baseball game is not uncommon.

Living Expensive

The place is expensive, without any question. For instance, there are no laundry facilities on the post, and the civilian laundries in Fairbanks charge an average of 35¢ to wash a shirt, 15¢ for a pair of socks, 10¢ for a handkerchief. This latter is particularly ridiculous when one recalls that handkerchiefs cost only 4¢ each, new, at the commissary. The dry cleaners in town charge $2.50 to clean and press a uniform or a two-piece civilian suit, $1.25 for a pair of slacks or a blouse. An enlisted man on the post does some cleaning and pressing, but his capacity is limited. A very plain, quick haircut at a town barbershop costs $1 and the mind won't stand the shock of knowing the price of a shampoo.

Recreational facilities, while lavish compared to such outposts as Newfoundland, are only fair and largely what were there before the army arrived. There are two motion picture theaters in town, four miles away, which show fairly recent films. There are also bowling alleys (at 25¢ a line) and pool halls. An Army Motion Picture Service theater is operated in a temporary building on the post, showing somewhat hoary films (permanent facilities in the combined theater-barracks-hospital-post exchange should be in use by this time) and there is one tennis court. A gymnasium is needed, because during the winter the temperatures frequently get too low to permit the men to stay outdoors very long at a time.

Hunting is wonderful, for such game as moose, bears of several kinds and degrees of ferocity, ducks, grouse and ptarmigan. Nearly all can be found within a short distance of the post. Unfortunately, financially it is practically impossible for an enlisted man (or young officer with a family) to do any hunting legally, because of the restrictions. The territorial game commission has ruled (the chief of the Alaskan Defense Command is contesting this legally at present) that soldiers can't have resident licenses, which are only $1, although they are assigned to the station for three year or "duration" tours. Instead, if they want to hunt at all they must pay $11 for a visitor's permit to bag duck and grouse, $50 for big game such as bear and moose. Most of the local civilians feel that the men are being discriminated against and attribute the commission's attitude to pressure from the powerful organization of guides, who, by law, must accompany every visiting sportsman.

Housing facilities in Fairbanks are limited, expensive and quite ordinary. Married officers living in town (as most must) pay about $65 for an unfurnished, one-room, kitchenette and bath apartment. Electricity runs about $15 a month more, with heat bringing the total to about $100 a month. Larger quarters are proportionately more expensive. Some of the apartments are pretty crude, but the prices are high regardless.

Good Food Assortment

Military personnel can get a good assortment of fresh vegetables and meats at the commissary at reasonable prices. This is fortunate, since no officer with an average family could afford to feed them on his pay if he had to buy his fresh foods in town. Cucumbers at 39¢ each are an example, not an exception; fresh peaches are almost worth their weight in gold.

Outside of the prices, Fairbanks is a fairly attractive little town, with about 3,500 people. Placer gold mines a few miles outside the community provide it with its principal source of income. There are well-stocked, modern drug stores and clothing stores, fairly good restaurants (which serve excellent steaks and chops even if they do charge 75¢ for an 8¢ can of chili) and good schools. The University of Alaska is situated a few miles outside town, and has a good reputation. There is a small daily paper (10¢ per copy), a handsome Federal building, a good hotel and one or two paved streets.

Air Forces officers assigned either to Ladd or Elmendorf Field should bring with them the ordinary personal equipment, such as O.D. woolen uniforms (no cotton clothing can be worn), shirts and the like. About the only special clothing needed is woolen underwear and socks. The rest of the winter clothing required for daily life in such a climate as Ladd's is issued at the field. Heavy shoes, such as the G.I. field shoe, are desirable because the roads and walks are glacial gravel and hard on footgear.

ELMENDORF FIELD

Elmendorf Field is a much bigger establishment, commanded by Col. J.L. Davidson, and is "on" a large post, at which are stationed a great many soldiers of many different arms and services. Fort Richardson is headquarters of the Alaskan Defense Command, which is commanded by a ground officer, and the Air Forces personnel stationed there are considerably outnumbered by ground troops. Conditions therefore are somewhat different from those at Ladd Field, where the senior Air Forces officer is in complete charge at least of all he surveys.

Elmendorf Field is about three and-a-half miles from Anchorage, which is a community of about 3,000 persons normally. The cost of living in Anchorage

is about the same as in Fairbanks, but the latter is a much more attractive community. There is only one theater in Anchorage, which doesn't begin to accommodate its patrons, but there are literally dozens of saloons and other establishments of varying degrees of quality and respectability.

The laundry situation is even worse than in Fairbanks, although the prices are about the same. In Anchorage the laundries have more work than they can handle and they are consequently pretty independent. For example, the quartermaster at Fort Richardson couldn't get one of them to accept a contract to launder the men's sheets and pillow cases. There is a building available on the post for a quartermaster laundry and dry cleaning plant, but the equipment is not available. The result is that, like in Newfoundland, one of the toughest problems an enlisted man, or even an officer, faces is simply the problem of trying to keep clean.

Wives may be brought to Elmendorf Field, too, but at the husband's expense and with practically no chance of quarters being furnished. There are a few sets of quarters being prepared for the commanding officers of various units stationed on the post, but other married officers must find places to live in Anchorage, or leave their wives in the States. There are some apartments in town available at prices comparing to those in Fairbanks, but many officers are building their own houses with FHA assistance.

The cantonment type quarters for bachelor officers, and officers who left their wives behind, are crude and hard to keep clean. As is the case at many large cantonments in the States, there is a lot of dust and dirt flying through the air. The atmosphere of the place is as drab as it is dirty. Some units have attempted to brighten up their barracks by planting little evergreen trees around the buildings, but the general impression of the still-unfinished reservation isn't particularly pleasant.

Country Is Beautiful

The surrounding country, however, is beautiful. Great mountains tower above the post on all sides--some only a few miles away, some snow-covered peaks glistening rosily under the sun 50 or 100 miles from the reservation. A wild stream, said to be full of trout, tumbles noisily along the edge of the post. The fertile Matanuska Valley, where the "dust bowl refugees" were settled, is only about 50 miles away, and great woods are nearby.

The enlisted men have formed a "Gold Seekers' Club" and actually have staked claims and taken gold out of the ground. They play football with other post teams and with Anchorage, and participate in other sports. At the present time they are building, with their own hands and under the guidance of Maj. M.R. Marston, A.A.F. morale officer, and Lieut. Ralph K. Wheeler, A.A.F. chaplain, log recreation buildings both on the post and in Anchorage, on land donated by patriotic residents. Elmendorf Field has a small motion picture theater, accommodating about 300 men at one showing, and there is a larger post theater for the entire garrison. There is also a recreation hall with a library and ping pong tables, but bare of easy chairs, sofas and other comfortable, home-like furniture. The officers' club also is small, sparsely furnished and inadequate for the garrison.

One of the major obstacles to satisfactory living conditions, for either officers or enlisted men, is the transportation bottleneck. Transportation facilities are limited both by nature and general conditions, and it is extremely difficult to get enough furniture or supplies shipped in to be comfortable.

Except by air, the only way to get out of Fairbanks is by the Alaska Railroad, a single-track line which takes its time and charges pretty high rates, and the Richardson Highway, an engineering feat which, unfortunately, closes around October 1. Traffic between Anchorage and the States, again excepting air travel, is limited to the water-borne, and the service is limited. Personal belongings of literally hundreds of army people stationed in Alaska are stacked up on Seattle piers awaiting transportation--at premium rates.

Otherwise, conditions at Elmendorf are about the same as they are at Ladd Field, from the standpoint of living, sports and duty. While many of the married officers and practically all of the married enlisted men can't afford to bring their wives along and don't care much for the idea of being separated from them for two or three years, they say generally that they like duty in Alaska. Many hope to stay there when they retire. Many, but by no means a majority.

Three of the four bomber commands were assigned commanding generals last month. Brig. Gen. Arnold N. Krogstad was selected to head the First Bomber Command, First Air Force, at Langley Field, Va. Brig. Gen. John B. Brooks will command the Second Bomber Command, attached to the Second Air Force, at Fort George G. Wright, Washington.

Brig. Gen. Follett Bradley has been designated commanding officer of the Third Bomber Command, Third Air Force, Drew Field, Florida. The assignments leave unfilled the post of chief of the Fourth Bomber Command, of the Fourth Air Force, which will have its headquarters at Tucson, Arizona.

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Maj. Gen. Gerald C. Brant, commanding officer of the Gulf Coast Training Center at Randolph Field for the past year, was assigned last month to command the Newfoundland Base Command.

JOHN J. PERSHING
WASHINGTON

September 18, 1941.

Brigadier General Muir S. Fairchild,
Assistant Chief of the Air Corps,
War Department,
Washington, D. C.

My dear General Fairchild:

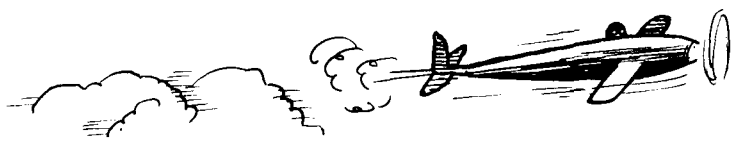
To the Air Corps, through you, permit me to extend my warmest thanks for the cordial birthday greetings your kind letter conveyed. I appreciated deeply the friendly thought of me, and seize this opportunity to send to all my heartiest good wishes.

Yours very sincerely,

John J. Pershing

AERIAL TRAFFIC COPS GET TOGETHER

By Major A. B. McMullen



THE War, Navy and Commerce Departments, (the latter including the Civil Aeronautics Board and the Civil Aeronautics Administration) recently indicated their interest and concern over air traffic by the joint establishment of the Interdepartmental Air Traffic Control Board.

Each agency has one member on this Board. Mr. Earl Ward represents the Civil Aeronautics Administration, Mr. E. N. Ellington the Civil Aeronautics Board, Lieut. Comdr. John C. Crommelin the Navy Department. The writer represents the War Department--and at the present time is Chairman of the Board.

The Board has no executive authority. It acts as a clearing house for not only air traffic problems but reviews applications and makes recommendations with respect to the use of the navigable air space by other activities--such as artillery firing training areas, searchlight and barrage balloon training areas, the location of aerial bombing and gunnery ranges, flight training fields, etc.

During the recent expansion of the Army Air Forces, tactical or training units have been located on Municipal or Civil Airports, many of which were airline terminals already faced with serious traffic problems.

P-39's And Cubs Don't Mix

The officials responsible for the location of these military units on civil airports realize the fact that 300 MPH bombers and 400 MPH pursuit planes cannot operate safely or efficiently from fields also used by small aircraft of the Cub and Aeronca class. Additional airports are, therefore, being constructed largely with Federal funds in these communities for private and commercial flying. This procedure confirms an opinion I have had for many years, namely, that more--properly placed and better designed--airports would lessen the need for regulations governing air traffic.

The air carriers and some non-scheduled civil aircraft will, however, continue to utilize most of these jointly occupied airports and it has become necessary to provide a satisfactory means for directing both civil and military traffic on--and in the vicinity of--these air terminals.

At first glance this would not appear to present any unusual problems, but War Department regulations and the principles of military command prohibit the commanding officer at these stations from delegating the responsibility for the safety and operation of the planes in his command to an employee of another department--particularly a civil agency not familiar with the problems peculiar to military aircraft operation. Therefore, both military and Civil Aeronautics Administration airport control personnel will be employed in the same towers at these jointly occupied airports.

Airports Join Federal Network

The CAA and the Air Corps are assuming the responsibility for the operation of air traffic control towers at 39 municipal airports as rapidly as personnel and equipment can be obtained. Thus a precedent has been established and the welding of airport and airway traffic control with the operation of both by the Federal Government has taken a big step forward. Only those civil airports that are occupied by Army or Navy tactical or training units will be taken into the Federally operated network at the present time.

Except during a military emergency determined by the station commander, the Senior CAA Operator will be in charge of the control of all traffic in the airport control zone. When both civil and military aircraft are involved, the CAA operator will issue instructions to Army or Navy aircraft only after consultation with the service operator.

Normally, Army and Navy tower operators will not issue instructions to civil aircraft--and in no case will instructions be issued to civil aircraft by service tower operators unless they hold a CAA "Air Traffic Control Operator Certificate."

The commanding officer of the Air Forces station may assume complete control and supervision of the airport traffic control tower and all air traffic within the airport control zone when the military situation demands such action. When such control is assumed, the commanding officer shall assume full responsibility for the safety of all air traffic in the airport control zone. During such periods, the CAA control tower operator shall direct civil air traffic as requested by the commanding officer.

Conditions To Be Determined

Just what military situations may arise which will require the commanding officer to assume control of air traffic in the vicinity of the airport no one can predict at the present time. It is possible that all traffic in the vicinity of the

airport might have to give way to a group of pursuit planes which had exhausted most of their comparatively limited supply of gasoline before arriving at the airport, or it might be necessary temporarily to clear the landing area to permit the landing or take-off of one or more military aircraft executing a mission of particular importance to our National Defense.

The recent Army maneuvers in Louisiana and adjoining states developed a situation which foreshadows many air traffic problems that may be expected as the Army and Navy Air Forces are increased, and should the present emergency become more acute. The combined air forces of the Second and Third Armies participating in these maneuvers included approximately 900 airplanes of all types. These planes were conducting missions in all types of weather and during the hours of darkness without lights, without flight plan, and at all altitudes. As a result, following recommendations of the IATCB, scheduled air carrier operations by Chicago and Southern, Eastern and Delta Air Lines were suspended by the CAA in the maneuver area except during daylight, and under contact flight rules.

The area involved covered approximately 130,000 square miles and roughly included the territory within and south of a line from Houston, Texas, to Dallas, Texas,--thence, eastward to Greenwood. Mississippi,--thence, south to Mobile, Alabama. This area was designated as a temporary danger area by the Administrator of Civil Aeronautics; and all civil aircraft, in addition to the air carriers were advised to restrict their operations in this area.

Air Line Schedules Rerouted

Similar Army maneuvers will be held in North and South Carolina during the latter part of November. A plan has already been approved authorizing Eastern Air Lines and Delta Air Lines to reroute their schedules to other airways and in some cases leave the established airways entirely during the hours of darkness and during instrument weather in such a manner that these schedules will not cross the maneuver area.

The cooperation of the airlines during these maneuvers has been excellent, and it is hoped that private flying will be as ready to assist the War and Navy Departments in working out solutions to similar problems where the National Defense or training programs require such action.

This month private flyers in the states bordering on the Atlantic Seaboard from Maine to North Carolina are having an opportunity to demonstrate their ability and willingness to cooperate with the military authorities in problems of National Defense.

I refer to the maneuvers being conducted by the First Interceptor Command. During these maneuvers, actual war conditions are being simulated as closely as possible. Pursuit aircraft and anti-aircraft artillery are assigned the task of driving off "hostile bomber" aircraft which simulate attacks on important cities and other objectives within 150 miles of the Atlantic Coast.

The recently developed warning network in this area is getting an opportunity to prove its efficiency, and observers are expected to report the approximate altitude, direction of flight and other pertinent information concerning every aircraft seen flying over the maneuver area during this period.

Special Traffic Control

No Army, Navy or Coast Guard aircraft is making a flight beyond ten miles from the airport from which take-off is made during maneuvers unless a flight plan has been approved by the local operations office and submitted to the nearest Air Corps Information Center. These information or filter centers are established at Boston, New York, Philadelphia, Baltimore, Norfolk and Harrisburg.

All civil pilots based in the maneuver area are requested to cooperate by filing similar flight plans with the manager of the airport where take-off is made. The airport manager will in turn telegraph or radio the information concerning the proposed flight to the nearest Information Center. With complete information available in each Information Center it will be possible to identify friendly or hostile aircraft quickly, and thereby conserve the use of pursuit aircraft on interception missions.

The manner in which private and commercial pilots demonstrate their ability to cooperate with government officials and carry out instructions during these maneuvers may--to a large extent--determine the conditions under which civil aircraft will be required to operate in a real emergency. While many of the changes in traffic control procedures recently inaugurated have resulted in further restrictions to civil aircraft, one change has taken place which (temporarily--at least) will remove some of these restrictions to which all pilots have been subjected. I refer to Air Space Reservations and Danger Areas which have been established over arsenals, munitions depots, torpedo plants and other types of high explosive activities.

Danger Area Policy Changed

These Danger Areas were intended--up until a few weeks ago--to prevent flight of aircraft over HI-X areas and the possibility that objects might be dropped from them or that they might fall or make forced landings on or within these areas. With the advent of the present war, the danger from subversive elements and sabotage to high explosive and military establishments became greater than

the danger from aircraft falling or dropping objects on these establishments.

The Navy Department has, therefore, abandoned the policy of designating air space reservations or danger areas over high explosive areas, and has recommended that previously designated areas of this type be discontinued. It is believed the War Department will adopt the same policy.

In this connection, it is interesting to note, however, that many danger areas have recently been --and it is reasonable to assume that many more will be--established. These areas, however, will be established as a means of protecting or warning aircraft in flight rather than protecting activities or facilities on the ground from aircraft. These new danger areas are being established over artillery firing ranges, aerial gunnery and bombing ranges, searchlight and barrage balloon training areas, congested training areas, etc. In other words, these danger areas may be defined as the air space above a designated area on the ground wherein the pilot, in entering, subjects himself and plane to unnecessary risk but does not greatly endanger the National Defense.

You might reasonably ask what is being done to protect high explosive plants, munitions depots and fortifications from subversive activities and sabotage by persons utilizing aircraft. The danger, of course, is reasonable, and I can assure you that the War, Navy, Justice and Commerce Departments--as well as the Office of Civilian Defense--are giving this problem considerable study.

New Control Method Recommended

The Interdepartmental Air Traffic Control Board in a recent report recommended that a more rigid control of non-scheduled civil flying be placed in effect as the most effective means of accomplishing this objective.

It was recommended that:

1. Within the limitations of constitutional authority all airports and landing areas be required to obtain a certificate of public convenience and necessity from the Civil Aeronautics Authority as a condition precedent to their operation, and that in issuing airport certificates particular attention be given to the qualifications of airport management personnel.

2. The Civil Aeronautics Board prepare regulations to be placed in effect, when necessary, by the Civil Aeronautics Administration governing the control of all non-scheduled civil flying by requiring individual flight authorization, from an airport manager or his authorized representative, similar to Air Corps departure and arrival reports.

3. The fingerprinting of all licensed airmen and the investigation of each plane owner and pilot by a law enforcement agency to determine nationality, place of birth, criminal record (if any), etc.

The Interdepartmental Board realizes the importance of a large civil aviation reserve of planes, pilots and aircraft factories to the National Defense and will assist the industry in every manner possible in working out its many problems during the present or any future emergencies. However, conditions change rapidly from day to day, and the civil pilot and plane owner must be prepared to adapt himself to new regulations and restrictions should they become necessary.

Long Range Program Planned

From what I have said, you may have gathered the impression that regulations, restrictions and more regulations are the only means by which the various Departments of Government are attempting to cope with the problems of air traffic control. This is not the case, for during the past five years at least one Department (the Airport Division of the CAA, Department of Commerce, of which I was formerly Chief) has been preparing long range, nation-wide airport and airway development plans, and airport layout plans of all types. In preparing these plans, the safe and efficient flow of air traffic has been a deciding factor.

The War Department has indicated its interest in civil aviation and the coordination of military and civil air traffic by appointing a representative on the Interdepartmental Air Traffic Control Board, and the creation of the Civil Aeronautics Section within the Air Staff of the Headquarters of the Army Air Forces.

Another important move to relieve the restrictions imposed on airports and private flying within the limits of civil airways in the vicinity of radio range stations and control airports, while at the same time increasing the safety of through traffic, has recently been made by the CAA upon the recommendations of the Interdepartmental Air Traffic Control Board. This plan provides for the establishment of a "Range Approach Channel" four miles wide (two miles each side of the center line of the oncourse signal of the range) for a distance of 15 miles from the radio station. This in effect means that the airways have been narrowed from 20 miles to four miles along this 15 mile section.

Length Depends On Terrain

It is realized that training or other flying activities--terrain, etc., may require the establishment of a Range Approach Channel more than 15 miles in length in some localities to provide space for local flying activities. This will be done where necessary, upon the recommendations of the Regional CAA Managers and the approval of the Administrator of Civil Aeronautics, after clearance by the Interdepartmental Air Traffic Control

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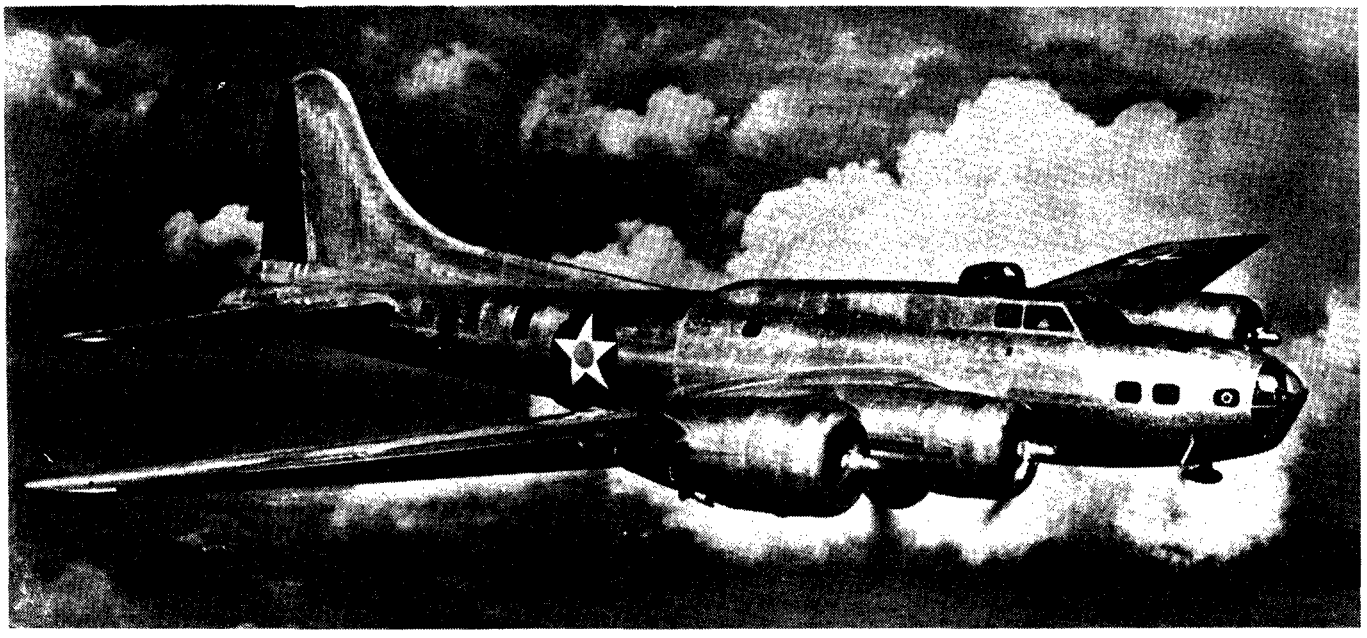
NEW SHIPS FOR THE ARMY AIR FORCES



The New B-17E, Latest Flying Fortress

Six new types of aircraft, ranging from a heavy bomber to three different makes of "flying flivvers" of the sport type, are undergoing tests by Air Corps engineers, headquarters of the Army Air Forces announced during the past month.

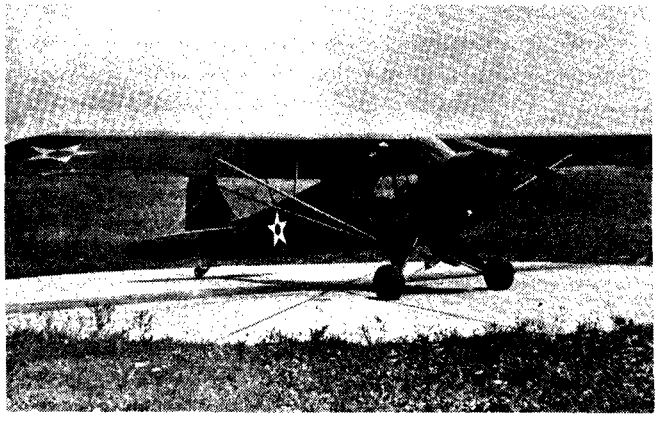
Most important of the new models is the B-17E, latest version of the "Flying Fortress." Under present plans the B-17E will be turned out in mass production by three manufacturers--Boeing, Douglas and Vega.

The new B-17E is approximately five feet longer and has greater gross weight and firepower than earlier models of the four-engined bomber. Power turrets both on the top and bottom of the fuselage and a stinger turret in the tail provide for resistance to attack from any direction. Enlarged horizontal and vertical tail surfaces make possible the increased size and weight.

Two New Cargo Planes

Two other new planes are the C-47, heavy cargo plane and the C-53, designed to carry a light cargo. Both are manufactured by the Douglas Aircraft Company. They are low-wing, all-metal monoplanes each equipped with two 1,200 horsepower Pratt and Whitney engines and capable of carrying 28 soldiers in addition to a crew of three.

Other recently-delivered Army airplanes are the YO-57, YO-58 and YO-59, all observation models. Each of these is powered by a single four-cylinder Continental motor developing 65 horsepower. All three are being tested for use as liaison ships for use in connection with ground units. The YO-57 is manufactured by the Taylorcraft Aviation Corporation, the YO-58 by the Aeronca Aircraft Corporation and the YO-59 by the Piper Aircraft Corporation.



The O-59 Observation Plane

Another In P-40 Series

Also undergoing Air Corps tests at the present time is the latest model in the P-40 series--the P-40F. This plane, manufactured by the Curtiss-Wright Corporation, is powered with a Rolls Royce "Merlin" engine. It is similar in appearance to the other planes of the P-40 series, all of which are powered with Allison engines.

The "Merlin" which will be used in the P-40F is a 12-cylinder V-type, liquid-cooled engine capable of developing 1,105 horsepower at an altitude of more than 20,000 feet. The plane itself will be heavily armored, will carry heavy firepower and will be equipped with leak-proof fuel tanks.

An Equipment Review

GERMAN AIRCRAFT AND ENGINES ANALYZED

THE ME-110 FIGHTER

A thoroughgoing, detailed analysis of a captured Messerschmitt ME-110 pursuit plane, one of the mainstays of the fighter arm of the Luftwaffe, has just been completed by the Vultee Aircraft Companv. This airplane, shot down over England late in 1940, reached the United States last April. Despite a crash landing, it suffered comparatively little damage. R.W. Palmer, vice president of Vultee, prepared the following report on the ship.

The ME-110 is a twin-engined, low-wing all-metal three place land monoplane primarily designed as a fast multi-place fighter but readily adapted to light bombing and attack missions. The crew consists of a pilot, a radio operator-navigator and a rear gunner. The airplane weighs approximately 15,300 pounds fully loaded, has a wing span of 53 feet 4 inches, a length of 40 feet 6 inches and a wing area of 414 square feet. The high speed of the airplane is reported at 365 miles per hour, while the cruising range is 565 miles at 301 miles per hour. Power is supplied by two Daimler-Benz engines developing 1,050 horsepower each.

It was not surprising to find that German ingenuity had developed a design admirably suited to mass production and manufactured with excellent workmanship, although reports of shoddy construction were fairly prevalent. This has been done at little sacrifice of weight or aerodynamic efficiency.

Sub-Assembly Time Reduced

The air methods give an interesting comparison with our current practice in two particular respects. Larger, simpler one-piece component parts are used, reducing the number of man hours for subassembly work. As manufacturers in this country are getting larger quantity orders and consequently can spend more money on tooling and equipment this trend is increasing here.

Even more striking are the differences between their methods of assembling major components and ours. The junction points of the ME-110 have the connecting fittings reduced to a minimum and each fitting has considerable freedom of adjustment so that a fairly large discrepancy in accuracy of dimensions is easily taken care of. This contrasts with our method of a large number of attachment fittings unadjustable and requiring very accurate jigging.

The advantage, particularly when sub-assemblies

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THE DB-601A ENGINE

Sometime ago the Wright Aeronautical Corporation had the opportunity of studying a Mercedes-Benz DB-601A aircraft engine, which had powered a Messerschmitt fighter. The power plant was torn down, bit by bit, with every part being subjected to a detailed analysis. Raymond W. Young, of the corporation, reports that a comparison between the major parts of typical high production German and American aircraft engines emphasizes that:

1. The materials used in the DB-601A are quite on a par with those used for similar purposes in the Wright Cyclone and other American engines.

2. There is no apparent sacrifice in the quality of material used in German engines up to the time, at least, when this particular one was produced, which is believed to be late in 1939.

While the engine first presented a somewhat discouraging appearance upon being unpacked, with its dull black finish and a dangling mass of wires, controls, fuel, oil and coolant lines, etc., it soon became apparent that good design, high quality and excellent workmanship lay behind its somewhat homely exterior, Mr. Young says. The general workmanship indicates the application of suitable machine tools, skilled operators and efficient personnel. Handiwork in polishing highly stressed parts is of the highest order, but no useless effort has been expended where there is not a direct return in increased reliability or performance.

Its general design reflects a ruggedness and reliability which has always characterized Mercedes-Benz products, while the relatively low rating indicates conservatism in output for the sake of improved reliability and increased service life.

Attention To Details

Careful attention has been paid, according to Mr. Young, to seemingly unimportant details which may mean the difference between success and failure in a given design. Specific reference in this connection is made to the doweling and serrating of joints to eliminate chafing and ultimate trouble; also to the shot hardening of stressed steel surfaces in intimate contact to reduce fretting and fatigue failures.

With possibly several minor exceptions, the design represents good mass production practice for the use of special purpose machine tools. While the grinding of gears is on a par with American

(Next page, Col. 1.)

ENGINE . . . practice, it is curious to note that highly stressed bolts do not have ground threads.

The high quality of the steels used, according to Mr. Young, is reflected in the marked absence of magnaflux indications and, with the possible exception of nickel, there is no evidence of any shortage of tin, chromium, tungsten, etc., at least at the time this engine was constructed. There is also a noticeable similarity in the application and composition of many materials with those used in American engines, the one exception being the almost total lack of magnesium alloys.

Another interesting phase of military operation which is reflected in the design of the DB-601A is the requirement for an unfaltering take-off with a stone-cold engine. This is particularly required of fighter and interceptor power plants. It has been reported that take-off with a cold engine in German fighting planes is accomplished on a few seconds notice.

A supplementary tank carries a mixture of ether and gasoline to be used for priming, while a secondary tank containing fuel mixed with a small percentage of oil is used during take-off and climb. The take-off is made almost immediately after starting the engine, and the switch to straight gasoline is not made until the normal operating temperatures have been attained.

The cooling medium used in the DB-601A is a mixture of 70 per cent. water and 30 per cent. ethylene glycol, Mr. Young states. In the case of fighters for high altitude operations, it has been reported that the ethylene glycol content is increased to 50 per cent.

Despite wishful thinking to the contrary, Mr. Young says, the performance of the DB-601A with respect to sea level and altitude output, fuel consumption and weight seems to be on par with other contemporary power plants of the same general type. Assuming that the engine under discussion is a model released for production during 1939, it is not unlikely that the current rating in 1941 is 1,400 horsepower, especially in view of the reports from abroad that the German planes are using fuel of 92 octane.

Since the impetus of war with its ever increasing demands for higher speeds and heavier bomb and armament loads, continues Mr. Young, dictates the necessity for power plants of greatly increased output, it is not at all unlikely that the basic design of the DB-601A has been incorporated into an "X" type engine. Such development would be the logical production setup utilizing known and service proven components, and accordingly may well be the 2,400 horsepower engine recently reported to be under construction in Germany.

The Mercedes-Benz Model DB-601A aircraft engine, he explains, is a development of the Daimler-Benz Aktiengesellschaft of Stuttgart, Germany, a firm which has been engaged in the manufacture of automotive and aircraft engines for over 50 years.

Restricted by the terms of the Versailles Treaty, German aircraft engine development had remained virtually at a standstill for a number of years, particularly in the high power output field. After the merger of Daimler and Benz, however, their aircraft engine activity was renewed, and this firm in 1928 produced a 12-cylinder "Vee," water-cooled powerplant of 800 to 1,000 horsepower known as the F-2 Model. During the succeeding years, the development of a 12-cylinder inverted "Vee" liquid-cooled engine was actively pursued and resulted in the production of the Model DB-600, with which several land plane speed records were broken.

From this chronological resume, Mr. Young points out, it will be observed that the development of a military powerplant for the fighting aircraft of the Luftwaffe involved a span of 10 years, and, like similar technical accomplishments in other countries, either in the field of aviation or other industry, was not brought about overnight.

Wall Street Journal

FIGHTER . . . are not built close to the prime contractor, would seem obvious.

Many people have had the impression that German planes were constructed largely of "ersatz" materials. The analysts found quite the reverse to be true. The highest quality material for the particular purpose was used in practically every case. Natural rubber, aluminum, magnesium, high-grade alloy steels, copper, nickel, manganese, chromium, molybdenum, tungsten, tin, titanium, vanadium and other materials appeared in quantities which indicated not the slightest shortage. (The fuel used was of 90 or 92 octane rating.) In the few cases where a material was omitted such as cadmium plating on small steel parts (bolts, etc.) it is suspected that an unnecessary refinement was eliminated to reduce man hours and not because of a shortage of the material.

Just as with materials the various equipment items--radio transmitters and receivers, engine flight and navigation instruments, power plant accessories and miscellaneous gadgets were used in abundance. If anything, the ME-110 was more completely equipped than our standards call for in comparable planes. In almost every case this equipment was well designed and built with precision.

The airplane probably went into production about three years ago and is still good by present day standards. Although the Luftwaffe has sent over the lines little of more advanced design the ME-110 should remind us that German technical skill is undoubtedly not asleep. American manufacturers cannot afford to do less than apply their knowledge and skill to the utmost.

Wall Street Journal

Graham Crackers for Grounded Flyers

By Capt. B. D. Vitamin

A new-type emergency field ration for use by Air Corps personnel who are forced down in isolated areas has just been tested during a 100-mile hike across a New Mexican desert by a 14-man experimental expedition from Wright Field.

The new ration provides its users with 3,500 calories a day, and has an average weight of 12.5 ounces per meal. It was developed by the Quartermasters' Subsistence Research Laboratory at Chicago, and tested as the result of conferences between Capt. Paul K. Smith of the Aero Medical Research Unit at Wright Field, Dr. Ancel Keys of the University of Minnesota and Col. Rohland Isker and other officers of the Quartermasters' Subsistence Research Laboratory.

Meals are prepared in individual packages, of which the mainstay is "pemmican" biscuit containing virtually all the essentials of a balanced diet, and said by scientists to be far superior to any former type. In addition to the biscuit each meal package also contains two graham crackers, a stick of chewing gum and a number of special condensed foods in keeping with the time of day the meal is to be eaten.

Concentrated Lemonade

Special foods on the breakfast menu include a powdered soluble coffee with sugar, a supply of malted milk tablets and a small tin of veal loaf. Those on the luncheon menu include a ham loaf tin, bouillon paste in a tube and a supply of dextrose tablets. The supper package provides a pork-beef sausage, some pieces of chocolate fudge candy and tablets for making lemonade.

The experimental expedition which tested the new ration was headed by Maj. D.B. Dill. Accompanying Maj. Dill were Capt. Paul K. Smith and Lieut. T.R. Noonan, both attached to the Aero Medical Research Laboratory; four college professors and seven enlisted men from the Wright Field medical detachment.

Most of the trip was through the huge Santa Fe National Forest. Each hiker carried a 25 lb. pack, including two blankets, mess kit and three days' emergency rations. Weight losses of as much as three pounds were not uncommon for a day's march, but the loss was principally water, due to excessive perspiration in the hot New Mexican sun.

The party recorded travel of from 13 to 21 miles a day at altitudes ranging from 5,000 to 9,400 feet. Since the average pilot wears an ordinary oxford shoe, instead of a heavy marching shoe, the hikers wore oxfords and uniforms or pilots' and mechanics' coveralls.

The results of the experiment showed, according to Major Dill, that the new ration is "generally satisfactory." They also proved that it has a distinct advantage over the Army Type C field ration, which contains a beef stew which must be heated to be palatable. Although the new ration contains coffee and bouillon, which can be heated as a matter of choice, both proved very palatable when made with cold water.

The 3,500 calories a day provided by the experimental ration are about 50 per cent. more than the average sedentary person needs. For this reason, despite the hiking exercise, only one subject ate all his food each day.

The ration, as supplied to pilots, would probably be contained in their "jungle kit," a pack supplied to flyers whose duties take them over wilderness areas. It contains a machete, a knife, first aid supplies and food. Additional ration supplies would probably be carried in the plane.

The new ration is the product of many dietetic experiments, and may be changed still further on the basis of the field test.

Pvt. G. E. Hohenshilt Has a Condensed Breakfast

MR. LOVETT SAYS OUR'S ARE THE BEST

Airplanes of the Army Air Forces which participated in the recent Second and Third Army maneuvers in Louisiana constitute, from point of view of quality, "the finest air force in the world." So stated Robert A. Lovett, Assistant Secretary of War for Air, at a recent press conference in which the most important types of United States Army aircraft were discussed.

Mr. Lovett asserted that his statement was based on the best information available from the European war zone, and on reports made by Army Air Forces pilots who have had experience flying the latest foreign types of airplanes.

With respect to quantity the Assistant Secretary admitted that the United States still has a long way to go, but explained that "production is now beginning to roll, and our share of it from here on should enable us to equip combat units at the rate of about one squadron every other day." Even this rate, he said, would be increased in coming months.

In each of the main classifications of aircraft which took part in the Louisiana maneuvers, Mr. Lovett said that in maneuverability, fire-power, and performance American planes represent the last word in modern fighting equipment. The four main types of airplanes participating in the war games were dive bombers, light bombers, medium bombers and fighter planes. Although heavy bombers were not utilized in maneuvers, Mr. Lovett remarked that the United States also possesses what is considered to be the world's best in this category.

A-24 Used

Newest type of plane used in maneuvers was the A-24, a dive bomber which, according to the Assistant Secretary, is without equal. Two squadrons of this airplane, a version of the Navy SBD, were used in Louisiana. The A-24 is extremely effective against moving targets, such as motorized troops, and is used primarily in close conjunction with ground forces.

Light bombers used in the war games were of the A-20A type, which was called the "fastest bomber in the world today" by Mr. Lovett. Airplanes of this type are being supplied to the Royal Air Force in quantity under the Lease-Lend program. The British, who have named the A-20A the "Havoc," are using it not only as a light bomber, but also as a night fighter because of its speed and maneuverability.

Medium bombers participating in the Southern "exercises" were the B-25 and the B-26. Mr. Lovett described the B-25 as a medium bomber with the ability to carry a good load a long distance, and the B-26 as a medium bomber with the fastest cruising speed of any plane of its class. The B-25, which has a top speed only slightly under that of the B-26, possesses range, speed and load facilities superior to any foreign medium type bomber.

In the fighter plane class the outstanding Air Forces planes, all used in Louisiana, are the P-38, P-39 and P-40. Mr. Lovett described the P-38 as being the fastest military airplane in the world, with a speed of well over 400 miles per hour with a full military load. In addition to being the fastest, this plane is also one of the most heavily armed fighters in existence, mounting 37 mm. cannons and .50 caliber machine guns.

P-39 Fast

The P-39 was described as faster than the majority of the latest fighting planes of the world, and as having no equal as a middle-altitude fighter.

The P-40, another front-line middle-altitude fighter used extensively by the British, is being improved greatly in recent models the Assistant Secretary announced. The latest model to be delivered--which was used in maneuvers--is the P-40E. It is very maneuverable, gives fine performance at altitudes where bomber interceptions are taking place, and has higher horsepower and much greater fire-power than its predecessors. It mounts six .50 caliber machine guns and, according to Mr. Lovett, can run circles around outstanding foreign types of pursuit planes in combat.

Although not yet delivered in quantity to the Air Forces, the P-47, now in production, was described by Assistant Secretary Lovett as the fastest single-engined airplane so far developed, having done 680 miles per hour in a dive test, and over 400 miles per hour in level flight.

Answering charges made in some quarters that the A-20A, B-25 and B-26 cannot be flown at night, that it required over a mile to land them, and that it is impossible to bring them down on sod fields, Mr. Lovett stated that night flying and operating from sod fields had been part of the accelerated service test of each airplane. Further he said that the British have been using the A-20A as a night fighter, and have been taking off and landing this type repeatedly on small war-time fields at night.

A Veteran Retires

FRANK P. LAHM APPOINTED MAJOR GENERAL

One of the pioneers in Army aviation, former Brigadier General Frank P. Lahm, became a Major General last month when the nomination for his promotion, made by President Roosevelt on September 15, was confirmed by the Senate two days later. General Lahm's promotion took place two months before he will reach the statutory retirement age of 64.

General Lahm, now Air Officer for the First Army, began the career which led to his present high rank in 1901 when he was graduated from the United States Military Academy and commissioned a second lieutenant of Cavalry.

General Lahm's career has been a significant one. Since he first went to France to study aeronautics in 1905 he has been in the forefront in the making of aviation history--both civil and military.

Lighter-than-air as well as heavier-than-air flying has held the General's interest, and his name appears many times in the annals of progress in both of these fields. Not only was he the first Army airplane pilot, but also one of the first balloon pilots in military history. As far as existing records show he was, in addition, the first person in the military service of any country to make a solo flight in an airplane.

First Cross-Country

Outside of military aeronautical history General Lahm can list among his accomplishments the establishment with Orville Wright, of one of the first endurance records for aircraft, remaining in the air for one hour, 12 minutes and 40 seconds. Also with Orville Wright he completed the first cross-country flight, a ten-mile journey from Fort Myer to Alexandria, Virginia, and return.

In the field of lighter-than-air flying General Lahm's activities led to his winning an International Balloon Race (from Paris, France, to Flying Dorles, England) as far back as 1906. During the early part of this country's participation in the World War he was especially active in the lighter-than-air field, being attached to the Balloon Wing, Second Army, of the British Expeditionary Forces in France shortly after joining the A.E.F. While with this unit he participated in an attack which lasted from September 6 to October 1, 1917. He was also attached for a time to the Balloon Headquarters of the French Army at Soissons, France, and served with this group during the attack on Chemin Des Dames on October 23, 1917.

After receiving this experience with the British and French Armies, General Lahm returned to the A.E.F. to form the American Lighter-than-Air Service in November, 1917.

Major General Frank P. Lahm

Fought At St. Mihiel

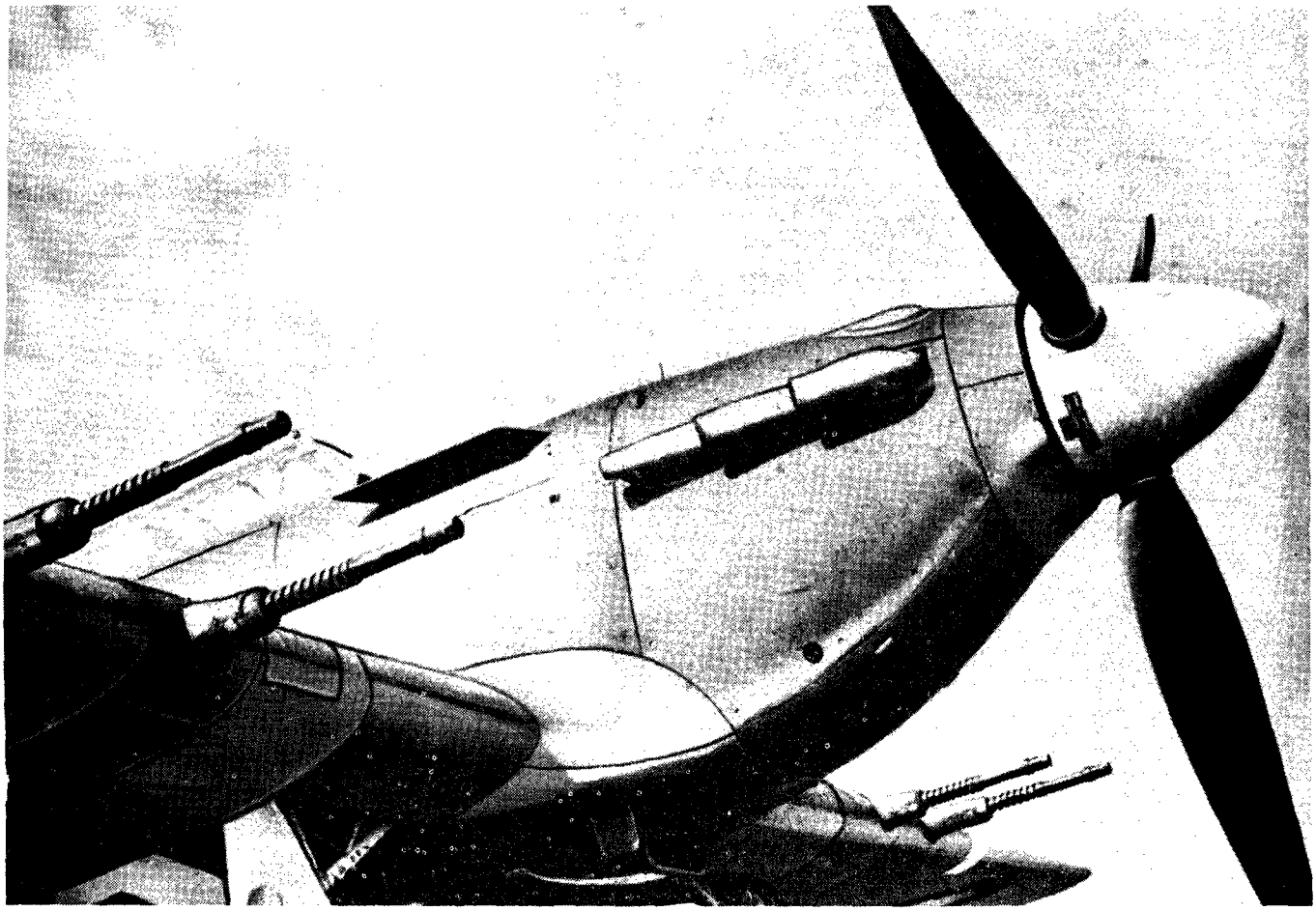
During February, 1918, his value out-grew the Balloon Service and General Lahm was made Chief of Staff of the Advance Section of the Air Service at Colombey-les-Belles, and later Air Service representative on the First Army General Staff. In this latter position he served at Toul during the period of the St. Mihiel and Meuse-Argonne Battles.

Before the war ended General Lahm had become commander of the Army Air Service, and later organized the Air Service of the Second Army. For his services during the war he was awarded the Distinguished Service Medal, the French Legion of Honor, and the Portuguese Order of Avis. At the War's end he had risen from the rank of captain to the temporary rank of colonel.

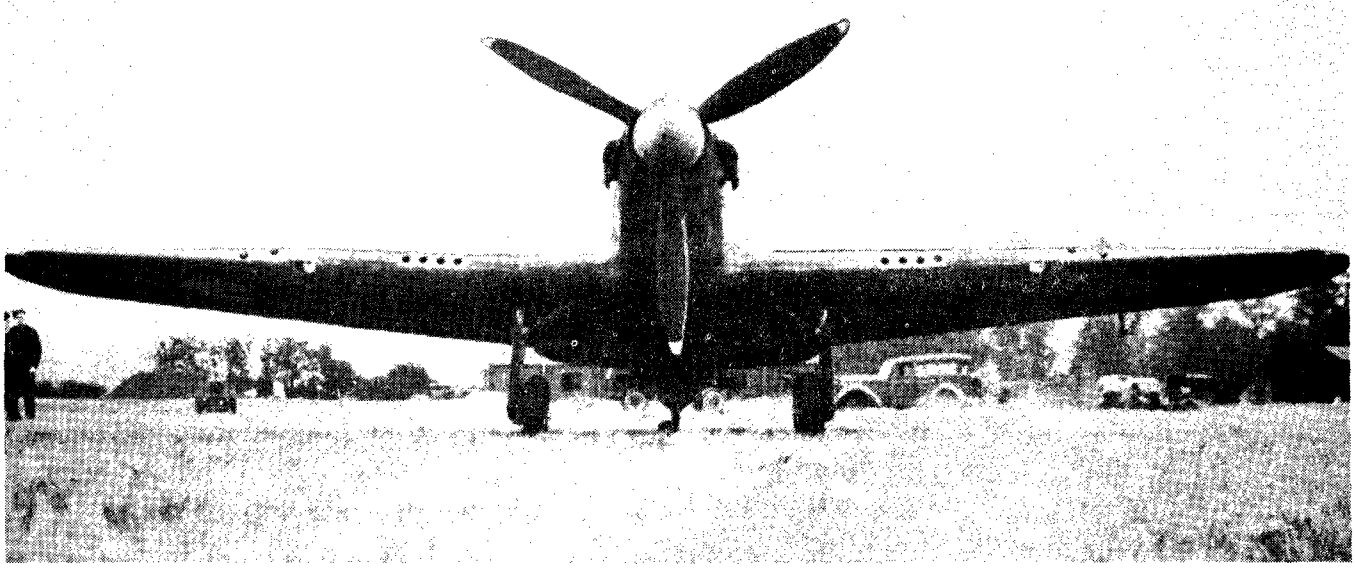
In 1919 the General returned to the United States and took a special course of instruction at the Army War College, graduating in 1920. He has been active in Army aviation ever since, serving as Air Officer of the Ninth Corps Area, Assistant to the Chief of the Air Corps, Assistant Military Attache

(Continued on Page 33, Col. 1).

NEW HURRICANE FIGHTER WITH SHARP TEETH



Here's a close-up view of the new British Merlin-powered Hurricane 11, showing its four 20 mm cannons



This one is equipped with 12 machine guns, six in each wing

New Marine Air Units

MORE FEATHERS FOR THE DUCKS

Aviation is in the process of taking an important place in the United States Marine Corps as plans for the activation of two complete Marine wings are being put into effect.

Latest steps in the chain of events designed to give the Marines a full-fledged air force have been the creation of the East Coast Wing Headquarters at Quantico, Va., and the approval of plans for the assignment of groups to the West Coast Wing at North Island, San Diego, Calif.

When present plans are put into effect the Marines will have two complete aviation wings--the East Coast and the West Coast--composed of five groups each. Two fighter groups, one scout bomber group, one bombardment group, and one utility group will constitute a wing. Utility groups will be used to transport men and materiel, and do other odd jobs for the tactical units. Each Marine group will be broken down into squadrons in much the same manner as those of the Army Air Forces.

Existing aviation combat units of the Marine Corps are assigned to Marine Aircraft Groups 11 and 21, which function under the new East Coast Wing at San Diego. At present each is composed of two fighter squadrons, two scout-bomber squadrons, commanded by Colonel Roy S. Geiger, the Group by Lt. Col. H. D. Campbell. The West Coast Wing is under Brig. Gen. R. E. Rowell; Lt. Col. L. G. Merritt commands the group.

Organization Will Grow

This present organization will grow into the planned organization of two complete wings as planes are made available by the Navy. Planes used by the Marine Corps are of Navy design, and are bought through Navy procurement machinery. Similarly, Marine pilots, gunners, and crews, although designated as Marines, are trained at naval pilot training centers.

Marine flyers, like all "Leathernecks", are trained to operate from both naval vessels and ground bases. Although their primary purpose is to function in conjunction with Marine ground forces and the Navy, the entire Marine Aircraft Group 11 participated in the Army's recent Louisiana maneuvers. They were being used in the Army's war games because of their background and experience in the technique of dive-bombing.

Unlike the Army Air Forces, Marine aviation wings will not maintain a separate organization but will function as part of a land division. According to present plans the East Coast and West Coast Wings will not be under a single head, but will be commanded separately under the control of the division to which they are attached.

MOONLIGHT AND ROSES

A one-man lonely hearts club and mail mart is in full bloom at France Field, in the Panama Canal Zone. Sergt. George Russell is it.

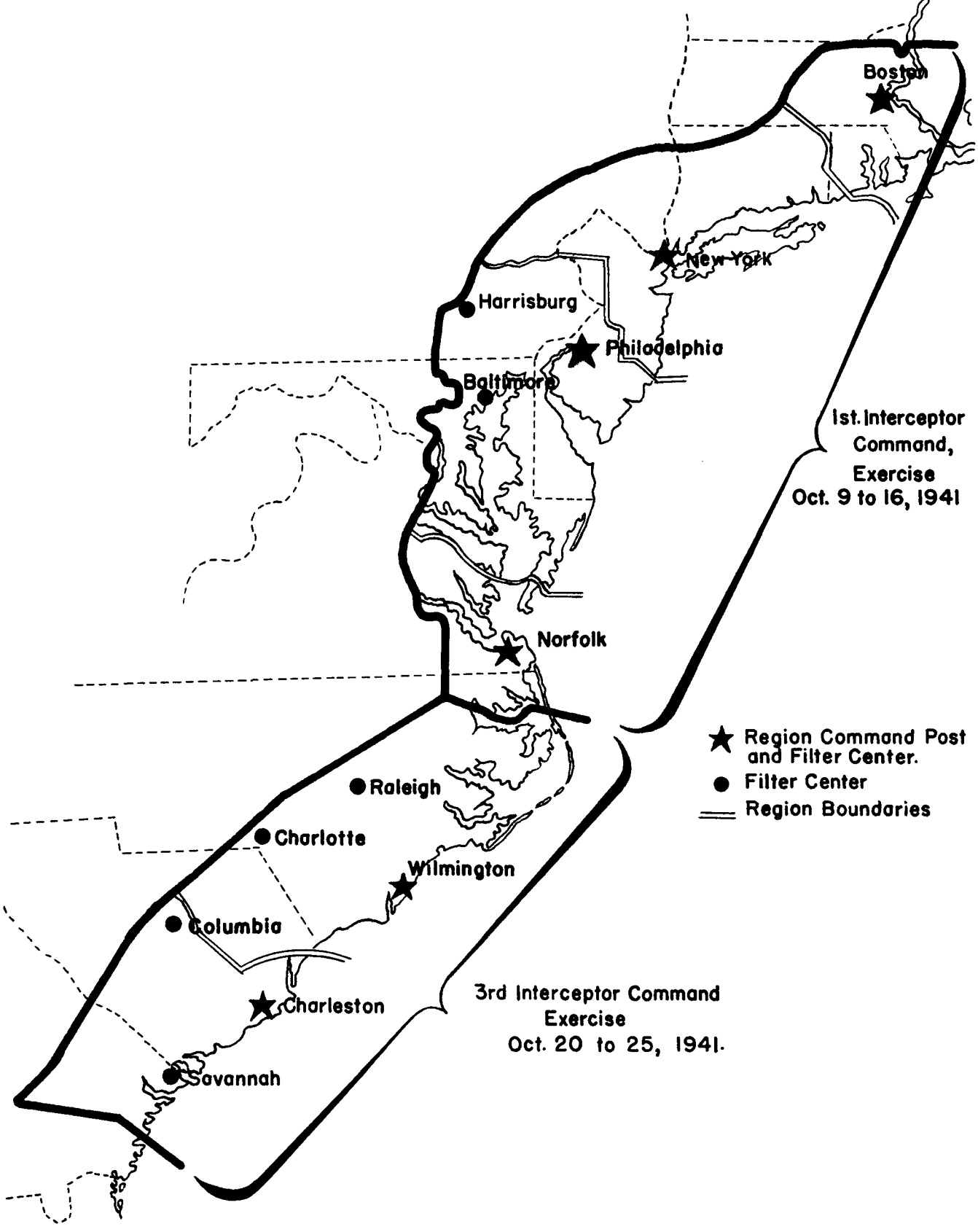
Attention was first called to Sergeant Russell last July when a puzzled postmaster investigated the soldier who received over 200 letters in two days. What the postmaster found was a once-lonely sergeant who one day sat down and wrote a letter or two to leading U.S. magazines suggesting that some of Uncle Sam's patriotic daughters might make life a whole lot easier for Uncle Sam's patriotic sons if they'd just sit down and write the boys a letter.

The result was staggering. Within a few weeks 48 letters from patriotic daughters arrived in one mail. The next day 153 arrived. Sergeant Russell, who had offered his services as a clearing house where letters could be distributed to interested soldiers, was swamped--but undaunted. He sat down, rolled up his sleeves and began the colossal task of indexing and distributing his correspondence.

California Leads The Way

The index has grown to astounding proportions. Each card shows a young lady's name and address, the type of correspondent she is interested in, her occupation, and her special interests. There are college students, clerks, stenographers, models, and almost every other type of occupation imaginable. The file contains letters from every state in the union, as well as from Canada, Alaska, Cuba, Hawaii, and the Canal Zone. Largest representation is from California, with New York close behind.

The response among France Field's soldiers is enthusiastic. Not a letter has gone unanswered, and outgoing mail from the field is keeping pace with Sergeant Russell's incoming batch, which is threatening to pass the 2000 per week mark.


Boston
New York
Harrisburg
Philadelphia
Baltimore
Norfolk
Raleigh
Charlotte
Wilmington
Columbia
Charleston
Savannah
1st. Interceptor Command, Exercise Oct. 9 to 16, 1941
3rd Interceptor Command Exercise Oct. 20 to 25, 1941.
Region Command Post and Filter Center.
Filter Center
Region Boundaries

Wholesale Mess Hall

Feeding Them by the Squadrons

By Lowell Limpus

A novel "mess regiment," which can toss a first-class meal into 18,000 men in less than an hour; that's Chanute Field's most notable contribution to the setup of our recently reorganized air force. And it has the oldtimers, as well as the Washington brasshats, watching the performance in goggle-eyed astonishment.

Nobody ever saw anything quite like it, as glowing letters from inspector generals attest. It's a brand new idea, and now the spectators are beginning to wonder if they can't put the whole outfit on wheels and take it into the field with an infantry division. For a "mess regiment," a big cooking organization composed of specialists, operating in this fashion, is something new under the military sun.

Out here, the commander of the regiment simply tosses a fully equipped mess battalion, complete with officers, noncoms, cooks and bakers, into one of three gigantic mess halls, and feeds endless cafeteria lines of men the tastiest food that this writer ever saw come out of an Army kitchen.

Only, being in the Air Corps, they call the outfit a "mess group" instead of regiment, and the battalions are designated "mess squadrons" to conform to the nomenclature of the flying units. But it's a regimental organization, just the same.

The man responsible for the innovation is Major Edgar T. Noyes, a two-fisted flying fighter, who has just been relieved as mess officer, in compliance with a War Department order that sends combat pilots back to airplanes. Succeeding Major Noyes in command of the group is Capt. Paul W. Summers, who acted as his superior's first assistant in building up the organization. And keeping an approving eye on the outfit is Col. R. E. O'Neill, commandant of the great technical school, which is turning out airplane mechanics and technicians in a slowly increasing torrent.

Gets Official Blessing

Washington placed its official blessing on the scheme, with a series of enthusiastic commendations of Major Noyes' work, when it sent him on to take command of an air base group located here, while the idea is already being adopted at the new technical schools that are just coming into existence at Biloxi, Miss., and Wichita Falls, Tex. Brig. Gen. Muir S. Fairchild, acting chief of the Air Corps, sent along a warm approval of the report of the inspector general on Noyes' achievement and a whole flock of other superiors added a chorus of praise in the form of indorsements to the official record. (The major, he noted, seems more than a trifle nonplussed by his sudden appearance in the spotlight--and this is perfectly natural, since nobody ever heard of a mess officer drawing tributes before.)

The Chanute Field mess group, whose mess officer is a member of the commanding officer's staff, consists of an administrative section, a supply section, a messing section and the three mess squadrons. Each squadron contains its own administrative and supply subsections as well as a messing division, divided into a food preparation, a dining hall and a refuse and garbage unit. And they handle food in assembly-line fashion.

The outfit normally numbers 1,020 men, of whom 600 are permanent members of the unit and 420 are KP's, furnished by various companies of enlisted men enrolled in the school. At present the basic cadre is down to 425 specialists, due to the fact that it had to furnish the nucleus of the mess

INTERCEPTOR EXERCISES MAP

Exercises of the First Interceptor Command got underway the second week of October in an area ranging roughly from Massachusetts to North Carolina, while the Third Interceptor Command was scheduled to take to the field toward the end of the month. The latter is functioning in the area from North Carolina to Georgia.

Each of the commands has divided the area to be organized for air defense into regions, as shown on the accompanying map. In each region an Information Center with Region Command Post has been or will be established, and Filter Centers---which make a preliminary collection of the reports---are located at each Regional Information Center and at other strategic points.

The exercises are, as pointed out by Lieut. Gen. Delos C. Emmons, commander of the Air Force Combat Command, actual tests of a permanent system of active air defense which is being worked out for the United States as rapidly as possible. Communication nets for the civilian observers are being set up and other details are being arranged. Planes operating in the first exercise alone were expected to fly more than 1,000,000 air miles during the eight-day program.

units sent to Biloxi and Wichita Falls. But it's still hitting on all six cylinders and handling amazing quantities of food in a fashion which dumfounds military men. The organization is so flexible that it can and does vary its service by as much as 4,000 to 5,000 men in the course of a single day, without batting an eyelash. (This is something in a school such as this, where classes numbering thousands are continually entering and being graduated.)

Food is handled in wholesale quantities with big business efficiency, the whole thing being controlled by an elaborate but efficient set of books, records and running inventories, which stir up a whale of a row if a cook bakes himself a private pie or a KP snitches an apple. The Government pays 47½ cents a day for each soldier's food and the mess authorities deal with colossal sums, sometimes spending as much as $5,000 a day more than their income and making up for it during the week by quantity discounts.

Holiday Dinner Already Planned

They plan their schedules weeks in advance and the resulting meals stir the imagination. Next Thanksgiving's dinner menu is already coming down the line and Chanute Field privates may look forward to a feast. The mess group now has listed for that occasion shrimp cocktail, oyster stew, roast turkey, roast chicken, roast ham, cranberry sauce, giblet gravy, potatoes, peas, and corn, lettuce and tomato salad, cake, ice cream, lemonade, coffee, tea, after-dinner mints, assorted nuts, candy, oranges, apples, bananas, grapes, cigars and cigarettes. The powers-that-be say they hope they can afford to add a few "extra fixin's" between now and then.

Major Noyes worked for two years building his organization and the flexible system of controls, which is too complicated for description here. He planned the physical setup of the three big new mess halls and fought until he obtained them from a reluctant quartermaster department. Each is organized in sections, with food flowing from delivery wagons to store rooms, through the great kitchens with their batteries of electric stoves into the long preheated service stands, where the soldiers are served on aluminum trays. They circle back to waiting, condiment-equipped tables, surrounding huge coffee urns, and then pass out by way of the electric dishwashing machines.

Noyes planned it all out himself and solved innumerable problems in the process. He flew a bomber to Langley Field, Va., to snatch worthless aluminum from a salvage heap and made the big serving pans from which his cafeteria lines are fed. For weeks he slept in the mess hall, checking cooking routines and soldier food preferences. Securing data from the Surgeon General, he went in for balanced diets and learned to measure vitamins with a practiced hand. Part of his reward was contained in the recent widely publicized letter which a local soldier wrote President Roosevelt saying: "The system we have here for mess can't be beat in any other Army camp. It's a system that everybody likes. The food is better than I ate at home."

Major Noyes can't quite say that, though. He encountered his only major defeat when he tried to show Mrs. Noyes just how rolls should be baked. The major proved totally unable to reduce the proportions required for an 18,000-man recipe down to five-person family size, and the resulting odor of mixed spices drove them out of the house. Since that episode he lets his own kitchen severely alone.

N. Y. Daily News

NAVIGATOR TRAINING BROADENED

A recent increase in the annual training rate of aerial navigators to 5,250 has opened up a large number of vacancies in new navigator-training classes now being formed. The first class under the new program was organized on October 4--others will follow at three-week intervals.

Navigators receiving training are classed as aviation cadets, and must meet the same general requirements for appointment as do cadets taking flying training. Physical requirements, however, are slightly less rigid in that visual acuity of 20/40 in each eye correctible to 20/20 in both eyes is acceptable.

Other requirements provide that applicants must be unmarried, citizens of the United States, between the ages of 20 to 26 inclusive, and of good character, sound physique and excellent health. While undergoing training, navigator cadets receive $75 per month and a one dollar per day ration allowance, the same as pilot cadets.

The navigator training course lasts 30 weeks, 15 being spent at a navigation school, 10 at a reconnaissance school and five at a gunnery school. Air Corps navigation schools are located at Kelly Field, Texas; Mather Field, California and Albany, Georgia. There is also a civilian school operated under contract by Pan-American Airways at Miami, Florida. Upon the successful completion of the 30-week course cadets are commissioned second lieutenants in the Air Corps Reserve and receive flight pay. They are rated as "Aircraft Observers."

In accepting applications, graduates of accredited colleges and universities who have received a degree in engineering are taken first. Next come graduates of accredited colleges who have had, as a minimum, courses in plane geometry, college algebra and trigonometry. Preference is given to those whose mathematical work has also included analytical geometry and spherical trigonometry. A third priority is given to those applicants who have not graduated, but who have completed two years of accredited college work, and who have had the mathematics courses outlined above.

The Bristol Light Bomber

Night Fighter for the Royal Air Force

The Bristol Beaufighter, latest product of the famous Bristol concern, follows closely in general design and construction its forerunners, the Beaufort and Blenheim. In night fighting it has proved itself very successful. As a day fighter its most spectacular engagement was the recent low-flying attack on Catania aerodrome, in Sicily, when no fewer than 34 Macchi-200 monoplane fighters were destroyed without loss to ourselves.

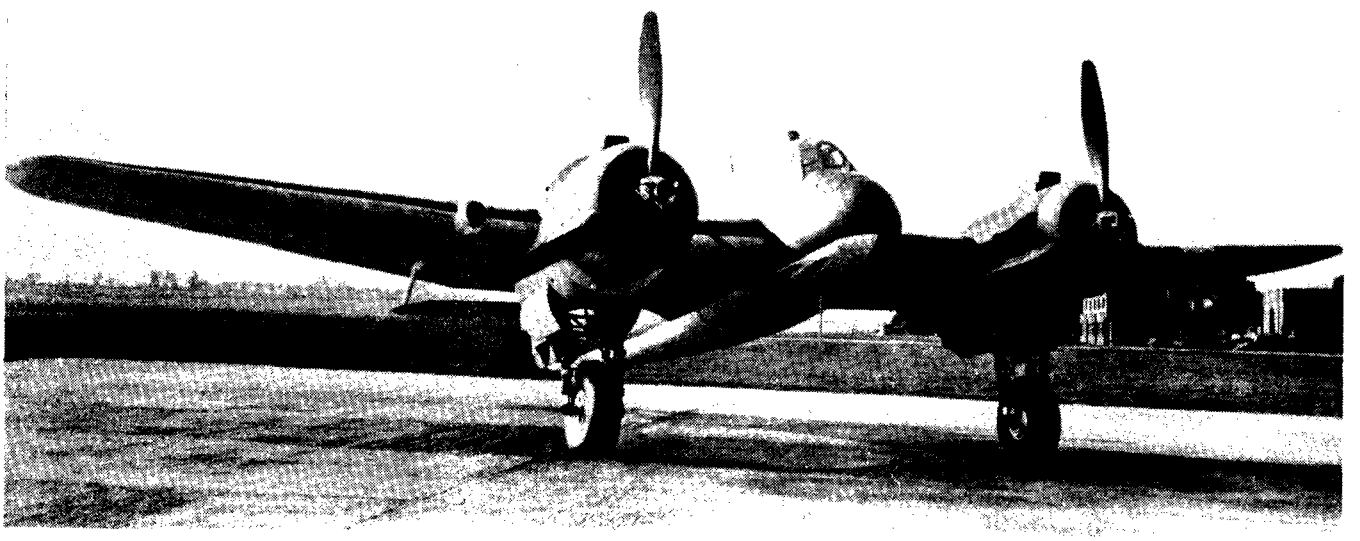
The Beaufighter is built to an ultra-modern specification for a twin-engined fighter. It is a high-performance midwing monoplane, all-metal with the exception of some of the control surfaces, powered by Bristol Hercules sleeve-valve engines. Classed as a day-and-night fighter, its outstanding features are speed, long range and hitting power. A crew of two is carried.

The principal dimensions and performance figures are: Span, 57 ft. 10 in.; length, 41 ft. 4 in.; height to top of rudder in rigging position, 15 ft. 10 in.; wing area, 451 sq. fet.; gross area, 503 sq. ft. All-up weight is 21,000 lb., of which no less than 34 per cent., or 7,200 lb., represents disposable load. Nominal top speed, at 14,000 ft., is over 330 m.p.h., and range, at an economical cruising speed of 200 m.p.h., is 1,500 miles. The sea-level rate of climb is 1,850 ft. per min., and at 15,000 ft. this drops by only 400 ft. per min. to 1,450 ft. per min. Service ceiling is 28,900 ft.

The armament is very heavy. Four 20 mm. shell-guns are carried in the floor of the fuselage and six machine-guns of rifle calibre are remotely controlled in the wings. Provision for a power-operated turret amidships is also made. The main fixed forward-firing armament is operated by the pilot, but the second member of the crew is responsible for reloading the shell-guns.

All three wheels of the landing gear are retractable, and all are hydraulically operated. The main wheels retract backward into the engine nacelles and are completely enclosed. The tail wheel comes forward into a recess in the underside of the fuselage. Electrical indicators in the pilot's cockpit show the position of all three units and, as a safeguard, there is the usual buzzer which operates if the engine is throttled down beyond a certain point while the undercarriage is still retracted.

The main landing legs are very robust, and the need for this is obvious when it is remembered that the wing loading is in the region of 46 lb./sq. ft. and the landing speed correspondingly high. Oleo-pneumatic shock absorbers are fitted, together with Dunlop pneumatically operated brakes. Automatic safety locks operate to prevent retraction while the machine is on the ground. Hand-operated landing pins are also provided for attachment from the ground. These are fitted with red flags which are visible to the pilot and must be removed before



The New Bristol Beaufighter

take-off.

As would be expected in a machine the main duty of which is night fighting, great care has been taken to get the controls nicely coordinated, accurate in operation and sweet to the touch. Pilots all speak very highly of the Beaufighter's controls. In layout they are normal. Ailerons and elevators are operated through the usual chains and cables by a pair of "spectacles" mounted on the top of the joy-stick. Gun-firing trigger and brake-operating valve lever are also mounted on the "spectacles" and come nicely to the thumbs. The brake lever also has a spring-loaded catch fitted to lock the brakes for parking. Pendulum rudder pedals, adjustable for leg reach, operate in parallel motion. All flying controls can be locked while the aircraft is parked.

Controllable trimming tabs are set in the trailing edges of the rudder, elevators and starboard aileron. The port aileron also has a tab but this can only be adjusted while the aircraft is on the ground. These trimming tabs are all operated by handles in the cockpit, and indicators are provided to show the position of the tab in relation to neutral. The pilot's seat is adjustable for height.

Entry and exit for the pilot and observer are by two specially designed hatches in the underside of the fuselage. That for the pilot is between the centre section spars, and the other is farther to the rear. These hatches are pivoted panels normally forming part of the underside of the fuselage. For use they swing to the vertical position, and use is made of a ladder attached to them. They are opened by a lever from the inside. Hand grips are also provided for convenience.

Bail-Outs At 400 M.P.H.

These hatches are also intended for emergency exit by parachute. By a quick-release each door opens so that part of the door protrudes outwards into the air stream beneath the body. This creates a dead-air region through which the crew can drop free without risk of injury, even in a dive up to 400 m.p.h. Steel cables support the air loads on the floor hatches when used in flight. Additional emergency exits are provided, consisting of a knock-out panel on the starboard side of the pilot, a hinged window above the pilot and a hinged hood above the observer.

An emergency electrical signaling system between the pilot and observer is also fitted, for use only if the need should arise to abandon aircraft. A push-button, operated by the pilot, warns the observer to prepare to abandon aircraft; and when the warning light on the instrument panel informs the pilot that the observer is ready, a separate switch is depressed to signal the observer to bail out.

For the crew's comfort a cabin-heating system is fitted, controlled by a lever on the port side, aft of the pilot. This operates a rotating louvre which admits hot air to the cockpit from the engine. Operational equipment stowed inboard is exceptionally complete, consisting as it does of navigation, identification and formation-keeping lights; landing flares; auto-recognition equipment; signal pistol; oxygen apparatus; cine-camera unit mounting; stowage for computors; map cases; fire extinguishers; first-aid outfit, and axe. Emergency rations are stowed in the rear fuselage, at the base of the observer's seat. Flying rations and water bottles are also carried. Other equipment provided includes the heating system, airscrew de-icing, oxygen apparatus and Lorenz beam-approach equipment. Provision is also made for carrying a four-gallon water tank for desert use.

Sleeve Valve Radial Engines

Turning now to the power plants, the two Bristol Hercules III's are mounted on the outer ends of the main plane centre section. As is well known, they are air-cooled radial engines with sleeve valves. The 14 cylinders are arranged in two rows of seven each, the cylinders of the rear row being opposite the gaps in the front row. Two-speed blowers and constant-speed airscrews are fitted. Each power unit is enclosed by a long-chord cowling of which the exhaust collector forms the leading edge. Controllable gills at the circumference of the trailing edge govern the air flow for cooling purposes. The swept volume of the engine is 2,360 cub. in. (38.7 litres) and the overall diameter 52 in. For take-off 1,400 h.p. is available, and 1,365-1,425 b.h.p. at 1,500 ft. At 15,000 ft. the power is 1,220-1,270 b.h.p. Electric starters and handturning gear are provided.

Fuel is carried in four separate self-sealing tanks with a total capacity of 550 gallons. Two tanks in the wing centre section each hold 188 gallons, and two smaller tanks--one in each outer plane--contain 87 gallons per tank. Separate oil tanks of 18 gallons capacity for each engine are mounted in the centre section. Ducts in the leading edge provide cooling air for the oil radiators. The fuel supply from the four main tanks is maintained by engine-driven pumps. For normal-range flights the four fuel tanks are filled and the outer tanks used first. When the outer tanks are empty, the inner tanks are turned on. This automatically turns off the outer tanks. The chief object of this arrangement is to get rid of the weight of fuel from the outboard section of the wing during the outward flight. Heavy weights so far out from the centre of gravity have an adverse effect on the maneuverability so necessary in an air battle.

A 24-volt, 500-watt generator on the starboard engine supplies the current necessary for the usual cockpit lighting, landing lamps, engine starting,

(Continued on Page 34, Col. 1)

THE MONTH IN REVIEW

by FALK HARMEL

Contracts For Airplanes

Within recent weeks the War Department, with the approval of the Office of Production Management, awarded contracts for airplanes and engines, together with spare parts therefor, in the aggregate sum of $859,584,140.61. Nine airplane manufacturers were awarded contracts totalling $817,108,757.14, as follows: Boeing Aircraft Co., Seattle, Wash., $337,447,957.86; Douglas Aircraft Co., Santa Burbank, Calif., $147,790,500.00; Bell Aircraft Corp., Buffalo, N.Y., $75,218,384.40; Northrop Aircraft, Inc., Hawthorne, Calif., $18,411,812.20; Vultee Aircraft, Inc., Downey, Calif., $14,518,707.60; Beech Aircraft Corp., Wichita, Kans., $12,610,125.00; Cessna Aircraft Co., Wichita, Kans., $12,043,865.47, and North American Aviation, Inc., Dallas, Texas, $6,980,612.76

Figuring in the award of contracts totalling the sum of $42,475,383.47 for aircraft engines and spare parts were seven aircraft engine manufacturers, the largest award ($19,268,820.36) going to the Wright Aeronautical Corp., Paterson, N.J.

New Construction Projects

A step in the direction of establishing a new Air Corps repair depot was made with the selection of a site, embracing 2,400 acres, near Galena, Wash., seven miles west of Spokane. This depot will be under the control of the Maintenance Command and will serve Air Force units in the Northwest.

The construction of additional facilities was authorized for the Twin-Engine Flying School at Midland, the Advanced Flying School at Victoria, both in Texas, and the Twin-Engine Flying School at Lemoore, Calif. Mission, Texas, will be the site of a single-engine advanced school, the contract for the necessary construction work thereat totalling $4,090,617.40. The school at Midland, which will accommodate approximately 3,700 men, is expected to be completed by December 1, next.

Basic instead of advanced flying training will be given at the school at Lemoore, and the additional construction work is designed to take care of 630 aviation cadets.

A contract was awarded for the construction of Tullahoma Air Field at Camp Forrest, Tenn., for the use of the 128th Observation Squadron, and a weather station was authorized for the Army Air Forces at Pine Camp, N. Y. For the training of the personnel at the Army Air Base at Bangor, Me., a tract of land, embracing some 6,582 acres, was secured for use as a bombing range, also for flexible gunnery ground training, smoke dispersion training and the firing of fixed guns on airplanes.

Training

Sixteen army pilots from eight Latin-American countries began a refresher course at the Basic Flying School at Randolph Field, Texas.

A new phase of military aviation training was launched on September 6th with the opening at Maxwell Field, Ala., of the first Air Corps Replacement Center, where aviation cadets are to be processed and taught the fundamentals of soldiering before entering flying schools.

The Replacement Center at the headquarters of the Southeast Air Corps Training Center, Maxwell Field, is the first of three such centers projected in the United States. A similar project is planned for the Gulf Coast Air Corps Training Center at Randolph Field, Texas, and at the West Coast Air Corps Training Center at Moffett Field, Calif.

The new innovation is designed to familiarize aviation cadets with the many aspects of soldiering before they are subjected to the flying course, in order to relieve them of the task of trying to assimilate too many things at once. Past experience, officers stated, had proven that a program which "threw too many things at the cadet at once" caused an abnormal physical strain which caused a large percentage of rookies to "wash out."

This processing phase is in addition to the routine course which gives the cadet ten weeks of training each in elementary, basic and advanced flying.

National Guard Squadrons

Five National Guard Observation squadrons were inducted into the Federal service from September 1 to October 1, under authority granted by an Executive Order issued May 17, 1941.

The five squadrons are the 121st of the District of Columbia, the 122nd of Louisiana, the 123rd of Oregon, the 124th of Iowa and the 128th of Georgia. Induction of these five squadrons leaves two of those included in the Executive Order, above mentioned, still to be called up, namely, the 125th of Oklahoma and the 127th of Kansas.

New Organizations Created

The past month marked the organization of a considerable number of new organizations to augment

the rapidly expanding strength of the Army Air Forces. Sixteen new units were formed on September 1, and placed on the active list. All of these units are Headquarters and Headquarters Squadrons, five of them pertaining to the First to the Fifth Support Commands, inclusive, and the remaining eleven to the Twenty-sixth, Fifty-ninth, and the Sixty-fifth to the Seventy-third, inclusive, Observation Groups. At the same time, the Headquarters and Headquarters Squadrons of the Seventh Pursuit Wing, the Fifteenth, Sixteenth, Seventeenth and Twentieth Bombardment Wings were placed on the inactive list.

Twenty-eight new units were formed at nine Air Corps stations, 26 being school squadrons and the remaining two materiel squadrons (special). Five more school squadrons, the 555th to 559th, inclusive, were called into active service on September 1 at the Advanced Flying School at Albany, Ga.

A number of new units of other branches of the Army were constituted by the War Department for duty at Air Corps stations, these including 20 Ordnance companies and detachments to work with the Army Air Forces; five Ordnance Service Companies to be stationed at Chanute, Maxwell, Randolph, Moffett and Wright Fields, respectively; nine Signal Service Companies, one each to be stationed at the five fields just mentioned and the remaining four to be allotted to the First, Second, Third and Fourth Air Forces, respectively; and 22 detachments of Signal Service Companies to work with Army Air Corps schools.

Changes Of Station

Constituted August 30, 1941, at Westover Field, Mass., the Ninety-fourth Air Base Group, comprising the Hqrs. and Hqrs. Squadron and the 311th Materiel Squadron, will be moved in the near future to Presque Isle, Maine, where the Group will be utilized for the Ferrying Service Command.

Nine Air Corps units were designated for transfer from the Basic Flying School at Cochran Field, Macon, Ga., to the Basic Flying School at Shaw Field, Sumter, S.C.

Tulsa, Oklahoma, is the new station of the Hqrs. and Hqrs. Squadron, Air Corps Technical Training Command, formerly stationed At Chanute Field, Rantoul, Ill.

War Department orders were recently issued for the transfer of 26 Air Corps and Air Forces units to other stations, included among which were 20 school squadrons - units which play a vital part in the training program of the vastly expanding personnel of this branch of the service.

The 57th Pursuit Group (Interceptor) was transferred from Mitchel Field, N.Y., to Windsor Locks, Conn., and three air base groups, the 50th from Maxwell Field, Ala., and the 69th and 70th from Chanute Field, Ill., were transferred to Baton Rouge, La.; Biloxi, Miss., and Wichita Falls, Tex., respectively. Also transferred to Biloxi were the 310th School Squadron from Chanute Field, and the Hqrs. and Hqrs. Squadron and the 301st to the 309th School Squadrons, inclusive, from Scott Field, Ill.

To Wichita Falls, Texas, were transferred the Hqrs. and Hqrs. Squadrons and the 311th to the 319th School Squadrons, inclusive, from Lowry Field, Colo.

Between October 1 and December 1, 1941, 42 Air Corps units, of which four are stationed at Las Vegas, Nevada, and the remainder at various Air Corps fields in California (Mather, Moffett, Stockton, Gardner and Bakersfield), are to be transferred, as facilities became available, to new permanent stations. Thirteen units are slated for station at Victorville, two at Santa Ana, seven at Merced, ten at Lemoore, all in California, and ten at Higley, Ariz.

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Several months ago, air-minded college students, anxious to join Uncle Sam's rapidly expanding air force but desirous of receiving their training as a unit identified with their college, formed such units at the close of the 1941 spring term and received their primary flying training at various civilian elementary flying schools. Two units were organized at Texas A. & M. College and one each at the Virginia Military Institute, Washington and Lee, Baylor and Pittsburgh Universities. These students completed their 10 weeks' primary training on September 23 and were transferred to basic flying schools. The men from Baylor and Washington and Lee resumed their training at San Angelo, Texas, and those from the three other institutions at the "West Point of the Air" - Randolph Field, Texas.

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The Mississippi Institute of Aeronautics at Jackson, Miss., one of the civilian elementary flying schools under the Southeast Air Corps Training Center, completed its first year of operation without a serious accident and with no injury to pilot or ground crew personnel. In the seven classes which have been graduated from this school up to September 12, 1941, 275 of the total enrollment of 514 Aviation Cadets were transferred to basic flying schools, or 54%.

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The Air Corps Board, which has functioned at Maxwell Field, Ala., for a good many years, was recently moved to Eglin Field, Valparaiso, Fla.

This board, the only one of its kind in the Army Air Forces, was created for the purpose of acting on such tactical and technical problems as may be

(Continued on Page 34, Col. 2)

SELF PROTECTION FOR AIR FORCES PERSONNEL

By Major Waddell F. Smith

THE Service Extension Act of 1941 was signed by the President and became a law August 18. This law gave the President authority to extend the periods of service of all military classes for periods not to exceed 18 months.

Section 3 of the act authorizes certain military classes whose periods of service are extended by the President, and who failed to apply for National Service Life Insurance or the full amount of insurance within 120 days of date of original induction into service, to apply for now and obtain the insurance without physical examination. The Act allows 120 days from signing or until December 16, 1941 within which time application must be made.

By this authority those who failed to apply originally for National Service Life Insurance or for the full $10,000 may now make application, provided their periods of service are extended.

Order Not All-Inclusive

The President on August 21, 1941 issued an executive order. The executive order did not extend the periods of service of all military classes, therefore, only the military classes whose service was extended by the order are authorized now to apply for National Service Life Insurance.

This article is presented to inform all military classes of their rights to insurance and not as an interpretation of the law affecting their periods of military service.

Some military classes are not entitled to apply for National Service Life Insurance in the current 120 day period from August 18 to December 16, 1941, therefore, it is vitally important that all individuals concerned be certain of their exact military duty status.

Each military class will be taken up separately and their rights to apply for National Service Life Insurance during the current period set out.

Regular Army

OFFICERS. No provision was made for regular officers in the United States Army inasmuch as it was not necessary by law to extend the periods of service of regular officers.

ENLISTED MEN. No provision was made for enlisted men in the regular army. The additional opportunity to apply for insurance within 120 days of August 18 was intended to be extended only to the emergency forces. Enlisted men in the regular army, however, are entitled to apply for National Service Life Insurance within 120 days of reenlistment without examination. If the current enlistment should be continued or extended, then application may be made within 120 days of such continuance or extension but subject to physical examination.

AVIATION CADETS and AVIATION STUDENTS. Special legislation enacted June 3, 1941 provided that all aviation cadets and aviation students shall be issued $10,000.00 or National Service Life Insurance, the premiums thereon being paid by the Government for the cadets and students. All classes of aviation cadets, assigned to pilot training, or as bombardiers or navigators, or to photography, engineering, armament, meteorology, or communications are included and the premiums therefor paid by the Government during training. Aviation cadets and aviation students are entitled either upon graduation or discharge from such status to continue their insurance by paying the premiums themselves.

Due to the foregoing, aviation cadets and aviation students are in no way concerned with the present period in which certain military classes may apply for insurance.

All aviation cadets and aviation students should familiarize themselves with War Department Circular no. 132, July 8, 1941, which may be found in any headquarters.

Reserve Officers On Extended Active Duty

AIR CORPS RESERVE OFFICERS. All such officers now on duty should examine their orders. If they were originally ordered to active duty under authority of Public No. 18, 76th Congress, passed April 3, 1939, and extension of active duty if any, authorized under the same Act, then such officers are not entitled to apply for National Service Life Insurance during the 120 day period from August 18, 1941. The periods of service of Air Corps Reserve Officers on duty under authority of Public No. 18 may be extended by authority of that law for periods up to a total of seven years.

As there was no necessity, the executive order of the President, which extended the periods of military service of various classes, as authorized by the Service Extension Act of 1941, did not extend the periods of service of such Air Corps Reserve officers. Inasmuch as the executive order did not make such extensions, therefore the current 120 day period for making application for insurance does not apply to such reserve officers.

It must be remembered, however, that the already

existing law entitles any reserve officer to a new 120 day period within which to apply for National Service Life Insurance, said period commencing as of the date on which reordered to active duty or the present tour is continued or extended. Upon being reordered with an intervening separation from service, application for the insurance is not subject to physical examination. If the present tour of duty is continued or extended, then a satisfactory physical examination must accompany the examination.

RESERVE OFFICERS, GENERAL. The reserve officers of all arms, branches, and services that are now on duty, excluding all but a limited number of Air Corps Reserve officers and a limited number of reserve officers of other branches, have been ordered to active duty under authority of Public No. 96, 76th Congress, passed August 27, 1940. The insurance provision in the Service Extension Act of 1941 extends to all such officers on active duty a new opportunity to apply for National Service Life Insurance within 120 days of August 18, 1941, subject to the following limitation. Only such reserve officers may apply whose current period of active duty expires within said 120 days and whose active duty is continued or extended within said 120-day period. Applications also must be made within the 120 day period.

National Guard In Federal Service
Selective Service Enrollees Now In Service
Regular Army Reserve
Enlisted Reserve Corps In Federal Service

The periods of service of all of the above military classes were extended by executive order by virtue of authority granted to the President in the Service Extension Act of 1941.

Although provision is made in the executive order for blanket extension of all of the above classes of military personnel, the executive order authorizes the Secretary of War to release from active service such persons or units as may be released without impairment to the interests of national defense, the releases to be effected upon completion of the original twelve months of training and service.

The Service Extension Act (approved August 18, 1941) granted to all military classes whose periods of service, training, active duty, etc. were extended under authority of the aforementioned law, a new opportunity to apply for and obtain National Service Life Insurance. Therefore, the National Guard, Selective Service, Regular Army Reserve and Enlisted Reserve Corps all are eligible to apply within 120 days of August 18, 1941, and no physical examination is necessary.

Individuals who may have previously applied for less than $10,000.00 insurance may in this present 120 day period apply for any additional amount, provided the total amount held will not exceed $10,000.00.

The four above mentioned classes of military personnel are entitled to apply for insurance under this provision even though their periods of service may not actually be extended at the completion of the current year of training or service. It is necessary, however, that application be made while still in active service and on or before December 16, 1941, the end of the 120-day period.

In addition to the privilege of applying within 120 days of August 18, 1941 without physical examination, all personnel of the four above mentioned classes whose periods of service, training, or active duty are extended upon completion of present period of service, training, or active duty, are entitled to apply for National Service Life Insurance within 120 days of such extension, but subject to satisfactory physical evidence of insurability. Also any individuals in these four classes, who may be mustered out of service or relieved from active duty and who may subsequently be ordered back into active service, are entitled to a new 120 day period within which time application may be made for National Service Life Insurance. The 120 days period begins on the date of reentry into the service and no physical examination is required.

Retired Officers And Enlisted Men

RETIRED OFFICERS. Inasmuch as retired officers who have been ordered back into the service are not ordered for any limited period of service, it was not necessary to extend their periods of military service, therefore, they are not eligible to apply for National Service Life Insurance in the 120 day period to December 16. All such officers are, however, eligible to apply for National Service Life Insurance without examination within 120 days of date on which originally ordered back into service.

RETIRED ENLISTED MEN. The Service Extension Act authorized the President to extend the periods of service of retired enlisted men who are ordered back into active service. The President did by executive order extend such periods of service, therefore, retired enlisted men now in active service are entitled to apply for National Service Life Insurance without examination during the 120 day period commencing August 18, 1941 and expiring December 16, 1941.

One Year Enlistments
(Army Of The United States)

The President's executive order did not extend or continue the periods of service of the above one-year enlistments. As these classes of military service were not extended, no additional opportunity to apply for National Service Life Insurance is applicable.

General Remarks

War Department Circular No. 192, issued September 16, 1941, which may be found in any headquarters, furnishes information as to the rights of military personnel to this new 120-day period for obtaining insurance. It also sets out instructions for mak-

ing the application. It is highly important that the application be completed in accordance with the instructions in the circular.

Any individuals who may be in doubt about their military status and rights to apply for National Service Life Insurance should make application before December 16, being careful to comply fully with all instructions contained in War Department Circular No. 192. Those applicants then determined to be ineligible by the Veterans Administration will be declined.

The value of National Service Life Insurance and the importance of its being applied for by all military classes cannot be stressed too much. No charge is made against the premium deposits of the insured to cover administration cost. The entire expense of administration and overhead of National Service Life Insurance is paid out of general appropriations for the Veterans Administration. Whenever a death claim is paid and the cause of death is attributable to the extra hazards of the service either in line of peace or war, the claim is paid out of a separate appropriated fund and no such claims are paid out of the premiums deposited by the insured.

Pay your premiums by deduction monthly from your pay. (War Department A.G.O. Form No. 29 3). Although it is permissible to pay premiums monthly, quarterly, semi-annually, or annually by check or money order, deduction from pay is surest. When once the deduction from pay is properly commenced then the insurance is sure to be kept in force. Many situations may arise in times of emergency which may separate a man from contact with his personal business affairs, causing temporary inattention to premiums falling due. The insurance, therefore, might lapse when it is needed the most unless premiums are deducted from pay.

All present holders of National Service Life Insurance should give thought to converting their insurance. Conversion is permitted any time after one year and before expiration of the 5 year term. Rates and descriptions of the converted policy forms are contained in War Department Circular No. 149, issued December 10, 1940. This circular may be found in any headquarters. National Service Life Insurance is not only unexcelled protection while in service, but is of such superior permanent value that all holders should plan on converting sooner or later so that they may continue to have the benefit of the insurance throughout life.

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Blanket permission for radio stations to broadcast without restriction the familiar song, "The Army Air Corps," was given recently by the American Society of Composers, Authors and Publishers. Provisions of the agreement are that the song, composed by Robert Crawford, may be played at any time during the emergency.

CIVIL LICENSE REQUIREMENTS

Simplification of the procedure for obtaining civil pilot licenses has been effected for military pilots, according to recent announcements by the Civil Aeronautics Administration and the Air Corps Training and Operations Division. The changes were brought about at least partly through the efforts of Lt. Col. David Grant of the Air Corps Medical Division and Lt. Col. C. L. Bissell of the War Plans Division.

Under the new procedure military pilots may obtain an initial or renewal certificate simply by filing a statement from higher authority that they are currently on flying status, and a statement from operations personnel showing types, weights, and horsepower of aircraft piloted, and the hours in each. There is no expense attached if the necessity of a physical examination is avoided.

The application method is part of a general simplification of the system used by the Civil Aeronautics Administration in the rating of pilots. The new system is based on the type, class, and horsepower of the aircraft rather than on the type, weight, and classification of the engine, a method which has demonstrated numerous inconsistencies in the past.

"Unconventional" Type Listed

The revised C.A.A. regulations divide aircraft into the following types: airplanes, autogiros, gliders, and lighter-than-air. Individual ratings must be obtained in each type. Airplane pilots are further rated according to classes of airplanes and horsepower. Airplane classes are single-engine, land; single-engine, sea; multi-engine, land; multi-engine, sea; and "conventional."

Horsepower ratings are based on a range which is 50 percent less to 50 percent greater than the rated horsepower of the airplane in which the pilot demonstrates competence. The only exception to this rule is in the class of airplanes having less than 80 horsepower, which are considered as a group. Because of this "80 horsepower group" provision a pilot demonstrating competence in a 60 horsepower ship is licensed for operation of airplanes ranging from 0 to 80 horsepower, but not from 30 to 90, such as might normally be expected under the 50 percent rule. Likewise, competence at 100 horsepower rates the pilot only for 80 to 150 horsepower, not 50 to 150.

Another of the new regulations provides that a pilot who becomes eligible for two separated horsepower ranges is also made eligible for all intermediate horsepowers. This means that the pilot is rated from the lowest to the highest horsepower applicable, and is licensed to operate all planes of the same class between these two limits.

MANEUVERS . . . *(Continued From Page 4)*
including 315 combat aircraft and 132 observation airplanes. Of the combat types, there were 39 medium bombers, 44 light bombers, 36 Navy dive bombers, 36 Navy fighters and 160 pursuit airplanes. Personnel strength totaled 7,946, including all service personnel, with a commissioned strength of 976 officers.

Personnel and materiel strength of the Second Air Task Force was almost equal to that of the Third Air Task Force.

Missions involving various numbers of combat aircraft, from one to as many as 80 in a single mission, were flown.

Although the maneuvers were planned with an eye to the utmost possible realism, there were some inescapable artificial situations. There were insufficient airdromes in the maneuver area and vicinity and two fields, one at Camp Beauregard and one at Natchitoches, were located along the border between the hostile armies and were declared "neutral," being used even when in the hands of the enemy. They were not subject to hostile attack, as were all other airfields within the maneuver area.

Another artificial situation, deliberately created, permitted the Red Second Army to concentrate adjacent to the international boundary--the Red River--while the Blue Third Army was restrained some 50-60 miles to the south. This permitted the Reds to invade Blue territory without necessity of forcing a river crossing in early stages of the maneuvers. This greatly offset the power of the Blue aviation, which under normal conditions might have held the Reds north of the Red River for many days, even in the absence of Blue ground support.

Bad Weather

Both phases of the maneuver opened under extremely bad weather conditions. Just prior to the opening of each phase, a sub-tropical hurricane, following erratic courses across the Gulf of Mexico, became so threatening that the greater part of the Blue aviation was moved out of the maneuver area into Alabama, Mississippi and Texas. Aviation, during both phases, operated initially under handicaps of turbulent winds, badly unsettled weather conditions and soft, muddy landing fields.

A typical day's activities by the Third Air Task Force resulted in the theoretical expenditure of the following ordnance: 81 500-lb. demolition bombs, 354 100-lb. demolition bombs, 140,000 .50 caliber ammunition and 162,000 .30 caliber ammunition.

Two attacks were made by parachute troops, which were assigned first to the Blue Army and then to the Red forces. The two attacks were made by Company A, Five Hundred and Second Parachute Battalion. The first attack, made against the Reds in the vicinity of Clarence, Louisiana, was tactically the more successful of the two. The first tactical parachute attack made by United States Army troops, this assault came as a complete surprise and had a paralyzing effect on vital Red operations in the critical center area of the Red lines. Thirteen transport planes of the C-33, C-39 and C-50 types were used, each carrying 12 to 14 soldiers and complete fighting equipment, which also was dropped by parachute. This equipment included .30 caliber machine guns, 60-millimeter mortars, .45 caliber sub-machine guns, .30 caliber rifles and enough ammunition for a full day's fighting. Each man carried a pistol and two hand grenades as he dropped. Strong Blue Pursuit support was provided and an abortive Red air attack on the paratroops was beaten off.

Air Operations Increase

As the weather cleared, the intensity and scale of the air operations increased. As an example of the intensity of the Blue aerial assault, it may be noted that in the two hours between 11 a.m. and 1 p.m. September 18, the Blue warplanes expended 280,630 rounds of .30 caliber ammunition, 238,830 rounds of .50 caliber ammunition, 937 37-millimeter airplane cannon shells, 834 100-pound demolition bombs, 131 500-pound demolition bombs and 214 recognition signals.

A recapitulation of aircraft ammunition expenditures by Blue Aviation during the five days' operations of the first phase shows a total of 4,920 100-pound demolition bombs; 514 300-pound demolition bombs; 725 500-pound demolition bombs; 12 1,000-pound demolition bombs; 2,181,000 rounds of .30 caliber armor-piercing and tracer ammunition; 1,356,000 rounds of .50 caliber armor-piercing and tracer ammunition and 3,000 rounds of 37-millimeter high-explosive airplane cannon shells, or a total expenditure of 1,025 tons of aircraft ammunition.

The resupply of airdromes by Army Depots during the five days involved movement of 871 tons of ammunition. This work required the services of 438 trucks and of 1,797 men to load trucks and 1,040 men to unload trucks. Resupply was completed every night under cover of darkness.

The name "Task Force" given to the air units participating in these maneuvers is highly appropriate. The Air Task Force has been charged with the responsibility of furnishing air support to the Army, not in the strategic sense that a bomber command might demolish factories or railroads far in the enemy interior, but to furnish the identical type of support that German panzer and motorized columns receive from their Stukas and that the Allies did not receive from their aviation during the brief battle of France.

This support may be visualized as being a prompt application of air power to remove obstacles or resistance preventing ground forces from gaining their objectives.

LAHM . . . *(Continued From Page 19)*

for Air at the American Embassy in Paris, Military Attache at Paris, and Second Corps Area Air Officer. He also organized and for a time commanded the Air Corps Training Center at San Antonio, Texas. At present General Lahm is Air Officer for the First Army, with headquarters at Governors Island, New York.

Served With Cavalry

General Lahm's career in the Cavalry was just as active as his later career in the Air Service and the Air Corps. He served with the Cavalry in Cuba, Jamaica, Panama, and the Philippine Islands, and participated in actions against bandits along the Mexican border. He remained in the Cavalry until 1916, when he was appointed Secretary of the Aviation School at San Diego, California.

Especially appropriate in the case of General Lahm is the citation which went with the award of his Distinguished Service Medal:

"For exceptionally meritorious and distinguished services. A balloon pilot of marked ability and scientific attainments, he rendered valuable services to the American Expeditionary Forces by his untiring devotion to the innumerable problems which faced the Air Service during its organization in France. His broad experience in aeronautics played an important part in the formulation of policies of the Air Service and was reflected in its successes during the St. Mihiel offensive and subsequently in the operations of the Second Army."

DISCHARGES FOR ENLISTED MEN

Release by the Air Forces of selectees over 28 years of age, and of both selectees and three-year men who desire dependency and similar discharges has been authorized by the Air Staff and the Adjutant General.

Under instructions issued by the Air Staff these releases will not exceed 15 per cent. of the authorized strength of any organization affected.

It is expected that relatively few men will be released by the Air Forces under the new policy because of current promotion opportunities and because most selectees assigned to the Air Forces reached their stations during the past two months. Of this group few have completed their one-year enlistment and few are over 28 years of age.

It is also believed that very few regular enlisted men will request discharges upon the completion of their three-year enlistments because promotion opportunities are so good at the present time.

PUBLISHER OFFERS PRIZES

A $2,500 contest among aviators---commercial, military and naval---for the best autobiographical booklength manuscript has been announced by Alfred A. Knopf, Inc., "in the belief that there are few subjects as interesting and unhackneyed as that of flying." Any Army Air Forces officer or enlisted pilot is eligible to submit a manuscript.

"I am looking for an authentic book of flying experiences," Mr. Knopf writes. "It neednot take the rigid form of a conventional autobiography---although it may do so if the writer feels that his story fits that pattern better than the less formal one of a volume of reminiscences. Above all, however, it must be true--even, in so far as practicable, verifiable---and it must be interesting---that is, in style as well as substance clear, untechnical and provocative enough to appeal to a wide general public."

All manuscripts should be submitted to Curtis Brown, Ltd., 347 Madison Avenue, New York city, who shall be exclusive agents for both the authors and the publisher, and should be postmarked not later than June 30, 1942. Only typewritten manuscripts, double-spaced and not less than 80,000 nor more than 150,000 words long, will be considered. Further details may be obtained from Curtis Brown.

ENLARGED BLUEPRINT PLANT

The Air Corps blueprinting plant--largest in the world--was placed on a 24-hour operating basis late last month in order to meet the ever-increasing needs of the Air Forces expansion program.

The blueprinting establishment, part of the Drafting and Records Branch at Wright Field, Dayton, Ohio, will turn out more than 3,000,000 blueprints monthly under the new schedule. Ordinary peacetime production is approximately 2[illegible] 000 monthly.

For the construction and maintenance of an average medium-sized bomber approximately 14,000 blueprints are needed. These show in detail every part and every installation in an airplane all the way down to the smallest rivet.

Blueprints are used for the procurement of airplane accessories and spare parts, for the maintenance of planes and for all equipment needed for the proper operation of tactical units in the field. For these purposes they are sent to all Air Corps depots and fields by the Wright Field branch.

The Drafting and Records Branch occupies a total of 38,400 square feet in the Administration Building at Wright Field, and employs 425 people.

TRAFFIC . . . *(Continued From Page 13)*

Board.

Training activities and acrobatics will be permitted within the limits of the airways outside the four mile Range Approach Channel. However, no acrobatics will be permitted within the four mile channel or within the three mile airport control zone and all flight maneuvers outside the Range Approach Channel, but within a ten mile radius from the center of the control airport, unless on an approved flight plan, shall be performed in a manner and over an area prescribed by the Regional CAA Manager after joint consultation with all aviation interests concerned, and after approval by the Administrator of Civil Aeronautics. This procedure contemplates no changes in existing regulations for flight plan procedure or flight within control zones.

Unless on an approved flight plan, all aircraft crossing or entering the Range Approach Channel must do so at an altitude of less than 1,500 feet above the ground. All altitudes above 1,500 feet above the surface of the earth and below 17,000 feet sea-level over the Range Approach Channel are reserved for aircraft approaching, departing from, or passing over, the control airport.

Careful and intelligent planning of our airport and airway systems are the only sure means of preventing costly and dangerous air traffic complications in the future.

BEAUFIGHTER . . . *(Continued From Page 26)*

radio, gun firing, fire extinguishers and other electrical equipment. The wireless installation is mounted on the port side in the fuselage between the centre plane spars, and comprises a transmitter and receiver, operated by the pilot by means of remote controls. Intercommunication telephones between the pilot and observer are provided. Navigation, identification and formation-keeping lights are controlled by a signaling switchbox on the starboard side of the cockpit, which provides for independent or simultaneous use of the upward and downward lamps, either through a telegraphic key for Morse or, alternatively, a steady illumination. Intercommunication signaling between the pilot and the observer is provided by a buzzer and a white light on the observer's instrument panel in the rear fuselage, operated by a push-button on the pilot's instrument panel. The observer can also operate a lamp on the instrument panel to attract the attention of the pilot. The gyros of turn and bank indicators and the artificial horizon are driven by one of two vacuum pumps, which are fitted to each engine. In the event of the failure of one pump the other can be selected by means of a change-over control on the port side of the instrument panel. The vacuum available is shown on a gauge beside this control. Compressor and cylinder are designed to operate at a pressure of 450 lb./sq. in. After passing the reducing valves it is 220 lb./sq. in. The differentially-operated wheel brakes are also operated pneumatically.

Condensed from FLIGHT

REVIEW . . . *(Continued From Page 28)*

submitted to it by the Chief of the Air Corps or such as it may originate in the course of experiments; also to test and evaluate new equipment, means and devices designed to improve the efficiency of the Army Air Corps.

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Acquisition of two large tracts for use by the Army Air Forces was authorized by the War Department last month. The largest, comprising 6,582 acres, will serve as a bombing range and a gunnery and smoke dispersion training area for the air base at Bangor, Maine. The other will consist of 260 acres and will be used for the establishment of a fourth echelon base motor shop at Stockton, California.

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Scott Field, the 2,500-acre Air Corps Radio Training School station at Belleville, Ill., is included in the list of Army posts, camps and stations designated as permanent installations, and will be maintained subsequent to the present emergency for a period of 20 years or more.

This decision was given by the War Department recently to the Defense Housing Coordinator in connection with a recent investigation concerning housing conditions in Belleville and surrounding community.

Scott Field at present provides facilities for a radio school, an Air Corps Technical School, and attached personnel of approximately 10,000. A new school area to house some 6,000 additional personnel will be occupied on November 1st, next. Plans provide for the training of 20,000 radio operators yearly, 400 to be graduated each week.

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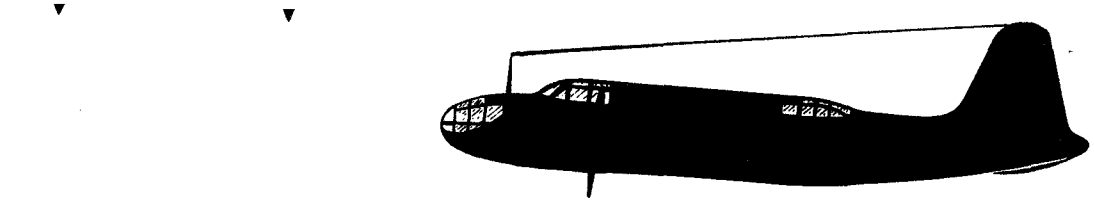
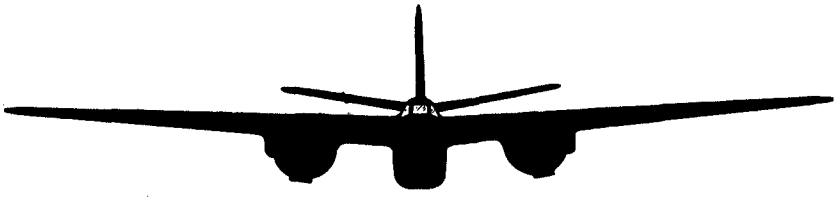
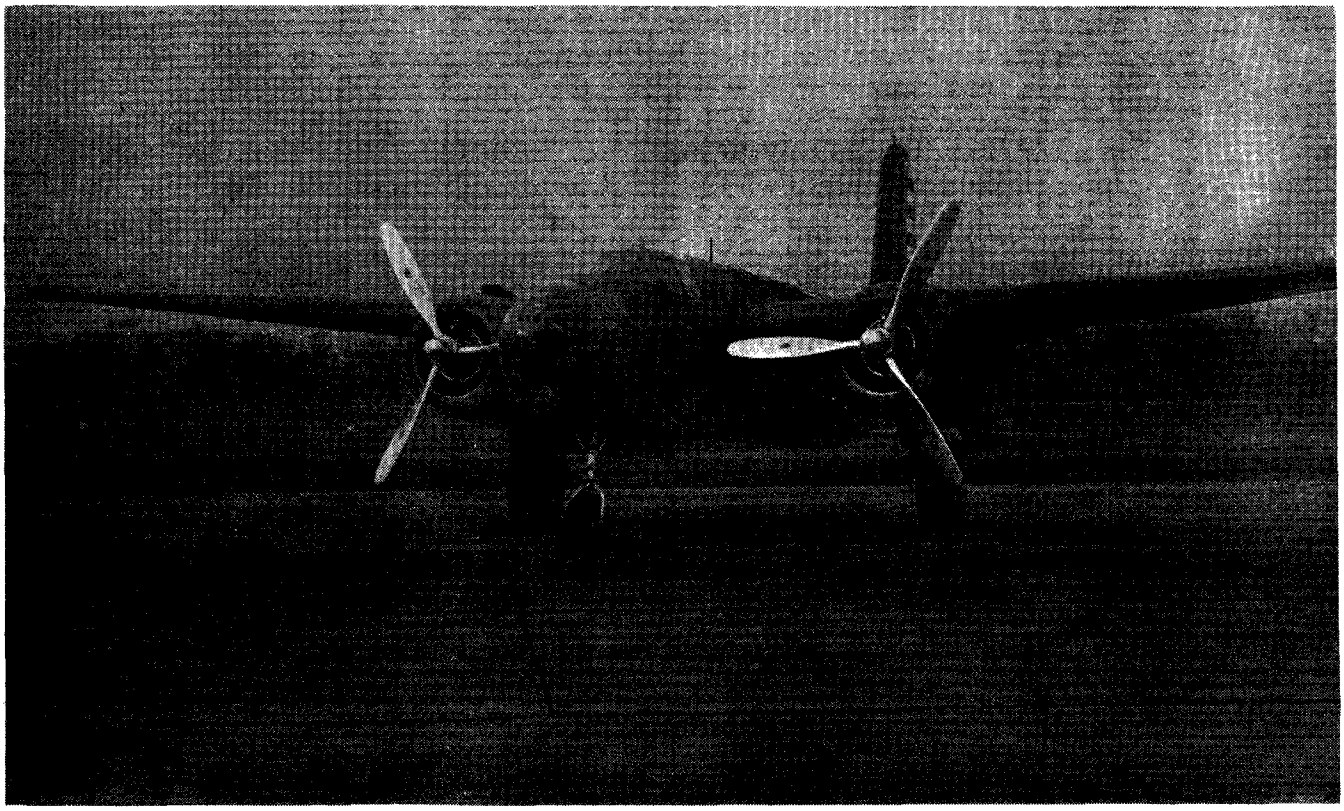
Recently added to the growing number of flying training schools under the Air Corps expansion program were one advanced school at Mission, Texas; three basic schools at Waco and Sherman, Texas, and Enid, Okla., all under the Gulf Coast Air Corps Training Center, and one basic school at Merced, Calif., under the West Coast Air Corps Training Center.

The Advanced Flying School at Lemoore, Calif., was redesignated as a basic flying school, and the Basic Flying School at Higley, Ariz., as an advanced flying school.


DON'T TALK!
YOU THINK YOU HAVE A GOOD OUTFIT! LET ME TELL YOU ABOUT ALL THE NEW BOMBERS WE'RE TAKING TO.....
PIPE DOWN! SOMEONE MAY BE LISTENING!
Yardley.







KNOW YOUR AIRCRAFT

NEWS LETTER

17

NOVEMBER 1941

HEADQUARTERS ARMY AIR FORCES WASHINGTON, D. C.

THE AIR FORCES NEWS LETTER

VOL. 24 NOVEMBER, 1941 NO. 17

THE COVER

The photograph of the aerial gunner on the cover of the October issue was made by Rudy Arnold, the well-known aerial photographer. Through an error, proper credit was not given Mr. Arnold in that issue. The oversight is regretted.

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THE BACK COVER

The pursuit plane on the back cover is the Bell P-39, known generally as the Airacobra. One of the most easily identified of our fighters, it is characterized by a decidedly long, pointed nose; slightly sweptback, tapered low wing and large, humped cockpit cover.

NOV 41

A Resume of Developments

The Chief Outlines Our Progress

By Maj. Gen. H. H. Arnold

Chief of the Army Air Forces

BEFORE the expansion the Air Corps had roughly 2,000 officers, including reserve officers and those detailed from other branches of the army, and 20,000 enlisted men, at a time when the German *Luftwaffe* was training an air giant of 1,000,000 officers and men.

We had one small-output training center, composed of Randolph and Kelly Fields at San Antonio, Texas, which graduated three classes a year--usually of less than 100 pilots in each class. Furthermore, the blight of too little funds over a period of too many years had reflected itself in all our combat airplanes.

In pursuit, we had an experimental order for 13 Curtiss P-40's, a first class fighter; however, most of our squadrons were flying obsolescent types whose fire-power of one .30 and one .50 caliber machine gun each was a pin-prick.

In bombardment, we had the first models of what has since proved to be the most outstanding bomber in the world--the B-17. Today, England and other countries are pleading with ever increasing fervor for any of that type they can get, from one up to 1,000. But we had only 13 of them.

B-18's Easy To Hit

The bulk of our bombardment squadrons were equipped with B-18's, a sitting target for even the slowest of our pursuit planes, and underpowered and slow. They were duds on every count except training, where they were a life-saver.

Frankly, pursuit had been allowed to drift in the doldrums, and in bombardment we had a 100 per cent. surplus of a type we could use only for training and a 99 per cent. shortage of the B-17 type we needed.

We had about 1,000 combat type airplanes, compared with thousands today---a total built up in spite of heavy diversion of planes abroad. We had a handful of planes outside the Continental United States as against many hundreds in foreign service units today.

We had less than 20,000 enlisted men as against more than 180,000 today. We had two or three hundred aviation cadets as against the 10,000 now in training. We had about 2,000 officers as against a present strength of nearly 17,000.

This article is a slightly condensed reprint of a speech which General Arnold made to the United States Military Academy last month. It is carried here because it should be of even more interest to The Army Air Forces, as a report by him on developments in the expansion program, than it was to the West Pointers. It is the most authoritative resume so far released.

We had practically no funds either for development or additional procurement, and there appeared to be no prospect of flesh and blood for the skeleton of our air strength. On the part of some of our leaders there was a sad reluctance to admit that the airplane was here to stay.

But the Commander-in-Chief in the White House was not one of these. His recognition of our aviation deficiencies and his vision, expressed to us during the fall of 1938, were well ahead of public opinion. In January, 1939, after consultations with the President, we outlined to Congress his proposals to raise our Air Corps objective from 2,320 planes, a dangerously deficient target which we had never been able to reach, to 5,500 airplanes and an objective of double our existing strength in officers and men.

That plan appeared to be adequate at that time. But after the invasion of Poland in September, in which it was demonstrated to the world that air power packed a Sunday punch, it was clear that the goal for the Air Corps must be revised sharply upward--at once.

Congress passed supplemental appropriations during the next few months to augment the program. Here is how rapidly ideas and plans can change. In January, 1940, our Air Corps made an estimate of 1,200 planes required for our needs. That was pared down by various agencies so that we appeared before Congress with a request for 496 planes. After arguing for two months, the House of Representatives reluctantly approved a total of 59. The Senate raised that number to 157.

Appropriation Increased

In May, the French Army broke in disorder, and we were given by Congress about $1,000,000,000 and over 4,000 planes.

Alarmed by the German smash through the Low Countries into a wingless France whose skies were bare of fighters, the President called a conference of defense leaders. The figure he dropped on us was a sashweight--50,000 airplanes a year. The Army had only 2,000 airplanes and here was the Chief Executive talking about building to an annual production of 25 times that number. We believe it can be reached.

(over)

However, we didn't begin to shoot immediately toward a goal of 50,000 airplanes for the Air Corps, since the money the President had in mind did not provide for air bases, overhaul depots, housing, personnel or flight training facilities to balance the program.

During 1940 and 1941, expansion was piled on expansion like plywood until we are now embarked upon a program which calls for the training of 30,000 pilots and 70,000 mechanics a year to man an organization which, if we meet our objective, will give us an ultimate strength of 41,000 officers and 600,000 enlisted men, including auxiliary personnel from other branches of the Service--or over four times the strength of the whole army a short time ago.

Pilot Training Success From Start

I am proud to be able to tell you that the pilot training program has been a bright spot from the beginning of the current effort, when we decided on a policy of letting contracts for elementary training to qualified civilian schools under Air Corps supervision. Since selection of the first nine in June, 1939, the plan has been a natural.

At present we have 26 civilian schools giving primary training and three giving basic training. By June, 1942, there will be 41 primary schools, 18 basic and 21 advanced schools turning out Air Corps pilots at the rate of 30,000 a year. In other words, we had two schools three years ago; next June we will have 80. But don't let that give you the idea that we've lowered the standard in order to turn out pilots like link sausages. The rate of elimination for failure to meet the standard of flying proficiency--around 50 per cent.--is about as high as before.

Although the course has been shortened from a year to 30 weeks' flight instruction, the new graduate receives better training than in the past. He climbs into our newest and hottest equipment and brings it back right side up. (Most of the time, anyway.) He reports directly from the advanced school into instructing or supervisory work at the civilian contract schools, and what he lacks in experience he is apparently making up in enthusiasm and hard work.

Accident Rate Falling

This has been reflected in the mean accident rate while the expansion has been under way, compared with the three years prior to the shortened training course. You would normally expect the rate to zoom. Exactly the reverse has occurred. The rate has gone down and the trend is still down. This year the accident rate in basic training has been half what it used to be and fatal accidents in advanced training have fallen off 50 per cent. This in spite of the pressure under which we have had to operate.

The record is equally good for mechanics and technicians, whom we are training in 14 civilian schools, besides the five schools under our Air Corps Technical Command, to help us reach the mark of 70,000 a year. Along with all this, we are training British pilots and navigators under a schedule which calls for 7,000 pilots and 1,000 navigators to undergo training annually, and we are qualifying an adequate supply of bombardiers and navigators, on non-pilot status, for our own combat crews.

No one denies that we were short on types with which to go into mass production when this war broke out. As I've pointed out, we had the Curtiss P-40, and the Boeing B-17 and we were well fixed for trainers.

Modifications were necessary in the P-40, and we have been incorporating them into our later pursuit models--armor plate, leak-proof tanks, more rugged landing gear for unprepared fields, and, especially--greater fire power. The British like eight or more machine guns, preferably of unmixed calibers. By that I mean they favor all .50 caliber or all cannon rather than, say, a combination of .50's and .30's. In fact .30 caliber machine guns for fighters are on the way out. They lack the necessary sting.

P-40 Rated As Trainer

Hundreds of P-40's have been built and delivered to pilots in our squadrons and to the British, who have found them superior to the *Hurricane*. They have given an excellent account of themselves against the *Luftwaffe* in Egypt and have been adopted as standard equipment in the Near East, although we no longer rate the P-40 as better than a good pursuit trainer, because of its limitations in speed, ceiling and fire power.

The B-17, even in its original form, represented a long head start over any of the heavy bombers of foreign nations. The Air Corps' championing of this type has been amply vindicated, and has enabled us to go into large production without drastic changes. The ceiling and speed have been well increased through the use of turbosuperchargers; armor, leak-proof tanks, power-driven turrets and tailguns have been added to make them an even better fighting machine than they were.

The first 20 B-17's operating with the R.A.F. have provided enlightening performance reports. Our performance data had been worked out only up to 25,000 feet, and within those limits the ship gave no trouble. But the British wanted to operate them at 35,000 feet with a full load, which created plenty of new problems. To meet these difficulties, which come under the head of pioneering, changes were made and the B-17's executed for some time successful day and night raids over Germany at 34,000 feet with virtual immunity from enemy fighters and ground fire. *(See page 4)*


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For the rest of our aircraft requirements, then, we had to embark on an extensive and hazardous program of buying airplanes on paper, without the usual service testing. Bugs cropped up in the new ships, but such difficulties are not going to stop us from procuring in ever increasing quantity the best fighting airplanes in existence. Make no mistake about that.

In the pursuit category, we have reached the large production stage on our single-engined Bell P-39, a type that has demonstrated it is a match for the Spitfire and Messerschmitt up to 16,000 feet, and on our Lockheed P-38. Eclipsing both of these, however, is the new single-engine Republic P-47B.

In various stages of development are pursuit types which will make all current types look obsolete.

The Douglas A-20 series, a splendid light bomber and night fighter, has been rolling off the assembly lines in shoals, and so has the Martin B-26, a medium bomber of outstanding speed and defensive armor and armament.

The R.A.F. already has many of our four-engine Consolidated B-24 bombers. The B-24 is so maneuverable, in spite of its size, that Coastal Command has stuck four cannon in the nose, equipped it with anti-submarine devices and depth charges and used it as a fighter. New versions of the Consolidated and Boeing will have really startling performance.

Materiel Division Producing

An airplane is designed around its engine, so it has fallen on Wright Field to develop power plants of higher and higher output. And the Materiel Division at Wright Field, true to its tradition, has not been sitting around with its thumb in its mouth. They are testing an engine out there now that develops well over 2,000 h.p. Still in the design stage at Wright Field are power plants that will turn up still higher power. Once you get up into horsepower brackets like that, you've got a headache finding a prop that will absorb the horses. The use of as many as eight blades and counter-rotating props will probably be the answer, since you can't put a 30-foot prop on a pursuit plane.

Reports on new airplanes and engines are very encouraging, because they mean that our Materiel Division is planning to provide our Air Forces with the best fighting planes the world has ever seen.

Out first aim, despite the diversion of a great part of our aircraft production to the nations fighting Hitler, has been to keep our squadrons "flying, shooting and bombing." The shortage of equipment has been acute and a very dangerous threat to pilot morale, but we can look forward to a steady increase in airplane strength. The continual process of activating new units and spreading experienced personnel ever thinner has placed a severe strain on us all. But we'll have to take it and like it. There's a war going on.

Ferry Command Functioning

Do you remember the difficulties encountered by the Air Corps when it carried the mail in 1934? We have been doing a somewhat similar job with our Air Corps Ferrying Command, but on a much vaster canvas and with much more success and efficiency. There were cogent reasons why the Air Forces undertook the project of transporting airplanes from the factories to their points of departure from our shores.

Obviously the British couldn't spare the pilots to do it. We could.

Ferrying meant training on latest types for pilots starved for equipment.

An Air Corps Ferrying pool was more flexible and less expensive than staffs of civilian pilots under contract to individual factories, any of which might have to throw their pilots into idleness through a plant shut-down.

Here is the record of the Air Corps Ferrying Command from June to October, 1941: in that initial period we moved over 900 planes from the West Coast to eastern terminals, with only two fatal accidents and at an average of two days en route as against eight days en route for the civilian ferry service. On a normal day, 40 planes were in transit, many of them piloted by boys fresh out of a twin-engine Advanced Flying School. To date, no plane ready to leave the factory has been delayed more than 24 hours, barring zero-zero weather. More than 300 ferry pilots have been absorbing excellent experience in concentrated doses. A pilot ordinarily makes five deliveries in a 35 day period, and he is permitted to make more if he wants to.

Around The World?

Except for our short range planes, the Air Corps Ferrying Command is capable of operating around the world. Its navigators are studying globes--not maps--and they would take a bomber to Tibet or Little America if you gave them 48 hours' notice.

In line with our hemisphere defense policy of forcing an enemy to run into our fist instead of our chin, we are guarding our Eastern approaches with Air Force stations from Iceland and Greenland to Labrador in the frozen North, to Georgetown, British Guiana on the tropical coast of South America: aerial sentinels guard our Western approaches from Alaska to the Philippines; and our Southern approaches, including the Panama Canal, are protected with a greatly augmented Caribbean defense system, with both air and ground troops under an Air Corps officer, Gen. Frank Andrews.

In the North Atlantic region, our most recent area of development, we are garrisoning eight large bases and four radio and weather stations

where 20 to 30 men will maintain emergency staging fields.

In Alaska, we have a composite squadron conducting experimental cold weather tests at Ladd Field, Fairbanks, and a composite group of pursuit and medium and heavy bombardment at Elmendorf Field, Anchorage. Bases are preparing at Metlakatla, Yakutat and Nome, while the Civil Aeronautics Board is constructing 10 fields at sites chosen by the Army along the Aleutian Islands aiming toward the defense of Dutch Harbor.

Shifting back to the Atlantic side, I could point out a few more places where Engineer troops are busy constructing fields: Bermuda, Jamaica, Antigua, Santa Lucia, Trinidad, Georgetown.

By this time you are probably getting some idea of the scope of the Army Air Force activities and an understanding of the desire that comes over us sometimes to go away and catch up on our sleep.

Observers On The Job

But there are many others besides those of us in the States who would like to catch up a few days' sleep--for instance the 78 Air Corps officers who are on duty as foreign observers. They are the eyes and ears of the Air Staff. Their reports come in from South America, Canada, Egypt, England, Germany, Russia, Morocco, Turkey, China, Singapore--almost any place you can name, and they bow to no adventurous foreign correspondent when it comes to the pursuit of new developments in Ankara or Karachi. From the information they furnish us, we are able to modify our present plans and set up future plans.

Our Air War Plans Section has a many-sided and never-ending task. It is continuously studying the economic set-up of possible enemy nations in order to determine what objectives are vital and vulnerable to air attack. The large objectives are broken down into smaller objectives--for example, a system of locks whose destruction would throw a whole water-way system out of operation. A large country may have 150 such targets requiring exhaustive study.

Suppose it is necessary to reinforce the Philippines immediately with several squadrons of heavy bombers. War Plans must figure out to the last detail how we can get them there safely and quickly.

I don't think it would be fair to conclude without giving you a glance at the lessons we have learned about military aviation during the conflict now entering its third year. Here are a few samples:

Lessons Being Learned

The Army and the Navy must have the whole-hearted cooperation of the Air Force. Air units needed for direct and intimate functioning with army and navy forces should be under the command of those forces.

The full weight of air power must be available either for purely air operations or for the support of the naval or land operations, whichever may be of decisive importance at the time. This is an expression of the one essential principle of air strategy, which is the concentration of the maximum force at the decisive time and place.

The single-engine fighter, with its superior maneuverability, appears to hold the edge over other fighter types. It should have every ounce of fire power it can carry without impairing necessary performance. The fighter during the day is more than a match for bombardment airplanes, but before long it must push its ceiling above 40,000 feet--some say 50,000 feet--if it is to maintain this supremacy.

Bombers Are The Winners

Fighters can prevent the *loss* of a war, but the heavy bombers are required to *win* it. The heavy bomber, in which type we lead the world by several laps, remains the backbone of air power. But since day bombers must expect savage treatment at the hands of hostile pursuit, and since night bombing, at present inaccurate and indiscriminate, cannot be decisive in itself, we must seek to build even greater speed, higher ceiling and stronger defensive armament into our forthcoming types. We are doing that.

Parachute troops and air-borne infantry can be highly effective. Our own army is letting no grass grow under its feet on this score. Glider-borne troops have proved their value in Crete and the Air Corps is keeping in step with this development by the procurement of gliders and by training selected pilots in gliding and soaring.

Dive bombers can achieve devastating results, although their use is often accompanied by heavy losses as compared with the horizontal bombing we have always stressed. The A-24 dive bombers with which we are equipping our squadrons will outperform those of any foreign nation.

Enlisted Pilots Needed

Military pilots need not be officers. Accordingly we have created the grade of Aviation Student to train men who lack the educational requirements for graduation as officers. Eventually, 20 per cent. of our pilot strength will consist of enlisted men.

An aircraft warning net is indispensable to the operations of defensive fighters and anti-aircraft units, and it must be backed up by a huge force of trained civilian volunteers. Our first Air Defense Command, established at Mitchel Field, is leading the way in this field.

Land and sea operations cannot succeed when the enemy has control of the air. In order to gain control of the air, the enemy's aircraft are best destroyed when actually in the air or in the factory,

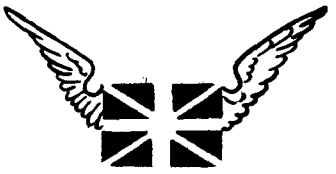
(Continued on page 14)

BUNDLES FROM BRITAIN (F.O.B. RAF)

Bundles From Britain

British Cadet Training Program

By Oliver Townsend



DOWN among the palm trees and orange groves of America's deep South, far from the reach of the *Luftwaffe*, more than 2,500 Royal Air Force cadets are learning to spread their wings under the careful guidance of the Air Corps. And, to use their own expression, don't think they aren't "keen" about it

The "leading aircraftsmen"--as British flying cadets are called--have been sent to this country from all parts of the British Isles, and from all walks of British life, to achieve through American instruction the common objective of "doing their bit" for Britain in the air.

The 2,500 who are here now are part of a training program designed to turn out British pilots at a rate of well over 4,000 per year from Air Corps flying schools in the Southeast Training Center. Also in training here are approximately 900 British cadets who receive an R.A.F. course of instruction at six civil contract schools supervised by the British Air Ministry, and about 200 navigators, located at the Pan American navigation school at Coral Gables, Florida.

Get U.S. Course

The British who train in Air Corps schools receive almost exactly the same course of instruction as that given United States aviation cadets. It consists of a five weeks' "reception course" at the Maxwell Field Replacement Center, 10 weeks in primary school, 10 in basic, and 10 more in advanced. The only variation from the standard Air Corps program comes in the ground school, where courses in R.A.F. procedure, aircraft recognition, radio code practice and current events are substituted for some of the work usually included in navigation, meteorology and mathematics. These latter subjects are included in an eight-week preliminary training course, known as the Initial Training Wing, given the cadets before they leave England.

Enthusiasm for the American training course is general among the cadets. Particularly impressive to them is the high grade of U.S. flying, the high training standards maintained and the quality of Air Corps equipment. Most feel the planes they use and the instructors who teach them are "all that could be desired."

No less enthusiastic has been their reaction to the American world outside of the training fields. They describe the American people as unusually friendly and much more sympathetic toward Great Britain than they had expected.

From a social standpoint the cadets are a big success. Invitations to dinners, parties, picnics and dances come in constantly--at a rate which greatly exceeds the number of cadets available. Weekends almost invariably find the barracks deserted by two o'clock Saturday afternoon--unless midweek bad weather has made weekend flying necessary.

Interesting as the British have found the "extra-curricular" phases of their training, it is the time spent learning to fly that really counts. And in this department they seem to be taking to the American program of instruction--somewhat different from the R.A.F. program--much better than had been expected. British liaison officers stationed at the schools say the cadets are progressing "extremely well". American instructors generally agree with this view, and say the British are doing excellent work considering their strange environment and the slight differences in language.

Flight instructors at the schools, who perhaps come into closest contact with the British, find them to be on the whole an intelligent, interested and conscientious group, looking forward to the day when they can match their skill in the air with that of "Jerry".

Instructors have found British reactions in the air to be approximately the same as those of Americans, and have experienced less difficulty in teaching the "aircraftsmen" than they thought they would. What trouble was encountered at first is gradually being eliminated as both instructors and cadets add to their experience. Some of the cadets have demonstrated unusual proficiency for flying, and have shown themselves capable of becoming real aces after their return to England.

Want To Fly

Ground school instructors find that, like American cadets, the R.A.F. trainees are more interested in the flying phase of their training than they are in the ground school. They are however, impressed by the "I.Q." of the average Briton, and by his general knowledge and information. Some of them--especially engineering instructors--though, wish the British could have played with "Model T's" and small gasoline engines when they were younger, like most American boys do. Americans coming into engineering courses usually have a me-

chanical background which aids them immeasurably in grasping the fundamentals of the subject. The British, in many instances have had very little mechanical experience, and find the whole field new and strange.

Cadets failing to qualify as pilots are sent to Canada where they are turned back over to the R.A.F. for navigation training or whatever disposition the British care to make.

The R.A.F. cadets vary greatly in age, and in educational and vocational background. Ages range all the way from 18 to 33 with the average closer to the lower figure. A few are public school boys, and about five percent are college graduates. By far the most are products of the free British school system, many having graduated from what corresponds to American high school. A number were continuing their higher education when they enlisted in the Air Force.

Cross-Section Of Britain

A few of the cadets are from titled families, but by far the most are clerks, farmers, machinists, and students who decided to do their bit for Britain in the air. They come from all parts of England, Scotland, Wales, and North Ireland. There are even a few volunteers from South Ireland. Surprising is the large number of former "bobbies" (British for "cop") who are taking flight training. A sizeable contingent of these are present at almost every school.

Some, but not many, of the cadets have wives back in England. In some of the earlier classes the percentage of married trainees ran as high as 20 percent, but in later classes this has dropped considerably, in some instances to below five percent. The average age of cadets has also dropped as additional classes have been sent over. Instructors react favorably toward this, saying that in general younger men learn more quickly.

About six percent of the aircraftsmen, although simply cadets over here, maintain noncommissioned officer ranks in the R.A.F. and other branches of the British Army. Some of these are sergeants, and quite a few are corporals. Some saw service with the British Expeditionary Force in France, and came through the ordeal of Dunkirk. Those who did say they were greatly impressed with the force of the *Luftwaffe*, and it is partially due to this experience that they are now taking pilot training. They regard air superiority as essential.

Organized Like U.S. Cadets

Organization of the R.A.F. cadets is along the same lines as the organization of American cadets. In other words, there are cadet captains, adjutants, and other cadet officers. Also, the upperclassmen, like American upperclassmen, are given disciplinary jurisdiction over the lower classes.

Pay of the Britishers in training here runs around $55 to $60 per month. They also receive their food, living quarters, uniforms, laundry, shoe repairs and hair-cuts. Much like American cadets, however, they are usually broke.

The cadets, like their American counterparts, rise early and work late. Depending upon the school, they either get up at 5 or 5:20 a.m. and are busy in the air, in ground school, on the athletic field or on the drill area almost constantly until 4:30 in the afternoon. Evenings are spent studying. Under this schedule weekends are the cadets' only free time, and these too are sometimes forfeited when rain has interfered with flight training during the preceding week.

In such spare moments as they do have, sightseeing is one of their favorite pastimes. Many have said they'd like to return some day when they have enough time to "sight-see" properly. In order to make a permanent record of their experiences here, a large number have taken up photography. PX's and camera stores in the vicinity of schools have all reported a run on photographic supplies since the arrival of the British.

"Pop" Fans

One of the things which amazes American officers most about the British cadets is their liking, and capacity for, good old American "pop". Orange pop seems to hold first place in popularity, with the various types of cola beverages running a close second. One Britisher quaffed 30 of these in one day. Flight instructors are constantly amazed at the cadets' ability to fly after enthusiastic pop-drinking sessions at the canteen.

At all of the schools R.A.F. trainees are being taught American games. Most like these games after they learn how to play them, especially softball, volleyball and basketball. All maintain, however, that none quite compares with soccer. Soccer, cricket and some rugby are played at many of the schools, although these are not on the regular program. Most of the British are glad of the opportunity to learn American sports, "because it widens their athletic background ".

Athletic programs at the schools also contain calisthenics, which are designed to develop the physical coordination so necessary to the successful pilot.

Some of the instructors have noticed that the British do not have the fierce competitive approach to group athletics which Americans have come to associate with their sports. The British seem to play for the sake of playing rather than to win. Athletic directors are, however, very much impressed with the stamina of the British, and with their ability in such individual sports such as swimming and tennis.

One of the habits of the R.A.F. trainees which has impressed civilians in nearby towns is their church attendance. Most of them, members of the

Church of England back home, rarely miss attending the Episcopal Church in this country. In the smaller towns the number of cadets in church sometimes exceeds the number of townspeople who are present.

Mustaches Allowed

Air Corps rules and regulations, upheld to the letter in most instances, have been relaxed by Maj. Gen. Walter R. Weaver, Commanding General of the Southeast Training Center, to the extent that the British cadets may retain their mustaches. The sight of mustaches of varying shades and density on the upper lips of cadets is a source of constant surprise to Air Corps instructors, who just can't get used to the idea.

Also relaxed by General Weaver are the Air Corps rules applying to drill, saluting and commands. Under these relaxed rulings the British are permitted to march with the long jaunty stride and shoulder-high, full length arm-swing typical of Empire troops all over the world, and to salute their superior officers with the snappy British salute in which the soldier leans backward and brings the back of his right hand flat against his forehead. In coming to attention, they continue in the old style of bringing one foot high, then slamming it down beside the other.

The British cadets are no exception to the universal rule that women are of special interest to military men the world over. American girls they find to be unusually well-groomed and well-dressed. They also believe they have more poise, are more natural, and have more vitality than do their British "cousins". On the question of comparable beauty, though, there is "no comment".

Food here, according to the cadets, is excellent--and there's all they can eat, and more. A number miss their favorite English dishes, and some of the primary schools have varied menus in order to include the most popular. Two of considerable popularity are lamb stew and kidney pie. Cooking they say is good, but "doesn't compare with that back home."

Many Will Receive Commissions

Of the cadets taking American courses at this time, approximately 25 to 30 percent will receive commissions upon graduation. The remainder will become Sergeant Pilots. Commissioning is entirely in the hands of the Royal Air Force, but it is usually done largely on the basis of the record the cadet has made in training.

Sergeant Pilots, although noncoms, receive almost the same amount of pay as do commissioned pilots, and have virtually the same responsibilities of command. A Sergeant Pilot is completely in charge of his plane, and exercises authority over any commissioned personnel serving under him in a bombardier or navigator capacity.

Last month a special inspection party composed of high-ranking U.S. and British officers visited schools giving flight training to the R.A.F. It was the general consensus of this group that the training program was progressing in a very satisfactory manner, and individual members of the party expressed personal gratification with the results.

Air Marshall A. T. Harris, chief of the Royal Air Force Mission to the United States, said that in his opinion the cadets were doing "exceptionally well". Air Marshall A.G.R. Garrod, Director of Training for the R.A.F., was also pleased, and stated that he was very glad British cadets had been given the opportunity to train in this country, where so much more time and attention could be given them than was possible in Great Britain at this time.

Training Program "Magnificent"

Group Captain Lord G.N. Douglas Hamilton, special aide to Air Marshall Garrod, said the Air Corps training being given R.A.F. cadets was "magnificent". Other members of the party were impressed by the living quarters, mess halls, and recreational facilities of many of the schools. They also reacted very favorably to the American physical development program, which they said was working wonders in equipping cadets for the strain of combat flying.

Brig. Gen. George E. Stratemeyer, Chief of the Air Corps Training and Operations Division, was a member of the party. He concurred in the British reactions to the training program, and stated that he thought it was progressing better than had been expected.

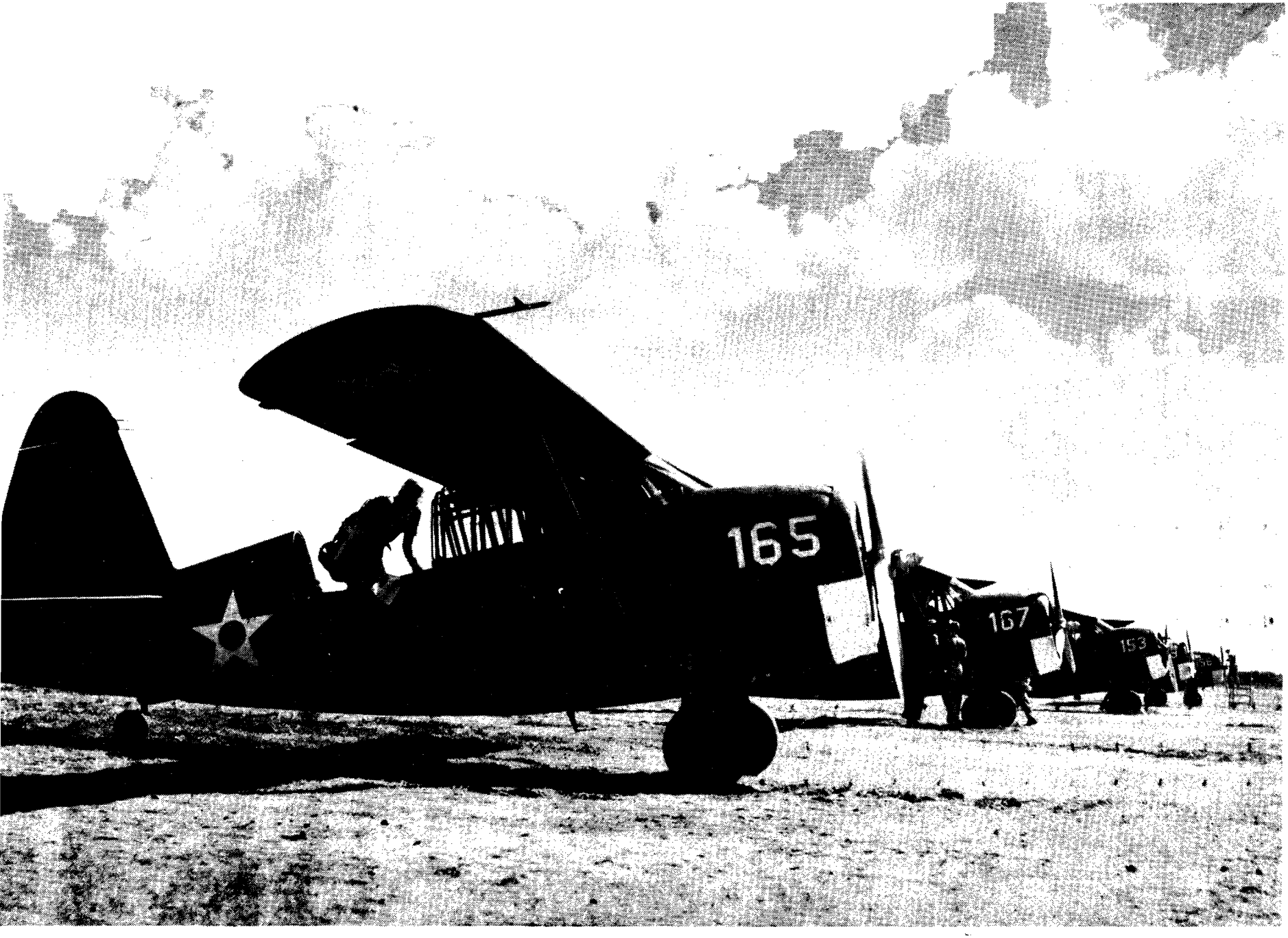
Newest of the Air Corps primary schools being used by the British is Carlstrom Field, located at Arcadia, Florida. It is a civil contract school operated by the Riddle Aeronautical Institute, a subsidiary of the Embry-Riddle Company. Located 95 miles southeast of Tampa, it has facilities for approximately 440 cadets.

Latest Improvements

Laid out in the general circular plan of Randolph Field, it is equipped with all the latest improvements. The barracks, mess hall, canteen, and classroom buildings are especially attractive. These are all constructed of solid concrete block in a modified Spanish style. The court in the center of the building area contains a swimming pool, tennis, basketball and volleyball courts, and a patio which can be used for dancing. The barracks are divided into rooms, four men to a room. These run completely through the 30-foot wide buildings, and have windows on each end.

Other schools giving primary training to the British are the Lakeland School of Aeronautics, located at Lakeland, Florida; the Alabama Institute

(Continued on Page 24)

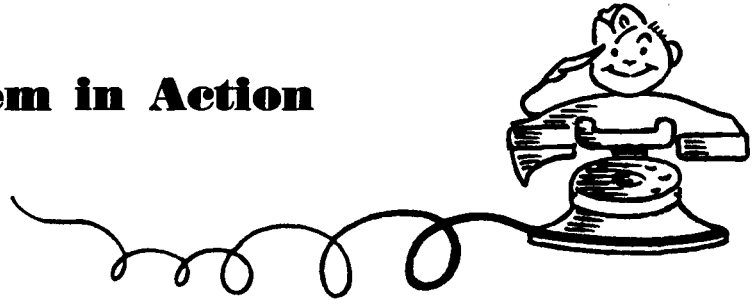


0-52's at Brooks Field, Texas

Stopping the Enemy

The Air Defense System in Action

By Capt. Oliver F. Holden



THE air defense test of the First Interceptor Command, conducted along the Atlantic Coast during October, was a revelation not only to civilians but to Army and Air Forces personnel of all ranks.

Outside the small group which has been working for years in development of the system, belief is widespread that it has been borrowed outright from the British. Actually the two systems were developed along parallel lines and while there have been interchanges of information, the American system of aircraft warning in the continental United States has no duplicate in the world and cannot have.

The reason is that the United States has more telephones than all the rest of the world put together, which means a greater diffusion of commercial telephones, a greater coverage of territory. The American aircraft warning system is built upon a framework provided by the existence in this country of a single company, the American Telephone and Telegraph Company, which with its subsidiaries operates a unified system of communications covering most of the continent, with few blind spots outside of such areas as the Southwestern desert.

Officers Amazed

The system itself amazed those who saw it for the first time. High-ranking officers from Washington and important officials of the civilian defense organization were heard to murmur that it was like something Orson Welles might have concocted. There was an important difference, a difference which Maj. Gen. Herbert A. Dargue, commanding general of the First Air Force, put into two words in a comment to Brig. Gen. John C. McDonnell, commanding the First Interceptor Command. They were: "It works."

Here's how it works:

Forty thousand observers, civilian volunteers, took part in the test at 1,600 observation posts-distributed five to eight miles apart in a strip averaging 125 miles in width from North of Boston to South of Norfolk.

At each observation post one or more observers was on duty at all times, shifts being arranged locally. Each observation post was located with convenience to a telephone as a prime requisite.

When a plane of any kind passed within sight or sound of an observation post the observer noted, on a form supplied for the purpose, the number of planes observed; whether they were single-motored, bi-motored, multi-motored or unknown; whether "very high", "high", "low", "very low" or "unknown" (no effort to estimate in feet) whether seen or heard, direction in which sighted, estimated distance from the post and direction in which flying. The observer might be lifting the receiver of his telephone while jotting this down.

Has Telephone Right-Of-Way

The switchboard light for an observer's telephone is of a special color, so the switchboard operator will know the caller is entitled to send a collect telephone call to the army with no delay. An "army flash" cannot be sent on other telephones. If this were not so patriotic American citizens, if they thought they had sighted an enemy, would jam the telephone system with so many messages that none could get through. It would be comparable with the packing of French and Belgian roads with refugees who unwittingly aided their enemies by creating traffic jams that blocked the movement of their own troops.

The observer, however, using his regular home or office telephone, calls "Army Flash!" The operator asks no questions; she connects him with the local long distance board where he is immediately connected with a direct wire to the nearest filter board.

Ten seconds, on the average, after he says "Army Flash" a plotter at the Filter Board replies "Army. Go ahead, please."

So he reads his notations from the slip of paper. No time wasted in discussion; no explanations.

If he says "four planes" she places a small disk the size of a shirt button, bearing the number "4", upon a black spot on the Filter Board, which is really an irregularly shaped table constituting a one-inch to one-mile map of the filter area. The black spot indicates the location of the observation post.

"Pips" Show Type And Location

If he says "multi-motored" she adjusts the bottom part of a "pip" (small movable standard) in her hands so that the letter "M" is uppermost. If he reports "Very high" she adjusts the middle section to show "VH". If he reports "Seen" she adjusts the point of the pip to show green. If the

he reports direction and distance from the post the plotter places the pip on the board at the place and pointing in the direction reported. So the first observer's report is on the board, put there more quickly than it was possible to explain it. The plotter says "Thank you" and is ready for the next.

That is fast work but so far not impressive. There's so much more to be done and so little time to do it. If the plane really is an enemy, sighted perhaps 100 miles from its objective, it probably is moving at five miles a minute and that means there's only twenty minutes from the time of sighting to do the following things:

Get complete information to headquarters.

Ascertain if the plane is friendly or enemy.

Ascertain exactly where he is, including his altitude in feet.

Ascertain his speed.

Ascertain where he will be when our own pursuit can reach him.

Get orders to the airdrome in the best position to fight off the enemy.

Get the planes off the ground.

Get up to the enemy's level.

Go where the enemy is.

Knock him down.

To complicate matters, much of the information already received and much that will be received later is and will be inaccurate. For instance, if an observer reports a flight three miles away it is quite likely to be two or four instead of three. And "High" or "Very high" are far from accurate terms. (What are those old jokes about "How high is high?" and "How long is a piece of string?") But planes going up to fight an enemy must know exactly how high.

Must Eliminate Inaccuracies

Filtering out the inaccuracies - evaluation and interpretation - is the task of the filter board plotters.

Before the first observer completes his report another observer will have seen the plane or planes. His light flashes at the filter board. The plotter answers - in a few seconds another pip is on the table. Then another and perhaps another, near each other and pointing in different directions.

By this time another plotter, standing behind the one seated at the table and taking reports, knows these are all the same flight. He also knows that planes ordinarily fly in straight lines - the shortest distance between points over hostile territory. So he removes the pips and places an arrow at the point where the plane really was. The inaccuracies as to position and direction thus are self-eliminating.

Most of the observers will report the correct number of planes, so the plotter takes the major-numbered and lettered pieces of cardboard, which he attaches to a metal frame which he moves ahead of the line of arrows which begins to form on the board. This stand describes the flight - perhaps "4VHM", meaning four planes very high multi-motored."

By the time fifteen or sixteen reports are in, an experienced officer, knowing the averages in this matter, can estimate within about 500 feet how many "very highs" and "highs" mean 10,000 feet. Sixteen "highs" and two "very highs" mean a very different altitude from nine "highs" and nine "very highs".

Colored Arrows Used

Arrows of three colors are used and the color is changed every five minutes. This automatically provides an estimate of speed. Without an estimate of the enemy's speed it would be impossible to decide where to go to meet him.

The pips are information. The arrows are military intelligence. On a balcony overlooking the filter are tellers who watch every move on the board. When one sees an arrow, or new stand, she speaks into the mouthpiece of her headset, reporting the military intelligence on the filter board. It is immediately duplicated on the operations board at the Information Center, which is regional headquarters. The filter board and operations board may be in adjoining rooms, but as there ordinarily are two or more filter areas in a region the filter board may be in another city. Direct wires, used for no other purposes, are utilized, however, so there is no difference in the time of transfer.

The military intelligence on the operations board is not yet far enough advanced for tactical action, however. We still do not know if the planes reported are friendly or enemy. It will be necessary to find out - the observer wasn't even asked to give an opinion because even an expert in airplane silhouettes could not give an opinion that would have any value.

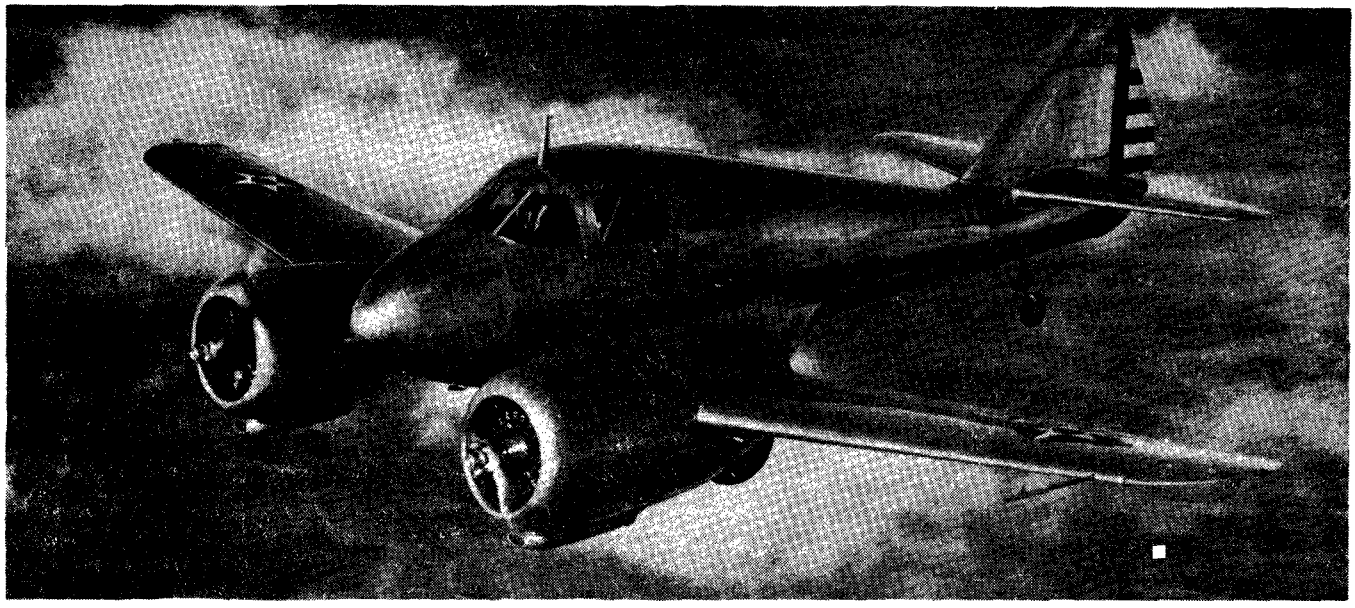
Liaison Officers Present

On a balcony overlooking the operations board are liaison officers from the Navy, Civil Aeronautics Administration, Bomber Command, and Air Support Command. They are in constant communication with their own organizations as to planes in the air. As soon as they see an unidentified flight on the board they check to see if it belongs to them. If not - it is an enemy. They report their findings to the raid clerk, who has a table beside the operations board. If friendly the raid clerk puts a green tab on the metal stand; if enemy a red tab.

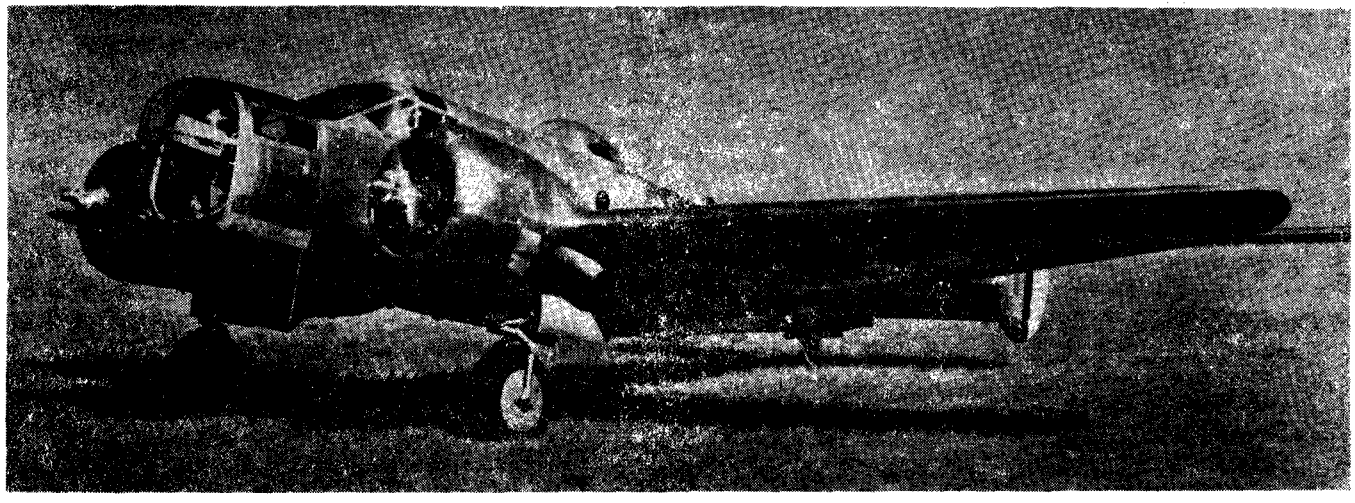
Also on the balcony overlooking the operations board is the controller or control officer, who is the tactical commander of the region, acting for

(Continued on Page 14)

NEW AIRCRAFT FOR THE ARMY AIR FORCES



AT-9



AT-11

NEW planes delivered to the Air Corps for service testing during the past month are the AT-9 and AT-11, both twin-engine advanced trainers.

The AT-11 is a low-wing, all-metal monoplane manufactured by the Beech Aircraft Corporation for training a crew of three or four men. It is equipped with flexible guns and bomb racks. The wing span is approximately 47 feet, the length 35 feet.

Equipped with a retractable landing gear and twin tail, the AT-11 is powered with two nine-cylinder, 450 horsepower Pratt and Whitney engines.

Propellers are two-bladed, and have a diameter of approximately eight feet. The plane will be used for the specialized training of bombardiers and gunners.

The AT-9 is also a low-wing, all-metal monoplane equipped with retractable landing gear. Manufactured by the Curtiss-Wright Corporation, it is designed for the training of pilots of multi-engine fighters and bombers. According to plans it is expected to facilitate the transitional training necessary in the transfer of pilots from single-engine planes to the latest types of multi-engine tactical aircraft.

Seats for the instructor and the student pilot are placed side by side in the AT-9. The plane also incorporates the same general performance and operating characteristics of modern multi-engine combat planes, and includes many of the same instruments. Powered with two 280 horsepower radial air-cooled engines, the plane has a wing span of 40 feet, and weighs more than two and one-half tons.

DEFENSE... *(Continued From Page 12)*

the commanding officer. Facing him across the operations board is a status board, which tells him how many planes are available at any moment at each airdrome in his region. When he sees the red tab he quickly decides which airdrome is in the best position, both as to location and planes available, to effect an interception and he immediately orders into the air enough pursuit to do the job.

It has taken me longer to write it and you longer to read it, but, on the average all these things are done within three minutes. One and a half minutes from time of sighting to the decision; another one and a half minutes for transmittal of the order. It's mighty quick work but during that time the enemy has traveled fifteen miles.

Information Center Guides Planes

Once his order is given the controller is through, but the planes now have to find and meet the enemy. Obviously the pilots of fast pursuit planes haven't time to circle over rivers or other landmarks finding their way; they haven't time to make instrument calculations; they have no way to ascertain any change of course the enemy may make while they're hunting him. So a man on the ground, in a little cubby hole at the Information Center, guides the pursuit to the enemy, even making use of any cloudy areas that might help - or dodging any that the enemy might utilize.

While the pilots are getting aboard their planes a radio officer is clearing a radio network for an intercept officer to talk directly with the pursuit commander in the air. Tellers at the filter board begin reporting direct to the intercept officer the flight he is to intercept - and a moment later the flight he is guiding. Weather information, including wind velocities at various altitudes, begins pouring into him from the weather officer.

With gadgets operating on the same general principles as slide rules he calculates the point at which our pursuit can cut off the enemy. He talks constantly with the flight commander. He guides the pursuit to the interception point. Two or three miles away the flight commander probably will see the enemy. He flashes back a code word to that effect. The intercept officer cuts off - he is through. The fliers are on their own now. They react in split seconds and can't take time to talk with any one.

Get In The Air Quickly

It takes the fliers about one and a half minutes to get into their planes and take off after receiving orders. Another seven and a half miles for the enemy. It takes about two and a half minutes to climb 1,000 feet and assemble. At this point the enemy will have traveled 35 miles from point of sighting. If the enemy is flying at 10,000 feet it may take another 3.4 minutes to climb up to him. That's 52 miles, but our pursuit will have advanced 15 while climbing.

Less than ten minutes to reach the enemy after that climb - not much leeway but that is the measure of the speed in the fastest military maneuver ever seen on this earth - the interception of fast bombing planes. Ten minutes if we're lucky and sometimes we hope to have fifteen or twenty, but there aren't any seconds to spare and the Interceptor Command is working to cut down the time for the interception.

The October test was threefold in purpose. First it was for the training of personnel. Second it was to ascertain how the system could be improved and speeded up. Third it was to inform the public as to what was being done to protect it from possible raids that might come at any time without warning and to show how the public could help.

Lieut. Gen. Delos C. Emmons expressed himself as well-pleased with the whole test, - with the work of General Dargue of the First Air Force, General McDonnell of the First Interceptor Command, of their staffs and assistants, and of the military personnel and civilian volunteers who gave their time and services.

One aspect of the test, not unexpected, was the difference in time elements at the beginning of the test and at the conclusion. For practical purposes the nation's air defense needs equal speed at all times; it must keep people in training and available for that unknown moment when they may be needed.

EXPANSION... *(Continued From Page 5)*

rather than on their own airdromes as was so widely believed. It is too easy to disperse or conceal aircraft on the ground and protect them with individual parapets so that losses will not be critical.

Air Power Versus Sea Power

Where air power and naval power have come into conflict in the present war, there has not been a single instance where naval power has prevailed over air power, whereas the invasion of Norway, the sinking of the *Bismarck*, the invasion of Crete and other engagements have provided examples of air power prevailing over naval power. Sea power, incidentally, is no longer synonymous with naval power. Sea power is a combination of air and naval power. Its vital importance has never been more clearly recognized than it is today.

Finally, air power is a factor of utmost importance, at times of supreme importance in war--any kind of war.

EVERYBODY'S GOING TO THE MOVIES

By Capt. Nathaniel F. Silsbee

THE Army Air Forces are going to the movies on a grand scale. They say one picture is worth ten thousand words, and what you once see, you can't "unsee". In these two phrases is wrapped up the whole philosophy of the modern trend toward the use of pictures, charts, maps and diagrams as effective teaching aids. During the past few years this has received a tremendous impetus by the adaptation of moving picture sound films and film strips to class instruction.

The War Department for some time has recognized the great value of visual aids in easing the teaching problem, particularly in view of the very rapid expansion, which has put a great strain on the instruction staffs of the various branches. A program for furnishing specially prepared illustrations to the instructors in the field is now well under way. Field Manual 21-5 "Military Training", and Training Circular #34, War Department 1941, contain instruction in the proper integration of training films within the training schedule. FM 21-6 "List of Publications for Training" contains a list of the training films released to date.

Film Units Established

To meet the instruction problems which arose with the tremendous expansion in the training of aviation cadets and airplane mechanics and technicians, in the autumn of 1940 the Chief of the Air Corps provided for the establishment of four Training Film Preparation Units. These are fully staffed with competent visual aid specialists, and it is their job to whip the vast amount of material into shape for proper presentation. These units are located at the technical schools at Chanute Field, Illinois, and Lowry Field, Denver, and at the flight training centers at Maxwell Field, Montgomery, Ala. and Randolph Field, Texas. Each of these units has a two-fold division of its work: (1) to prepare plans for motion picture sound films, and (2) plans for film strips.

The Training and Operations Division, Office of the Chief of the Air Corps, has prepared a list of some 58 Training Film Projects (all sound), some of which are now available, with several others in the works. A "First Priority" group of 24 sound films includes fairly complete projects covering Celestial and Aerial Navigation, Aerial Bombs and Bombing Technique, Aircraft Propellers, the Automatic Pilot, Aircraft Identification, with shorter ones on Aircraft Radio, Instrument Landings, Weather, etc.

11 In "Second Priority" Group

A "Second Priority" group of 11 sound films includes a series on Airplane Structures; on Airplane Hydraulic Brakes; on Teletype Printers; on Aircraft Machine Guns and Cannons and Machine Gun Sights, with others on Pursuit Aviation, Air Reconnaissance, High Altitude Flying, etc.

The "Third Priority" group contains 23 sound films of a miscellaneous character, including 9 on flight techniques, acrobatics, formation flying, etc., with others on Turbo-Superchargers, Aircraft Icing, Air Corps Supply System, etc.

A second type of official visual instruction aid is the film strip. These can be made invaluable for emphasizing certain details covered more generally in the sound films. Equipment and techniques may be clearly illustrated in the form of still pictures, drawings, charts, cartoons and the like. Obscure parts can be emphasized for teaching nomenclature and functioning, and motion can be arrested for detailed study.

When sufficient visual aid equipment is available, it is contemplated that in connection with a given course a complete sound film would be used at the beginning for orientation purposes. This would be followed by the use of film strips to cover the subject in detail, and at the end or the course the sound film may be shown again, as an effective method of review.

Although the advantages of the use of sound films and film strips are fairly obvious and quite generally recognized, it may be of interest to indicate some of the War Department reasons for regarding such visual aid as valuable time savers and also as methods of improving the quality of instruction.

They concentrate attention by showing only the essential action or subject. They bring the demonstrations of techniques and exercises directly into the classroom, and the same demonstration can

be shown repeatedly if necessary. Films on the use and care of new equipment, such as a new type of engine, propeller, carburator, etc. can be shown in advance of its arrival. (The War Department is getting increased cooperation from the various manufacturers along this line.)

Instruction at all training centers is standardized, and the services of expect instructors and the most highly trained personnel are utillzed in demonstrating the methods and techniques illustrated on the film. This insures that all students, regardless of location, have constant visual access to the latest approved methods as a standard in attaining their training objectives.

Although the training films and film strips are so designed that the picture itself will clearly indicate the exact lesson to be taught, there is plenty of scope for the individual instruetor, especially in connection with the film strips. Even in the case of the sound film, where the instruction is completely integrated with the pictures, the topnotch instructor will always add to the lesson by introductory remarks or discussion and comment afterwards.

Mechanics Series Complete

One of the most complete projects in connection with training film strips is the series for instruction in Airplane Mechanics. This will eventually cover 118 film strip subjects, divided into nine groups as follows: a) Film Strips for use in Basic Instruction, Airplane Mechanics - 13 film strips, including Maintenance Policies and Functions of Air Corps, Maintenance Publications, Maintenance Records and Reports, Aircraft Materials, etc. b) For use in Airplane Structures (10). c) For Hydraulics and Miscellaneous Equipment (14). d) For propellers (13). e) For Instruments (15). f) For Engines (12). g) For Aircraft Electrical Systems (17). h) For Carburation (11). i) For Aircraft Engine Operation and Test (13).

Films must be fitted editorially to the requirements of the various Air Corps schools, such as primary, basic and advanced flight training, aerial bombardment, navigation, etc. The Randolph Field Training Film Preparation Unit, for example, is charged for the most part with the production of films to be used in connection with the pilot training program.

Among other things, young aviation cadets have to be taught the things they must NOT do. To put this across effectively, the pictorial art of Jack Zumwalt, commercial artist and cartoonist of Dallas, was pressed into service. The result was the creation of Aviation Cadet Knucklehead of the Army Air Corps, who's never been right in his life and whose motto is "Keep 'em Falling."

Originally forming part of a film strip entitled "DON'TS", designed to warn student pilots against common errors, Knucklehead provides the perfect examples of when, where and how NOT to do things. The pictures of the mythical bonehead proved so attention-arresting that he soon became a "starlet of the first magnitude", appearing in scores of scenes.

A still wider influence for Dodo Knucklehead was found when some of the more striking scenes on the film strips took the form of Randolph Field News Releases with glossy photos. These have been widely used by the press, and public interest in the pilot training program stimulated. One amusing example is entitled "Don't Concentrate on Maps" and shows "The Flying Frankenstein" about to crash into the tower of a building labelled "City Hall, Altoona", with his face plunged into a sectional map and exclaiming, "I *should* be in the vicinity of Altoona!"

Libraries At Each Station

The procedure governing the requisition, supply and distribution of training films and film strips in Army Air Force is found in A.A.F. Regulations No. 65-4, of September 17, 1941. Training Film Libraries will be established at each Air Corps Control Depot in the United States. Sub-libraries and distributing points will be operated by the Commanding General, Air Force Combat Command, and the Chief of the Air Corps, at each Air Force headquarters, Air Corps flight training and technical training center, tactical school and other points at the discretion of the Commanding General AFCC and Chief AC.

DUNCAN FIELD

The above design, created by artist T. J. Hinnant II, will be carried on the cars of men and employees of Duncan Field in order to illustrate their part in the program to "Keep 'Em Flying".

The Middletown Program

Training Craftsmen for the Air Depot

By Corporal George Eckels
Second Transport Squadron

A comprehensive four-fold program for specialized training in the field of engineering, supply, administration, and military science has been developed and placed in operation by the Middletown Air Depot.

Typical of the training programs is that developed in the field of mechanics and engineering, in which the need was most urgent. It is a continuing program, based on a training course of four months duration.

Executing the program, under the supervision of Captain Herbert A. Pelton, is a complete staff geared to meet demands for speed - efficiently and safely. The staff includes a personnel administrator and a technical librarian who also supervises compilation of texts and technical materials. We have a civilian training director, two shop coordinators, a specialist on job analysis, a director of apprentice training, and about twenty clerks.

Township Instructors Used

Key men on the staff are 188 part-time instructors. There are twenty full-time instructors assigned by the Derry Township School District, (Hershey, Pennsylvania is in Derry Township) which pays their salaries.

The school district's expenses are subsidized by the Commonwealth of Pennsylvania and, for national defense training, a subsidy was also allotted by the United States Office of Education. Normal salaries of instructors are paid by the State while payment for overtime is made from federal funds. Derry Township instructors also aided in establishing engineering training courses and in editing textbooks produced for the emergency program. Key mechanics and foremen in Middletown Air Depot's shops outlined and wrote the training courses.

The senior mechanic or foreman of each department supervises training in his own sphere of specialization. Under this plan every man in the depot is being trained to be some kind of specialist. Four-fifths of all training at the depot is in engineering subjects. We use the pyramidal system of instruction in each department. By that we mean that as an individual student progresses toward a higher level of experience, he teaches what he has already learned to the newer men behind him. The values of this system are manifold. It teaches teamwork. It helps the instructor. It helps the experienced mechanic. It certainly aids the newer men. It saves time for foremen and department heads.

Training Practical

Vocational training at Middletown is a practical synthesis of instruction in working shops and adjoining classrooms. This plan allows trainees to gain "on-the-job" experience on material they will work on after their period of basic instruction is completed. Six portable classrooms have been built adjacent to the depot's engineering shops. Each classroom has its own maintenance crew. Wide windows and bright fluorescent ceiling lamps provide adequate lighting for lectures, blackboard discussions, meetings, and specialist training, twice around the clock.

In intensified technical training, one of the greatest needs is for practical instruction methods. Wide usage is made of visual aids and mock-up boards at the Middletown Training center. These excellent devices increase the "seeing range" of students. For example, as many as fifty students at one time may carefully examine a board showing the complete scheme of the electrical system for the B-18 Bomber. By pulling a switch, cut into the circuit, course instructors may short-circuit the board and then, as a test, designate a trainee to find the trouble. Large numbers of students may examine similar boards showing a B-18A hydraulic layout, instrument panels, and so on.

An obsolete and surveyed plane has been rebuilt and used to train mechanics to taxi and start engines. Use is also made of training films, produced by the Maintenance Command at Wright Field. These include titles on aircraft electrical systems, propeller installations, and engine mechanics. The Middletown Air Depot serves as a control center to distribute films to the fields served.

Writing Own Texts

When defense training classrooms were first opened at the depot, no textbooks containing the required specialized information were available anywhere. None had been written that was suitable. Textbook conpilers of the future may well look to the original work done by the pioneers of Middletown for guidance. Men there are writing their own course outlines and texts. The depot

has in use complete equipment for photostat developing and printing.

The effectiveness of the Middletown plan is revealed by statistics. Early in 1941, as the program started, the training staff worked day and night, building up course outlines and text books; selecting qualified instructors; and forming schedules. At the start of the expansion of the training effort, hundreds of new general mechanic helpers were being trained in basic principles of maintenance, besides some apprentices and a number of younger men assigned from the National Youth Administration. By the end of September, 1941 the school had graduated a large number of basically trained general mechanic helpers. The general plan was to allot 60% of each man's time to "on-the-job training" and 40% to formalized training in the individual's particular trade.

It has been impossible to procure mechanics skilled in the trades used in the air depots since industry has already absorbed these men. Therefore it was necessary to employ people whose only recommendation was that they had worked at some trade for not less than six months. Fortunately there has been a steady supply of such men due to the fact that the repair depot lies in a great industrial complex, centering in Harrisburg (Dauphin county) and spreading outward over several adjoining countries. Here there is a great backlog of available manpower. High selectivity was used as the training program was launched.

Training Begins At Once

Procedure for entering the government's aircraft maintenance service (also true in the case of training for occupations in technical supply and administration) is much the same as governs entrance to employment in any federal bureau. About 1500 candidates must be interviewed for 1200 vacancies. The mechanic is assigned to a section. His training begins at once. When it is discovered that a man does not have aptitude for training under an original assignment, he is given a second change in another specialized field. If he is not suited for any type of aircraft work he is discharged.

After about six months the trainee is eligible for promotion if his record is excellent. In half a year he has had about four months' formal training and two months' practical experience in the shop. When promoted he becomes a junior aircraft mechanic. When he is again promoted he becomes a journeyman mechanic.

To record trainees' skill, knowledge, personality, and general aptitude, a comprehensive progress reporting system has been introduced in the form of a card index. A report of each student's work in the shop and in the classroom is made each month by his immediate supervisors. Introduced as a visual aid is a color-tab system which reveals at a glance the individual's current status. The system also shows the progress made in a whole department, or in a single trade, or under one designation.

Development Speed Important

Speed of individual development is also important. The progress report shows this on a month-by-month basis. The color code for grading quality of performance is: blue, excellent; purple, good; orange, fair; red, unsatisfactory. When, for example, a sub-depot requires thirty trained mechanics for emergency or permanent assignment, the engineering officer can determine which men are qualified and available, in a very few minutes.

Advancement to higher positions in other posts may be thought of as a function of "blueness" of record, although administrators consider fully other factors, such as whether transfer to a distant post in the control area would constitute a hardship for the individual or his family. Further, all of the men who have shown excellence in performance cannot be held ready for transfer. Some of them must be retained in order not to weaken the local production efficiency.

Similar problems have arisen in the field of administration, especially with respect to the standardization and handling of records which could be expected to grow to massive proportions week by week. The officer appointed for this type of training has also been given command of a still unexecuted plan to establish a military college at the depot, where specialized officers may be trained. This school, like others to be founded at other posts, will be a sort of extension center for enlisted men considered for commissions. This phase of training is still in the explorative stage.

Special Commendation

So capable has conduct of the training program by officers at Middletown Air Depot been considered that special commendation has recently been made by an expert consultant to the Secretary of War. An idea has grown to maturity and produced definite results in less than twelve months. Whatever defense needs of the future may be, the Air Corps' training section at Middletown is ready. This is the answer to a question that had to be answered in record time. Thousands of skilled mechanics trained at Middletown are already employed at bench, at engine, at lathe, in supply warehouses. In the months to come, thousands of others will go up to the line to work for national defense. This vast army of trained civilian technical experts will literally 'keep 'em flying."

Gunnery Training

Development of the Aerial Gun Camera

The use of gun cameras for training pilots in aerial gunnery dates back to World War I, as does the actual use of machine guns in aerial combat. But just as the actual armament of heavy-caliber machine guns and aerial cannon now in use on our newest planes is far superior to the one or two hand-operated guns which armed planes of the first world war, so is the new training equipment far more efficient than the first gun cameras.

Today the Air Corps is putting into use its new gunsight aiming point camera, the GSAP, so named because of its optical system, which shows in the finder not only the target of the gunner but also a picture of the sighting apparatus used, and records both of these on each frame of film taken. In addition, the new equipment has an overrun device, which keeps the camera going after the pilot ceases firing for a predetermined time, to record what happens after he ceases to fire.

May Be Used In Combat

Earlier gun cameras were mounted on machine gun mounts, necessitating removal of part of the armament, but today's cameras are fixed behind the gunsights, so that the plane may carry its full complement of guns in addition to its recording device. By this means the camera may be carried into actual combat, and works simultaneously with the guns, to provide a record of the combat. Here again the overrun device is an advantage, for the pilot may follow an enemy plane down to its crash after it goes out of control, and the camera will continue taking pictures of it, after he has ceased firing his guns.

The new Air Corps GSAP camera is electrically driven, equipped with a 50-foot film magazine using standard black-and-white 16 mm. motion picture film. The pilot may vary the speed of the camera from 16 to 64 frames a second, by a reset knob. The machine compensates for atmospheric conditions by aperture controls for bright, hazy and dull weather, which are accessible in flight. But the film latitude is sufficient for the camera to produce satisfactory pictures if the setting is within the equivalent of a stop and a half of the proper setting. Like most aerial cameras, the focus is at infinity, and the camera is equipped with a footage indicator.

Lens May Be Heated

The device is so designed that the optical system showing the gunsight in each frame may be replaced with a straight lens arrangement to get ordinary pictures without the gunsight, if desired. Also, provision is made to heat the lens electrically against the cold of high altitudes.

Oddly enough, if the picture shows the sight directly on the target, the shot is usually a clean miss. It is clear indication to the instructor that the student has not taken sufficient "lead" in aiming his gun ahead of the swift-moving adversary plane. Only when the attacker is directly on the tail of the target, or when the two planes are flying directly toward each other, is such an aim good for a hit. In any other flight maneuver it is necessary for the gunner to lead his target, making allowances for the distance between the two planes, the speed at which his ship is traveling and the speed of the adversary plane. And it is in the measurement of the lead which the gunner takes, which gives the new equipment an important advantage.

Each frame of film has four indice marks midway on the sides, the top and the bottom of the frame. The camera is adjusted before takeoff so that the sight, an electrically lighted two barred cross, coincides with these indice marks on the first frame of film. By this arrangement, if the sight shows the aim to be a certain distance ahead of the nose of the target, actually the guns of the attacking plane would be pouring a stream of lead into the opponent.

Can Determine Hits

The developed film is projected on a small viewer screen, equipped with a mil scale of fine shadow lines around the edges, so that the instructor can view the frame critically, measuring the amount of lead taken by the gunner, and with the known facts of the speed of both planes can determine whether the frame should be scored as a hit.

After the instructor scores each strip of film, he can call in the pilot who made it, and point out his errors. Frequently the film is shown to a group of pilots in the classroom on a larger screen, also equipped with the mil scale, so that the whole group can benefit from the discussion of hits and misses.

As a simple means of identifying each film with the pilot who shot it, the Wright Field armament branch technicians have suggested that each magazine be placed in a hand movie camera, by the

(Continued on Page 30)

Air Forces Search

Ocean Flight Ended in Newfoundland

A five-man party from the Forty-first Reconnaissance Squadron, stationed at the Newfoundland Air Base, last month located and searched the wreckage of civilian flyer Tom Smith's Aeronca "Baby Clipper" which crashed in the rocky wastes of Newfoundland more than two and a half years ago.

Smith, a pilot from Clarksburg, W. Va., was headed for London when he took off from Old Orchard Beach, Me., on May 28, 1939. He was never heard from again, and, until recently his fate was not known. Then the wreckage of his light plane was sighted by an aircraft of the Royal Canadian Air Force. Search of the site was ordered accomplished by personnel of the Newfoundland Base Command.

Flying an OA-9, Lieuts. P.A. Sykes, pilot; R.W. Boggs, co-pilot; J.H. Shaw, navigator, and F. R. Amend, observer, and Cpl. R.H. Hubsch, engineer, set out to locate the plane, reported at approximately 47° 47' Latitude and 57° 38' Longitude.

Wreck On Barren Ridge

The search party found the wreck atop a rocky ridge about 15 miles north of the south-coast Newfoundland town of Burgeo, and three miles east of a mountain stream named Grandy Brook. The terrain was described as mountainous, rocky and barren and with very few trees.

Landing on a small lake at the foot of the ridge, the men anchored the OA-9, inflated a life raft and made for shore. They found the underbrush very thick and hard to penetrate, and after an hour's work managed to push through to the site of the crash.

Smith had made an excellent landing, considering what was available, and the searchers found the plane lying in a normal upright position, damaged very little. After more than two years the tires were still inflated. The plane's two auxiliary fuel tanks, with a total capacity of 160 gallons, and the regular 12-gallon tank in the nose of the plane were empty, probably due to the years of evaporation and leakage.

Newspaper accounts of Smith's proposed trip reported that he had prepared very thoroughly for his flight across the Atlantic, and he was said to be determined to prove the ocean flight feasible in a light plane.

Numerous papers and charts and much equipment were found in the plane, but there was no trace of the pilot. The mission discovered a note in which Smith had written that he had been forced down by icing conditions, that it was sleeting and that he was afraid of freezing to death if he remained in the ship. He wrote that he was going to walk in a northwesterly direction to hunt for some sign of habitation.

The Aeronca had been equipped with a complete set of blind flying and navigation instruments. Everything of value was salvaged and returned to the flyer's father.

A second search in the direction Smith had written he would walk resulted in the discovery from the air of an easily discernible line of "Indian Signs"--mounds of rocks and sticks placed to point in a northwesterly direction. These signs were about three miles from the wreck.

Landing again on the lake, the searchers looked for more notes, but found only a 1928 Portuguese coin and two bottle tops. About 300 yards from the line of mounds, a log hut, which apparently had been erected by a trapper, was discovered. There was no evidence that Smith ever had found the cabin. Whether Smith or the hut-builder had erected the mounds remains a mystery, for the search party found nothing further.

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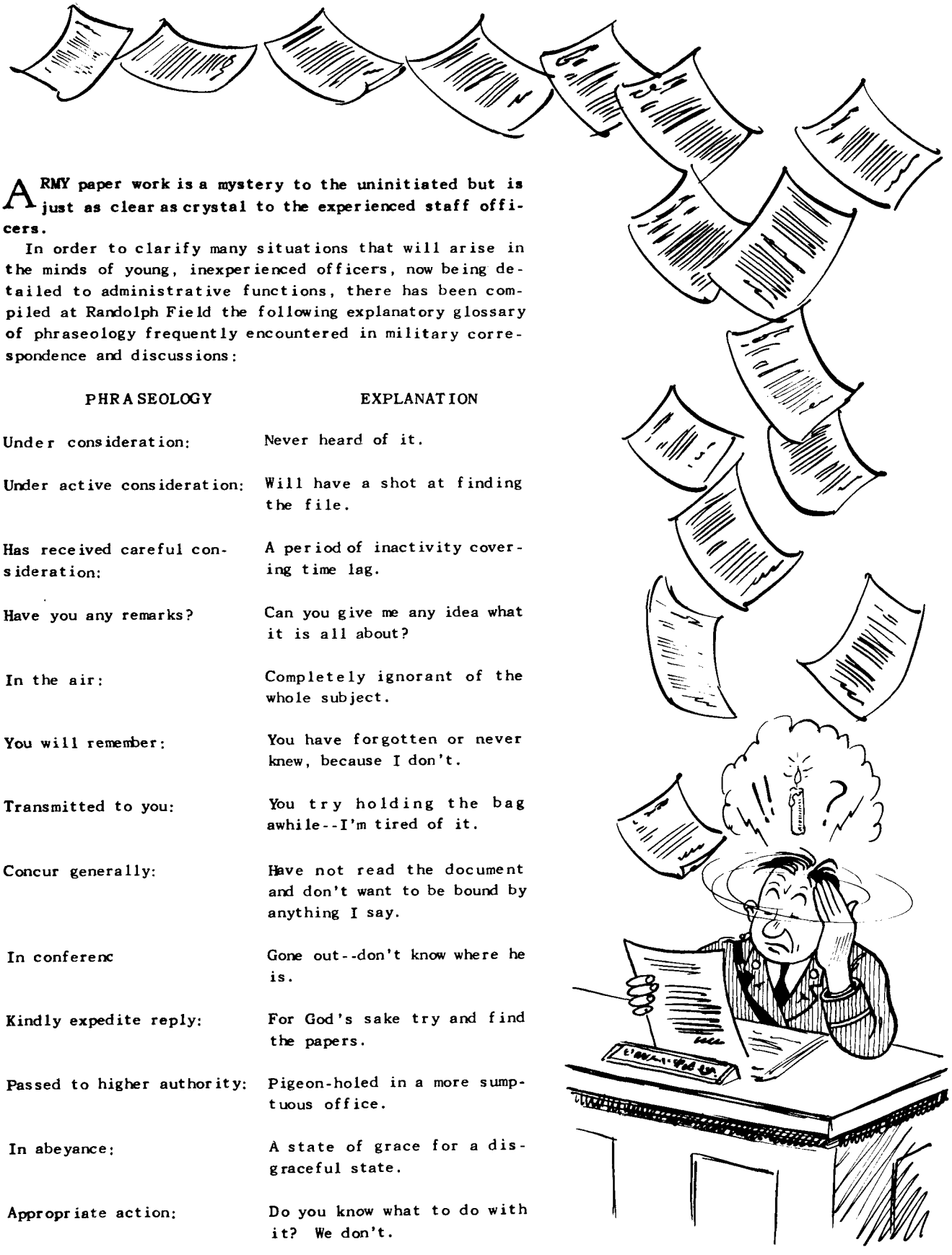
It is the function of the Air Council of the Headquarters Army Air Forces to periodically review and coordinate all major aviation projects of the Army.

●

Aviation cadets assigned to the new Air Corps primary training school at Avon Park, Florida, are never quite sure upon arrival whether they are in the Army or on a millionaire's vacation. The school's barracks, formerly a fashionable resort hotel, are located between two lakes, surrounded by palm trees, and have a private golf course. Ground school classes are held in a lodge on the shore of a nearby lake. A civil contract school, it is operated by the Lodwick Aviation Military Academy.

●

Dispatches from London indicate that the German Luftwaffe has developed a new fighter which is being used against the R.A.F. It is described as a Fokker-Wulf monoplane with a radial engine estimated to be rated at 1320 horsepower. The plane, it is believed, is capable of doing 370 miles per hour at 19,000 feet. Ceiling is estimated at 40,000 feet.



ARMY paper work is a mystery to the uninitiated but is just as clear as crystal to the experienced staff officers.

In order to clarify many situations that will arise in the minds of young, inexperienced officers, now being detailed to administrative functions, there has been compiled at Randolph Field the following explanatory glossary of phraseology frequently encountered in military correspondence and discussions:

PHRASEOLOGY	EXPLANATION
Under consideration:	Never heard of it.
Under active consideration:	Will have a shot at finding the file.
Has received careful consideration:	A period of inactivity covering time lag.
Have you any remarks?	Can you give me any idea what it is all about?
In the air:	Completely ignorant of the whole subject.
You will remember:	You have forgotten or never knew, because I don't.
Transmitted to you:	You try holding the bag awhile--I'm tired of it.
Concur generally:	Have not read the document and don't want to be bound by anything I say.
In conferenc	Gone out--don't know where he is.
Kindly expedite reply:	For God's sake try and find the papers.
Passed to higher authority:	Pigeon-holed in a more sumptuous office.
In abeyance:	A state of grace for a disgraceful state.
Appropriate action:	Do you know what to do with it? We don't.
Giving him the picture:	Long, confusing and inaccurate statement to a newcomer.

"E" Awards at Langley

Engineering Maintenance Efficiency

ALMOST unprecedented records were set by heavier-than-air units operating at Langley Field recently, as the results of an efficiency contest instituted by Brig. Gen. Arnold N. Krogstad, commanding general of the First Bomber Command, First Air Force.

General Krogstad's contest involved giving recognition at weekly ceremonies to the day and night crews of the airplanes flying the greatest number of hours during the preceding week, and it was the start of an idea that could be of benefit to other aviation units.

The contest consisted of presentations, to men of the crews whose work made possible the mechanical condition of the winning planes, of efficiency "E's," pinned by General Krogstad on the grease-stained coveralls of the winning squadron mechanics. A large "E," about a foot square, became the mark of distinction for the winning ship for the following week, and the squadron itself was awarded a banner reading "Excellence in Engineering Maintenance." An added inducement was offered when winning crew members were allowed to enter, admission free, the post theater for the time that their plane ranked the others at Langley Field.

Flying Records Set

Rivalry among the different squadrons berthed at Langley Field during the duration of the contest resulted in setting of some unprecedented flying records. General Krogstad, in commenting upon the contest, said: "This is a source of gratification and pleasure, since it indicates very commendable efforts on the part of the maintenance crews, flying crews and supervisory officers."

Presentation of awards, made each Saturday morning at impressive ceremonies in front of the winning squadron's hangar, were attended by not only the squadron personnel, but by officers and enlisted men from the large air base at Langley Field. The plane was given a thorough inspection by the post technical inspector.

Wide publicity, with photographs of the winning ship, officers and men, was given locally and in nation-wide publications. Individual stories, published in the home-town newspapers of the winning crew members, was another honor which tended to put every man in every squadron on his toes.

Hours flown by the different planes during the five weeks of the contest ranged from 60 hours and 20 minutes to the almost unprecedented time of 106½ hours for a week's flying time. The variance in hours was accounted for by the inclemency of the weather.

All planes competing in the contest were B-18A bombers. Winning units were the Eighteenth Reconnaissance Squadron; Headquarters and Headquarters Squadron, Twenty-second Bombardment Group, winners twice during the contest; Second Bombardment Squadron of the Twenty-second Bombardment Group and the Nineteenth Bombardment Squadron, also of the Twenty-second Bombardment Group.

SECURITY POSTERS DESIRED

ARTISTS in and out of The Army Air Forces are asked to submit posters, similar to those being run on the inside of the back cover of the News Letter, pointing out the danger to national security of careless talk on military matters.

Most of those which have been run already were prepared by a British artist and were aimed primarily at a British audience. It is felt in Washington that the posters, which are to be distributed throughout The Army Air Forces, will be more effective if they are prepared by artists familiar with The Army Air Forces and if they are aimed at an American audience.

Mr. Richard Q. Yardley, the well-known cartoonist for the Baltimore *Sun* and many magazines, has contributed a series prepared especially for The Army Air Forces, the first of which was run in the last issue. Other famous artists have been asked to contribute similar posters.

There are many equally well-qualified artists in The Army Air Forces. They are invited to contribute posters, which should be drawn on regular mat board and mailed to The Air Forces News Letter, Headquarters Army Air Forces, Washington, D.C.

The posters may be serious or humorous, in black and white or in color. The only requirement is that they emphasize the danger to The Army Air Forces and the security of the United States of carelessness in discussing matters which should be treated as confidential, or anything else which could be of value to potential enemies.

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The Navy recently awarded contracts for 21 blimps.

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Stepping up of the pilot-training rate to 30,000 per year has increased the annual training rate of Air Corps pilots approximately 10,000 percent in the past four years.

MEDICINE

DISCIPLINE, in general, is the willing obedience to all orders and instructions, and in the absence of orders and instructions, the decision to follow a line of action one believes the orders and instructions would have required.

Discipline implies promptness and dependability. There exists among many an attitude of mind which makes for self-discipline, but in the case of large groups, one cannot depend upon it. The individuals must be trained, and the more complicated and hazardous the action required, the greater necessity there exists for training. Training leads to correct habit formations, which in turn, develop self-confidence, and discipline is then more apt to become manifest.

Flight Discipline may be described as a state of mind which has resulted from a willing and wholehearted obedience to all orders and instructions affecting conduct preliminary to and during flight, in order that lives may be saved and tasks performed.

Oxygen Discipline has become an important part of Flight Discipline.

Recent advances in aeronautical and power plant engineering have increased the ceiling of aircraft to heights, which require most exact methods in delivering oxygen to individuals in an airplane in order that full advantage may be taken of such high altitude equipment.

Training In Use Of Oxygen

The use of modern oxygen equipment, including the individual accessory emergency oxygen unit, in routine flights and in emergencies requires the training of all individuals prior to the time such flights are required and prior to the occurrence of the emergencies.

Only crew members who have demonstrated their ability to use properly oxygen equipment should be selected to perform high altitude missions. These men must also appreciate that it is mandatory to examine the oxygen equipment prior to flight and assure themselves that it is functioning properly. The crew must also be thoroughly convinced as to the importance of following the detailed instructions governing the use of oxygen and allow no interference to its continuous use until safe altitudes are reached. When they have developed that frame of mind, Oxygen Discipline has been attained.

Par. 1 *a* Technical Order No. 03-50-1 W.D. Office of the Chief of Air Corps, dated April 15, 1939, states, "Except in urgent, unforeseen emergencies all personnel will use oxygen at all times while participating in flight above 15,000 feet. Oxygen will also be used when remaining at an altitude below 15,000 feet but in excess of 12,000 feet for periods of two hours or longer duration and when participating in flight below 12,000 feet but at or in excess of 10,000 feet for periods of six hours or longer duration."

Death At High Altitudes

The limit of "unimpaired" performance without oxygen is 10;000 to 11,000 feet. Sudden deprivation of oxygen above 23,000 feet will result in mental deterioration, unconsciousness and death, the time required depending on the altitude at which the interruption of the oxygen flow occurs.

The margin of safety is so narrow at extreme altitudes that the failure of complying with instructions relative to the use of oxygen for so short a time as 35 seconds at 35,000 feet will result in unconsciousness.

The commanding officer of Air Corps troops is responsible for the oxygen discipline of the command, and under him the senior flight surgeon of the unit is responsible for the instruction and training of flight personnel in the limits and use of oxygen equipment. The several commanders are responsible that oxygen equipment is used in accordance with existing instructions and principles.

"Unimpaired" Performance Sought

The training of crew members will provide familiarity with the general subject and oxygen equipment, and the requirements therefor, and will result in their ability to properly protect themselves from exposures to high altitude and so accomplish their tasks. The object to attain is "unimpaired" performance.

Training consists of lectures which include measures that can be taken by individuals before and during flight to insure an unimpaired performance; demonstrations such as movies, etc. and experience in so-called "low pressure chambers." It is anticipated that in time low pressure chambers will be more generally available for the purpose of training personnel in the use of altitude oxygen equipment.

Altitudes can be assimilated in these chambers and personnel can be trained in and experience altitude conditions and in the use of life saving

accessory emergency unit (emergency ration of oxygen) at extremely high altitudes under controlled, safe conditions, until confidence in their equipment and self-reliance in the use of it can be developed.

Low Pressure Chamber Used

Training in the low pressure chamber is divided into elementary and advanced. Elementary training might be conducted at the Pilot Replacement Centers as part of their indoctrination and would include experience in preventing "earblock," determination of "anoxic level," and in the use of altitude oxygen equipment. Advance training, available to crew members for service flying, would include training in prophylactic "decompression," experience in altitude between 30,000 and 40,000 feet and the use of the life saving accessory emergency oxygen unit.

Lack of oxygen discipline is the result of dissemination of false and unscientific information relative to the need of oxygen during flight at seemingly low altitudes and absence of instruction and training in flight or altitude prophylaxis. There is no doubt but that in recent months experienced pilots have become oxygen conscious. The time is ripe to develop discipline in its use to the novice.

BY LIEUT. COL. READ B. HARDING
FLIGHT SURGEON, KELLY FIELD

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Colonel David N.W. Grant, Chief of the Air Corps Medical Division, has been named to fill the newly created position of The Air Surgeon.

In his new position Colonel Grant will serve as a member of the Air Staff, where his function will be to coordinate the medical activities of The Army Air Forces. He will also retain his post as Chief of the Medical Division, Office of the Chief of the Air Corps.

The new Air Surgeon is a graduate of the Army Medical School, the School of Aviation Medicine at Randolph Field, the Air Corps Tactical School and the Chemical Warfare School. He has been on duty in Washington since October 1, 1939.

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The Flight Surgeon must be a man of vision and ambition, a before and after dinner guzzler, a night owl; work all day and all night and appear fresh the next day.

He must be a man's man, a ladies' man, a model husband, a plutocrat, a technocrat, a Republican, a New Dealer, an Old Dealer, and a Fast Dealer, a technician, electrician, politician, a mathematician, machinist and ambidextrous.

He must be a promotion expert, create a demand for his services, be a good correspondent, attend all meetings, tournaments, funerals and births, visit fliers in hospitals and jails once a week and in his spare time do missionary work.

He must be 25 years of age or over, married, single or divorced, with unlimited endurance and frequent overindulgence in wine, wind and gab; must have a wide range of telephone numbers in all principal cities and villages for cross-country purposes.

He must have an attractive home (a tent will do), belong to all clubs, pay all expenses at home and on cross-countries on one-third of what his associates have, payable when Congress chooses to give it to him.

He must be an expert talker, liar, dancer, traveller, bridge player, poker hound, toreador, golfer, diplomat, financier and philanthropist; an authority on palmistry, chemistry, archaeology, psychology, physiology, neurology, meteorology, criminology, dogs, cats, horses, blonges, brunettes and red heads.

And furthermore the practice of medicine is prohibited.

(Note: This is the Medical Division's own version)

BRITISH ... *(Continued From Page 9)*

of Aeronautics, located at Tuscaloosa, Alabama; Darr Aero Tech, at Albany, Georgia; Graham Aviation Company, Americus, Georgia; and the Southern Aviation School, at Camden, South Carolina. Stearman PT-17's are used at all the primary schools.

Basic Training of the British is carried on at Cochran Field, Macon, Georgia, and Gunter Field, Montgomery, Alabama. Both are run directly by the Army. Cochran is another brand new field, construction having begun last April. Actual flying from the field began on June 4--three days ahead of schedule. The British cadets arrived August 17. Lieut. Col. D. D. Fitzgerald, Commanding Officer of Cochran Field, has found teaching the British to be "an enjoyable experience, and helpful to both the cadets and ourselves." Training planes used at the basic schools are BT-13's.

Return Home In Early 1942

Aircraftsmen receive advanced training from Air Corps instructors at Craig Field, Selma, Alabama, which is a single-engine school; and at Turner Field, Albany, Georgia, a twin-engine school. Turner, another new School, will have a capacity of about 800 pilot cadets--all British--when it is in full operation. Also located at the field is a navigation school, where American navigators are trained.

No cadets so far have graduated from advanced schools. It is expected that the first contingent will complete the course and return to England early in 1942. Once there they will be given further operational training with tactical units before being assigned to actual combat.

Technique

DEVELOPMENT of a control to reduce the number of levers normally used by the pilot has reached the flight test stage. While designed primarily for the single seat type of plane, its application in the larger planes is anticipated.

In the operation of an airplane equipped with an exhaust gas turbine-driven supercharger, the pilot now has four controls for the power plant--the throttle, the supercharger, the propeller and the mixture. Engine failures, due to excessive manifold pressures, can be caused by the pilot leaving the propeller control set for a low r.p.m. and opening the throttle. This builds up the brake mean effective pressure in the cylinder to a point that may cause either a head failure, a rod failure, or both. The same result would be obtained if the supercharger control were pushed to the full "on" position with the propeller set for a low r.p.m.

Three Controls Linked

In order to prevent these excessive manifold pressures, a linkage has been devised, by means of which the supercharger, throttle and propeller are coupled together. When the throttle lever is pushed forward or pulled back, the supercharger and propeller controls go with it. Thumb latches are provided on the control knobs so that the three levers can be operated individually, but when the throttle lever passes these levers, they re-engage and move with the throttle lever until again manually disconnected.

In this way the manifold pressure is gradually built up to a safe maximum when the engine is operating at a high r.p.m. While this combination does not give the ideal relationship of the three controls throughout the range of operation, it does give a workable combination for the average pilot. It also relieves the pilot of the operation of two controls under combat conditions and allows him to concentrate his attention on the enemy aircraft or on the other planes in his own formation. In the case of long-range cruising it still allows the pilot to make close adjustment of the individual controls to obtain better cruising conditions.

Foreign Designers Unsuccessful

Foreign designers have made attempts to build automatic boost controls, but so far these are effective for a limited altitude range only. The turbine supercharger, when set for any given altitude, produces a very slight increase in manifold pressure as the altitude is increased.

The inherent characteristics of the power plant made this control practical and it is expected that further refinements will follow with further tests on the experimental model. While it is impossible to know at the present time just when this combination control will be ready for delivery to the service activities, it is a trend of development concerning which it was considered they would be highly interested in receiving information.

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Randolph Field is utilizing a simple method, devised by the Air Corps Materiel Division, for promoting accuracy landings during night flying. On the expansive landing field, 10,000 feet long and 3500 feet wide, a landing strip, 3200 feet long and 400 feet wide, is set apart and marked off by a row of eight equally spaced lights on each edge. Green lights indicate the start of this improvised runway and amber lights denote the end. Red obstacle lights may be placed as much as 1000 feet beyond the landing strip itself - if needed.

Mounted on a conical base two feet high, the lights are shielded by a specially designed hood so as to make them barely visible, the illumination being concentrated on the landing strip.

Power for the portable lighting system comes from an air-cooled gasoline engine, just about the size of an outboard motor for a row boat. Within forty minutes the lights can be strung out along the ground, the miniature power plant cranked up, and everything is in readiness for night flying to get under way. It only requires about ten minutes for a three-man crew to dismantle the lighting system and load the equipment into a pick-up truck.

Field "Too Big"

Officers of the Basic Flying School declare that Randolph Field is too big for the 700 aviation cadets in training there to obtain any appreciable practice out of their night landings, pointing out that they can "cut the throttle" almost at will, establish a glide, and feel sure they will make the 2300-acre field. They believe these future pilots should not be permitted to grow careless in their accuracy landings at night, since they must buckle down to accurate landings at night just as soon as they are assigned to bomber or fighter squadrons.

As for the cadets, they are unanimous in their praise of the portable lighting system, claiming that it is even easier to land on the strip than in the glare of the floodlights with the whole flying field available.

Further Expansion Underway

EIGHTY-FOUR GROUPS FOR THE AIR FORCES

Nov 41

TO keep pace with the expansion of personnel and materiel of The Army Air Forces under the national defense program, it has become necessary to expand the 54-Group program to provide for a total of 84 combat groups as the next goal for the development of the army's air defense forces.

Although the establishment of a 54-Group or an 84-Group program does not imply in any way an ultimate ceiling for expansion, it had become evident that the framework provided by the earlier 54-Group program was entirely inadequate to house the expanding air strength of The Army Air Forces.

The 54-Group program, first announced in March, 1941, is being expanded approximately 50 per cent. to provide for an orderly and rapid continuation of growth of all essential elements of the army's air organization.

The enlarged program contemplates an increase in non-commissioned personnel of The Army Air Forces to a grand total of more than 400,000 aviation cadets and enlisted men by the end of the current fiscal year, June 30, 1942. Subsequent increases in personnel strength, perhaps to the 600,000 level, is possible beyond that date.

Adoption of the 84-Group program does not involve any change in the organization of The Army Air Forces, now in process of detailed organization under the leadership of Major General Arnold, Chief of The Army Air Forces and Deputy Chief of Staff. The two major components of The Army Air Forces, the Air Corps and the Air Force Combat Command, will remain undisturbed by the expansion.

Will Go To Combat Command

The new tactical groups are to be assigned to the Air Force Combat Command for operational training, while the Air Corps will continue in charge of the individual training of pilots and technicians, in addition to its supply, procurement and maintenance duties.

Attainment of the objectives of the 84-Group program will involve considerable expansion of recruiting and training activities. The 54-Group plan contemplated an expansion of The Army Air Forces to 16,800 officers, 187,000 enlisted men (including enlisted men assigned from other arms and services), and 15,000 flying cadets. The rate of output of the training schools of the Air Corps was placed at 12,000 pilots and 48,000 technicians per year initially to meet requirements of the 54-Group program. Subsequently, however, it became necessary to increase the goal of the training program to 30,000 pilots and 100,000 technicians per year.

Under the 30,000 pilot training program, three Air Corps Training Centers supervise the activities of 41 civilian schools giving 10 weeks of elementary training; 15 military basic flying schools and three civilian schools giving basic training; and 21 advanced military flight training schools, seven of which are single-engine flying schools, and 14 two-engine flying schools. There are three flexible gunnery military schools, one civil navigation school and three replacement training centers (pilot, bombardier and navigator). There are three navigator schools and six bombardier schools. Technical training of enlisted specialists is conducted in 19 other schools and three replacement training centers.

Expansion to 400,000

By way of comparison with the enlarged program, which contemplates a total of more than 400,000 enlisted men, it is interesting to note that on June 30, 1940, Army Air Corps personnel included 3,397 Regular Army and Reserve officers, 1,894 flying cadets and 45,914 enlisted men. At that time there were 16 skeleton groups and wings and the definite goal for expansion was 54 combat groups composed of all types of airplanes.

On June 30, 1941, the strength was 10,697 Regular Army and Reserve officers, 8,707 flying cadets and 126,666 enlisted men.

On December 18, 1940, four air district headquarters were activated, together with 14 additional wing headquarters, to provide the overhead to care for the assignment of all personnel and planes in the 54-Group program. Other groups were ordered into being January 15, 1941, and were formed from existing Regular Army units. By that time, the Army Air Corps had been expanded to approximately 6,180 officers, 7,000 flying cadets and 83,000 enlisted men.

The air districts now have become air forces, in a step intended further to expedite the growth and training of The Army Air Forces.

This was followed June 22, 1941, by the War Department by the unification of its air activities in the present organization, The Army Air Forces.

(Continued on Page 30)

The Month in Review
By Falk Harmel

Contracts For Airplanes

The Ford Motor Company, Dearborn, Mich., which has been producing Pratt & Whitney engines under license of the United Aircraft Corporation, Pratt & Whitney Division, was awarded a contract by the War Department totalling $182,955,559.02 for the manufacture of this type of engine, together with spare parts therefor.

The Republic Aviation Corporation, Farmingdale, L.I., New York, received a contract from the War Department in the amount of $64,404,036.50 covering airplanes and spare parts.

Orders for additional Wright Aeronautical engines were placed by the War Department with the Studebaker Corp., of South Bend, Ind., totalling $74,338,783. These engines will be manufactured in plants constructed under Emergency Plant Facility contracts and under license of the Wright Aeronautical Corp.

Changes Of Station

Scheduled for transfer to Ellington Field, Texas, from Brooks Field, Texas, are the Fifty-ninth and Seventy-seventh School Squadrons. Their strength of 150 men each will be brought up to 200 men each with the transfer of recruits from Ellington Field.

Upon completion of the five new schools in the Southeast Air Corps Training Center under the 30,000 pilot training program, a total of 45 units will be transferred to them from other stations in this center. Five Air Base Groups, each comprising a Hqrs. and Hqrs. Squadron, an Air Base Squadron and a Materiel Squadron, and 30 School Squadrons will be involved in this transfer. Maxwell Field will send eight units each to Greenville, Miss., and Moultrie, Ga. Eight units will go from Selma, Ala., to Dothan, Ala.; 12 from Albany, Ga., to Valdosta, Ga., and nine from Barksdale Field, La., to Columbus, Miss.

Three Air Base Groups, the Thirty-seventh, the Forty-fourth and the Ninety-first, were assigned, respectively, to the Fourth, Second and First Air Force Service Commands, and to be stationed, in the order given, at Oklahoma City, Okla.; McChord Field, Wash., and Mitchel Field, N.Y.

Orders were issued for the transfer of the Hqrs. and Hqrs. Squadron, Second Air Support Command, and the 326th Signal Company, Air Wing, from Fort Douglas, Utah, to Oklahoma City, Okla., and the Hqrs. and Hqrs. Squadron, Fourth Air Support Command, from Fresno, Calif., to Hamilton Field, Calif.

The Twenty-second Observation Squadron has been attached to the Third Armored Division at Camp Polk, La., but will remain assigned to the Fifth Air Support Command, with headquarters at Bowman Field, Ky.

New Units And Stations

Recently called to active duty were the Hqrs. and Hqrs. Squadrons of the First, Second, Third and Fourth Air Force Service Commands, with respective permanent stations at Windsor Locks, Conn.; Fort George Wright, Wash.; Drew Field, Fla., and March Field, Calif. These units were organized at Westover Field, Mass.; Portland, Oregon; Savannah, Ga., and March Field, Calif., respectively, and the source of the personnel therefor were, in the order named, the Hqrs. and Hqrs. Squadrons of the Fourth Bombardment, Eleventh, Twenty-second and Ninth Pursuit Wings at Westover Field, Mass.; Portland, Oregon; Savannah, Ga., and March Field, Calif., respectively. Thirty-four Air Base Groups were assigned to these four Air Force Service Commands, nine to the First, seven to the Second, twelve to the Third and six to the Fourth. These Commands were assigned to the numerically corresponding Air Force.

Supplementing the Replacement Centers at Maxwell Field, Ala.; Kelly Field, Texas, and Moffett Field, Calif., three additional Air Corps Replacement Centers were created, their locations being Ellington and Sheppard Fields in Texas, and Kessler Field, Miss. New titles were conferred upon these Centers, the two last named, which are under the immediate jurisdiction of the Commanding General of the Air Corps Technical Training Command, being designated "Air Corps Replacement Training Center (Technician)," and the other four, under the immediate jurisdiction of the commanding generals of the Air Corps Training Centers in which they are located, being designated "Air Corps Replacement Training Center (Aircrew)."

With the completion of additional buildings at Scott Field, Ill., the necessary facilities were provided to permit the opening of a second school for the instruction of enlisted men as radio operators and mechanics, thus doubling the present student capacity.

Under a new schedule inaugurated on November 2, new students will arrive at the rate of 400 every week instead of every two weeks. The assignment of the new groups of 400 students arriving weekly will alternate between Radio Schools Nos. 1 and 2, and at the end of the standard 22 weeks' course of instruction, on or about March 1, next, the full quota of 4,400 new students will have been reached.

(Over)

Decorations

Gallantry in action against the enemy and heroic conduct in saving the lives of others led the War Department to confer decorations upon two officers and two enlisted men connected with the Air Corps.

Captain Elmer G. Rhenstrom, Air Reserve, now on extended active duty at Scott Field, Ill., was awarded the Silver Star for gallantry in action during the World War. At that time a second lieutenant and a member of the Ninety-fifth Aero Squadron, First Pursuit Group, he was engaged on a special mission when he was attacked by three enemy airmen. Single-handed he succeeded in destroying one of the planes and later accomplished his mission of strafing and killing enemy horses drawing heavy artillery in retreat, thus delaying their progress and leading to their capture by ground forces.

Captain John M. Talbot, Medical Corps, Flight Surgeon; Pvt. 1st Cl. Peter Schur, 20th Air Base Squadron, and Pvt. Mathew L. Pelikan, 35th Pursuit Squadron, were awarded the Soldier's Medal. Captain Talbot saved an enlisted man from drowning, as did Privat Schur, while Pvt. Pelikan rescured a woman from a burning house.

A passenger in an amphibian plane which went out of control, crashed and overturned in a lake, Captain Talbot, while in an upside down position, suspended by his safety belt, perceived one of the crew lying unconscious below him and in grave danger of drowning in the water which was gushing into the cabin of the plane. Disregarding his own safety, he unfastened his safety belt, reached the imperiled enlisted man and succeeded in bringing him to the surface of the water. Although suffering from the immersion and shock, he next clambered about the plane, which was in imminent danger of sinking, and administered first aid to other badly wounded crew members.

Private Schur, one of the crew of a crash boat plying the shark-infested waters of Manila Bay, jumped to the rescue of a fellow soldier who fell overboard from an Army transport and, being stunned by the fall, was in danger of drowning. Bringing the helpless soldier to the surface, he was assisted to a place of safety.

Perceiving a woman trapped on the porch roof of her burning home and on the verge of jumping to the ground to follow her sister, who was injured in doing so, Private Pelikan, after cautioning her not to jump, climbed to the roof with great difficulty and succeeded in carrying her safely down to the ground. In quick succession he rushed both women to the hospital. The injured sister subsequently succumbed to her injuries.

The Civil Aeronautics Administration announced a plan for increased cooperation among the American Republics to bring young men from countries below the Rio Grande to the United States shortly after January 1, 1942, to be trained as pilots and aviation technicians. The program, sponsored by the Interdepartmental Committee on Technical Aviation Training for Citizens of the Latin American Republics, includes courses from six months to two years and calls for initial training of 275 pilots, 18 aeronautical administrative engineers, 87 instructor mechanics, and 120 airplane service mechanics each pledged to advance to a career in commercial aviation. Pilot training will be supervised by the Army Air Corps and Civil Aeronautics Administration in the Air Corps schools (with exception of military subjects) and at approved certificated schools. Mechanical training will be carried out by the Civil Aeronautics Administration.

For the purpose or reorganization, the Hqrs. and Hqrs. Squadrons of the Sixth, Eighth, Tenth Pursuit and the Twenty-first Bombardment Wings were removed from active service and their personnel redistributed by the Chief of the Army Air Forces. The equipment of these units was turned over to the Hqrs. and Hqrs. Squadrons of the First, Third, Second and Fourth Interceptor Commands, respectively.

Fourteen Pursuit Groups (Interceptor) were assigned to these Interceptor Commands, five each to the First and Third and two each to the Second and Fourth. In addition, a Signal Aircraft Warning Company was assigned to the Second, Third and Fourth Interceptor Commands, and two such units in addition to a Signal Operations Company, Aircraft Warning, to the First Interceptor Command.

Interceptor Groups Assigned

Drew Field, a sub-post of MacDill Field, Tampa, Fla., was recently made an independent station. It is now garrisoned by 860 officers and men, but it is expected to be expanded in the near future to 2,750 officers and men. A cow pasture flying field a few months ago, the base is now at the half way mark of a $663,700.00 program of runway construction, scheduled for completion on December 15, next. The field will then have more than 300,000 square yards of paved runways and fringing aprons.

Of the initial class of 13 Negro students who began their primary training at the civilian elementary flying school at Tuskegee, Ala., one officer and five aviation cadets completed the ten-week course of instruction. They will remain at Tuskegee to undergo basic and advanced flying training, each of ten weeks' duration, and which are conducted by Air Corps instructors. Upon their graduation from the 30 weeks' course, they will be commissioned second lieutenants in the Air Corps Reserve and assigned to the Ninety-ninth Pursuit Squadron, which will also be based at Tuskegee. Ten Negro aviation cadets constitute the new primary class at Tuskegee.

WRIGHT FIELD LINKED WITH THE NATION

A nation-wide teletype network has been linked with a new tabulating system at Wright Field to give the Materiel Division an automatic daily report on Air Corps supply stores at depots all over the United States.

Nucleus of the new tabulating system is a battery of specially-built card punching machines designed to strike daily balances on Air Corps supply stores. The machines operate automatically from teletype tape bringing in reports from depots. Designed especially for the Air Corps, they are the first of their kind in the world.

The new machines do a job which would be physically impossible under the old hand filing system. They keep tab on all the Air Corps stocks of airplane engines, propeller assemblies, airplane tires, fuel pumps, landing gear struts and the thousands of other items and parts which go to make up Army planes and equipment.

Link Depots With Wright Field

Operated in conjunction with the new machines is a teletype network, linking supply depots and tactical bases with the Materiel Division. And through the new system the Army now gets a daily balance on all its equipment, which report 40,000 changes a day in balances on individual items of equipment at individual air bases.

Biggest advantage of the new system is the fact that the balances are received on teletype tape, which is fed through the newly devised card punching machine. This machine automatically records each new balance on a card which is then filed automatically. Thus the new plan makes it possible to correct the record of any depot's store of any one of the 300,000 articles stocked, as soon as the balance is changed by shipment to or from the depot.

Prior to establishment of the new setup, the Air Corps kept check on its stock by a system of machine posting in duplicate of stock record cards at stations and depots. Once a year the duplicates were sent in to the Materiel Division headquarters at Wright Field, where they were transcribed to tabulating cards, which in turn were used for preparing reports for the supervisors for purchasing and distributing new stock as required. The stock record cards were hand filed at Wright Field, prior to punching of the tabulating cards.

But the once-a-year balance became out-of-date so quickly after it was taken, that it proved to be to a large extent useless, except in normal peace times when there was no great fluctuation in requirements. The rapid pace of present Army Air Corps expansion soon proved this system completely inadequate.

With the new system, the Wright Field Budget Office receives at the close of each day's business, the closing balances on hand of all items in which any change has been made during the day, at each of the several depots. And from the automatically recorded tabulating cards, a report is available each day to the supervisors, of the condition of the stock of the day before, thus making possible automatic stock replenishment at the depots as it is needed, and eliminating much delay and confusion in replenishing stocks which had been largely consumed since the last balance was received at Wright Field under the former system.

To illustrate the working of the new system: Suppose the Fairfield Air Depot, at Patterson Field, Ohio, is asked to send three Allison engines to Selfridge Field, Michigan. As soon as the shipment is made an operator at Fairfield punches a card in a card punch machine showing the new balance in engines, resulting from this subtraction from the Fairfield stock. The card is fed into his teletype sending machine, and the receiving machine at Wright Field records the same punches on a roll of teletype tape. The tape is then fed into the new automatic card punching machine which duplicates the first card punched at Fairfield, and automatically files the new balance card in its proper place, throwing out the old balance card which it replaces.

Special Advantage

A special advantage of the new system is in the refinement made possible by a "borrowing" practice which has already been in use in the Air Corps for years. To carry the engine example further: Suppose Fairfield has a shortage of the Allison engines desired by Selfridge Field. The Fairfield operator teletypes a message to the Budget Office headquarters explaining the Selfridge requisition and the shortage. A check in the master file at Wright Field on the Air Corps stock of engines may indicate that Middletown Air Depot, at Middletown, Pennsylvania has an adequate stock of these engines and can supply them to Selfridge Field. The request is relayed from Wright Field to Middletown via teletype, and soon transports are flying the engines from Middletown to Selfridge

would have been consumed in filling the original order from Fairfield Depot.

Under the old setup, it would have been necessary for the depot needing the engines to check individually with other depots, or to have the Maintenance Command at Wright Field make such a check, whenever such a borrowing was required. But now the central office can check its master file and see at once where it can get the necessary equipment, making it possible to service any Army air field in the country, from any of its depots, in emergency.

The new network is also available for communication between any office at Wright Field and any of the Air Corps fields and depots, and by relay permits the various fields to communicate with each other.

An Example

Suppose Selfridge Field wishes to communicate with Hamilton Field, California. The message leaves Selfridge Field and comes into Patterson Field to be recorded on a relay tape. This is fed into another sending machine and relayed to Wright Field. By similar process, the message is relayed to the Sacramento, California, Air Depot, and from that station to Hamilton Field. Since the relay message is punched on the tape for each relay, the three relays may be made without the operators at Patterson, Wright or Sacramento fields knowing what the message was.

Wright Field officials believe that the new system's cost is more than compensated for, in the savings resulting from the speeding up of the entire supply and maintenance service. While no accurate estimate can be made of the airplanes that were grounded for lack of parts, the time wasted as a result of shipping orders issued and subsequently cancelled due to lack of stock at a particular depot and the inaccurate procurement of replenishment stocks as a result of inaccurate knowledge of stock on hand under the former system, it is apparent that all these were important cost items in operating the maintenance and supply service.

But the saving does not stop there. An actual net savings is shown in the use of the new system, over the former system, despite the cost of the new machines and their operators, by eliminating the use of billing machines and their operators and the laborious hand filing processes of the former setup.

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Air Corps officers assigned to the Headquarters Army Air Forces or The Air Force Combat Command are still officially regarded as Air Corps, and not Air Forces, officers, according to a Headquarters Army Air Forces interpretation of recent War Department and Air Forces rulings and organizational changes. The Army Air Forces, through the Air Force Combat Command and the Air Corps, will direct training, both individual and organizational, and the operation of all air units in the four air forces in the continental United States and in the territorial and outlying posts of the growing air defense system.

The training program required in connection with the 84-Group program would make The Army Air Forces one of the world's largest universities for applied science, with a total of more than 100 flying and technical training schools in operation.

A number of the 84 combat groups to be created as the goal of the new program will be assigned to overseas departments. The greater part, however, will be assigned to the Air Force Combat Command.

Aviation components of the Hawaiian and Panama Canal Departments will be organized into department air forces under command of their respective department commanders, to attain the unity of command so essential for successful operations.

Completion of the 84-Group program, with necessary airplanes, materiel, personnel, bases and equipment, presents a problem worthy of the utmost effort, efficiency and coordination.

CAMERA... *(Continued From Page 19)*

instructor, who takes a few frames of pictures of the pilot who is to use the film in his plane. The daylight-loading magazine is then taken out of the hand camera, and loaded into the GSAP camera for use.

Processing Almost Automatic

Early in the use of gun cameras, it was learned that a principal advantage to the trainee was to see the results of his training flight as quickly as possible after it was made. So Wright Field technicians and camera manufacturers have developed a very nearly automatic processing technique, which the armament mechanics without expert photographic knowledge can use. Without divulging the details of the processing it may be said that it develops the negative reversed as a positive, so that it can be used in a projector immediately, and that it comes out of the process spooled on a reel ready to go into the projector in a very short space of time. Thus the student is enabled to see his pictures the same day he makes them.

Deliberately Made Heavy

One gun camera developed at Wright Field in the late 1920's was made of very heavy materials, simulating as nearly as possible the weight as well as the size of the gun it replaced. The usual Air Corps search for lighter metals was abandoned, and parts were made of bronze and other

(Continued on Page 32)

Flying Time Counted

Cadets May Get CAA Training Credit

By Lieut. George H. Haddock

CPTP

THE recent change in regulations which makes it possible for the Air Corps to credit a qualified cadet with a maximum of 30 hours flying time for previous flying instruction or experience, will not necessarily shorten the cadet's term in the elementary phase of instruction.

What it does do is permit the Air Corps to take advantage of flying instruction given to those cadets who come to the civil contract schools from schools operating under the C.A.A.'s Civilian Pilot Training Program, and to permit other cadets having previous flying experience to forego at least a part of the scheduled elementary training.

The ground school requirements remain the same, however, and every cadet will still be required to qualify in these subjects prior to graduation from the elementary flying school.

Thus, any reduction in the time spent in the elementary phase will depend upon the individual qualifications of each student to forego a part of the required 60 hours flying time and the required ground school work.

Supervisors Determine Allowances

When a Civilian Pilot Training Program graduate enters the military training, for example, his knowledge and skill will be observed carefully to determine whether or not any allowances will be made to him. Partial or maximum allowances to be made will be at the discretion of the Air Corps Supervisor at the school concerned.

The Air Corps method in advancing aviation cadets in five-week classes has been found to be advantageous in many respects. Actual flight training is but one of the phases of instruction necessary to produce a skilled and dependable Air Corps pilot. The important grounding in military education in general, and the instillation of the vital factors of morale and cooperation are among the phases which cannot be neglected.

The move to make it possible to grant partial flying time credit was the result of a desire on the part of the Air Corps to take advantage of the flying training provided by the Government-financed CPTP, and thus help to reduce the cost of such training to the War Department.

Graduates of the CPTP have furnished a major source of aviation cadets since the beginning of the Army Air Corps expansion program. Approximately 10,000 graduates have been sent to the Army and the Navy for training as military pilots, and now, with the change in Air Corps regulations, both services may allow credit for previous flight instruction. The Navy can allow up to 33 hours.

Furnish Flight Instructors

One of the most important functions of the CPTP, as far as the Air Corps is concerned, has been the furnishing of flight instructors for the civilian contract schools providing the elementary training.

Air Corps officers have found also that CPTP graduates entering as aviation cadets in fewer cases fail to qualify for the next higher phase. A recent compilation showed that an average of 84 per cent of the CPTP graduates successfully passed the elementary phase of flight instruction, with some of the later classes reaching 92 per cent.

By comparison it has been shown that approximately 39 per cent of non-CPTP graduates fail during the elementary phase of the Air Corps program.

This good showing by the trainees from the CPTP is credited in part to the fact that the men who either cannot be or don't want to be military flyers are weeded out before entering the Air Corps training. Classes beginning Air Corps instruction without previous training still must lose their percentage of men not fitted to be military pilots.

STUDENTS LOSE RATINGS

ENLISTED men who hold air mechanic ratings and who are detailed as students at flying schools must forfeit their ratings, the Military Personnel Division, Office Chief of Air Corps, announces.

These men will not have opportunities to perform the duties of air mechanics at the civilian flying schools at which they will get their pilot training. In the event such students fail to complete the flight course successfully, however, they will be considered eligible for re-rating when they return to their regular units.

The division considers that this action will work no hardship on air mechanics who may be selected for flight training, since they will be on full-time flying status while undergoing training. The increased income from flying pay will compensate for the loss of the extra income derived from their mechanic's ratings.

CAMERA... *(Continued From Page 30)*

weighty metals. The flexible gun cameras were operated by triggers on the spade grips, and were provided with regulation machine gun sights.

Even after the adoption of motion picture film, the gun cameras were loaded by the old-fashioned spool method, having opaque strips of leader and trailer for daylight loading attached to the actual film. This method was discarded with development of more modern magazine loading, which eliminated the laborious threading of the film through the camera.

With the improvement of electric motors for camera operation, the gun cameras became electrically operated about 1938. As photographic lens and films improved, the 16 mm. film was substituted for the bulkier and more costly 35 mm. film with little sacrifice in clarity of the pictures. This too was a factor in making possible the switch to the magazine form of camera loading.

About this time the fixed gun camera changed its shape, as the armament designers decided there was no point in making it look like a gun since, operated by remote control, the gun suggestion was valueless to the pilot. The new fixed gun camera using the same mechanism as its flexible brother, was built into a long cylindrical shape, somewhat like that of a boat.

This camera was the immediate predecessor of the GSAP camera which was developed after a comprehensive survey of the problem of aerial gunnery instruction by Wright field technicians, who discarded previous types in their effort to produce a new and highly efficient piece of equipment.

First prepared for fixed mounting, the GSAP camera is being adapted for flexible gunnery practice also. Here the Air Corps engineers are confronted with a new problem, since today's flexible gunnery consists in the manipulation of power turrets, bristling with two to four heavy caliber machine guns, instead of the single, manually operated gun of the past.

Besides dogfight training for individual pilots, the gun camera is valuable for other purposes. Blind spots on planes to determine how large a group of fighters is necessary to attack a single large enemy bomber can be discovered, and the proper angles of approach for keeping as much as possible out of his line of fire.

Historically, it is believed that the first gun cameras were employed by the British and French during the world war, about 1915 or 1916. The first British gun camera had a film with six exposures, which could be divided into 12 frames, and each time the camera was fired a cocking operation was necessary. The device was developed in an effort to solve the training problem of judging the distance from the moving base of fire to the moving target. The idea was received very skeptically by British army officials for some time, until the training showed results in greatly increased accuracy of fire, according to accounts of that time.

The French camera was a large box type, which took a picture about four by five inches, and which also had to be cocked after every operation.

American Similar To British

The first American gun camera, produced by Eastman about 1918, was in many respects similar to a more advanced British gun camera. These cameras were built to resemble the machine guns which they simulated, having long barrels and spade grips like those which swung the manually operated guns. They were powered by spring-wound motors and regulation gunsights. They used 35-mm. movie film and were equipped with stopwatches. The stopwatches were so installed that every time a picture was fired the face of the stopwatch showed, recording the time.

This device was added after it was found that gun camera dogfights resulted in disputes between pilots over who fired the first vital shot, thus winning the combat. The cameras contained a simulation of the gunsight, on a glass plate in the camera barrel, marking off each frame of film into quarters. The plate was marked also with concentric circles, indicating the variation of the target from the center of the sight. Lighting for the stopwatch pictures was provided by a system of mirrors, reflecting natural light into the stopwatch chamber. By checking the time on the frame which showed the first vital shot on each of the opponent's films, the priority of claim could easily be established.

Since this basic type gun camera was established, there have been numerous changes and developments. American armament technicians soon developed, by changing the mount, a gun camera for both flexible and fixed gun positions. For fixed forward-firing gun cameras, the control was operated by a solenoid from a button on the control stick, the same system used for forward firing guns. The camera was sighted with the machine gun sights.

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On the occasion of the thirty-eighth anniversary of the first airplane flight by the Wright Brothers at Kitty Hawk, N.C., Professor Richard V. Southwell, world-renowned specialist in aerodynamics, theory of structures and other sciences applied to aeronautics, will deliver the annual Wright Brothers Lecture for 1941 at Columbia University, New York City, before the Institute of Aeronautical Sciences. His subject will be "New Pathways in Aeronautical Theory."

The Wright Brothers Lecture is endowed by a fund of $18,000 provided by the late Edmund C. Lynch, of New York, to honor the memory of his brother, Vernon Lynch. Since 1937 it has been an annual presentation by the Institute of Aeronautical Sciences.

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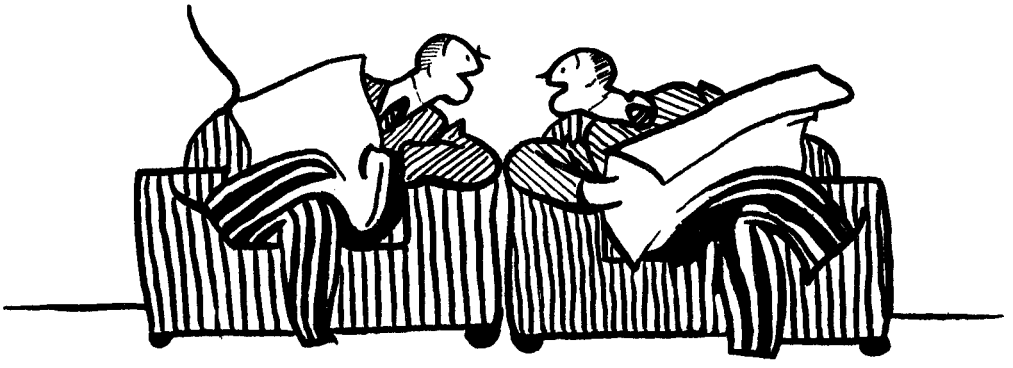
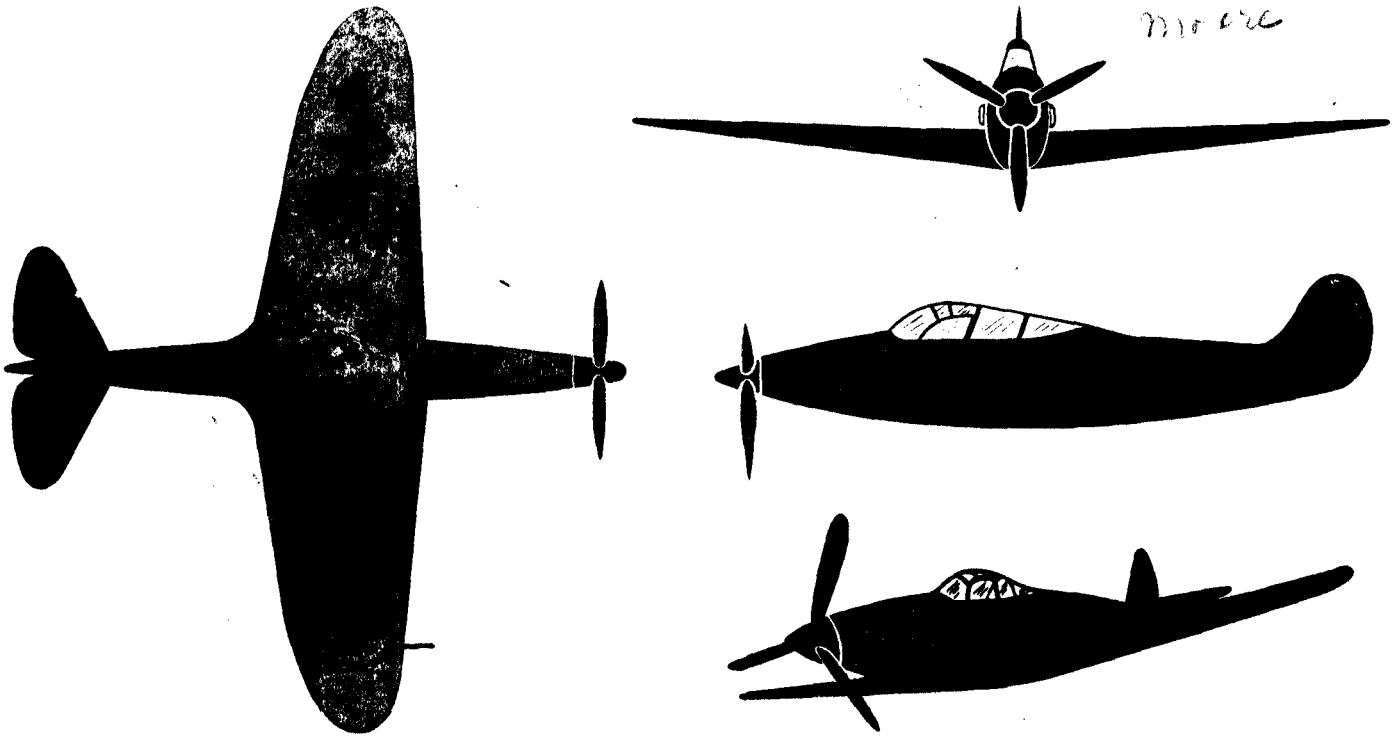
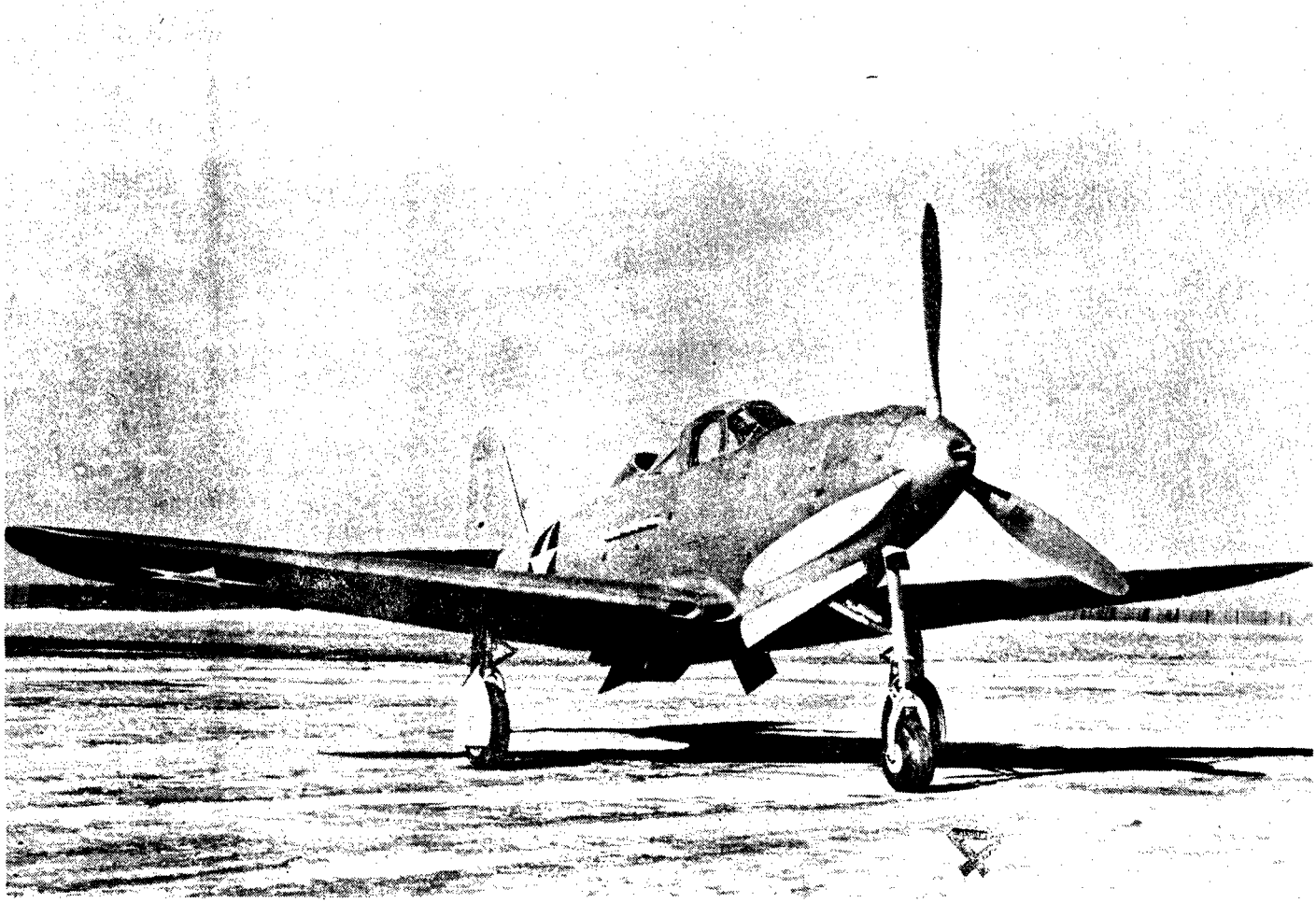


"...strictly between these four walls!"

CARELESS TALK COSTS LIVES





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