# AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES

*Air Commandos: Briefing for Burma*

JUNE 1944

# AIR POWER IN THE SOUTHWEST PACIFIC

Read the analytical article by Lieut. Gen. George C. Kenney, commander of the Allied Air Forces in the Southwest Pacific, beginning on Page 6.

# CROSS COUNTRY

Fighter pilots now get an additional nine weeks of individual training under a revised program made effective March 14 throughout the AAF Training Command. Five weeks have been added to the time it takes to make a bomber pilot.

Each of the periods required to complete the curricula for preflight training and for primary, basic and advanced pilot training has been extended from nine to ten weeks. In addition a new five-week transition course, officially designated "Fighter Transition, Single Engine and Fixed Gunnery," has been established for fighter pilots. Nine weeks' transition training has been established for fighter pilots. The nine weeks' transition training heretofore given bomber pilots in the two- or four-engine specialized schools has been stretched to ten weeks.

With the exception of the new transition course for fighter pilots, the revised schedule is a reversion to the ten-weeks-for-phase system employed before Pearl Harbor. Now that combat requirements are being filled, it is possible to slow down the tempo and allow students to absorb the complex instruction, reducing the mental and physical pressure under which they study and practice.

Most significant feature of the new program is the fighter transition course. Heretofore, transition training for them was included in the OTU curricula. Under the new arrangement, the fighter pilot, after graduation from an advance single-engine school with wings and a commission, gets ten days leave, then returns for the five weeks' transition course.

### THE FRONT COVER

Transport and glider crews of the troop carrier command are shown receiving final briefing before a recent airborne invasion of Burma. Col. Philip G. Cochran, Air Commando leader, explains the mission with aid of a map improvised from bed sheets. For details of troop carrier operations in Southeast Asia, see page 4.

### OFFICER APPOINTMENTS OVERSEAS

Warrant officers and enlisted men in non-combat assignments overseas may now be appointed second lieutenants by their theatre commanders. To be eligible for appointment, men must have demonstrated outstanding qualifications and be employed on work so important that they cannot be released to officer candidate schools.

In selecting individuals under the new authorization, particular consideration is to be given demonstrated leadership and ability of the men and their prospective value to the service in future assignments and in higher grade. In general, the appointments are to be limited to filling positions of a command nature or those which require special technical or professional skills. The number of such appointments will be limited to filling vacancies in tables of organization and allotments. Such overseas appointments will not be made for assignment to the Medical Department or the Chaplain Corps.

Overseas theatre commanders previously were authorized to appoint officers from the ranks for combat leadership.

### REPRINTS

In response to numerous requests for reprints of a series of articles on compressibility, written for AIR FORCE by Col. Ben S. Kelsey early last year, we are making a limited number of reprints available on request — first come, first served. Requests for two recent covers also have justified having them reprinted for distribution on request. These are the inside back cover of the February issue, a poster on the theme "Waste Delays Victory," and a security poster on "Self-Censorship" which appeared as the back cover of the May issue. Requests should be directed to the Service Division, AIR FORCE Editorial Office, 101 Park Avenue, New York 17, N. Y.

### SARDINIA SCENE

When our air and ground forces moved into Sardinia they found the civilian population coming down from the hills where they had fled to escape the heavy air attacks. They were hungry, poorly clothed. Some were without shoes. As everywhere, Americans began sharing their candy and cigarettes with Sardinians of all ages who

naturally supposed the visitors had a limitless supply. The civilians showed their gratitude by offering to do GI laundry and being generous with their high octane wine. Best delicacy the troops found was the abundance of almonds which, toasted, make a fine feast.

Some of the men coming down the mountains were Italian soldiers who had deserted the Fascist army. Most of them carried American and British pamphlets which offered good treatment upon surrender. They hastened to take advantage of the promise.

One Italian infantryman walked confidently into a B-26 squadron area, armed with safe-conduct pamphlets, a serviceable rifle and enough hand grenades to hold out for a month, provided he had been of that mind. He also had brought along his barber tools which he was interested in using. After proving his good intentions, he trimmed every head of hair in the squadron before being sent on to higher headquarters.

"Me? I'm a four-engined pilot."

## New Engineering Courses

The AAF Engineering School is currently being reactivated at Wright Field, Dayton, Ohio, to provide short courses in basic and specialized phases of aeronautical engineering. It is anticipated that most of the graduates will be assigned to the Materiel Command or similar duty. Students will be officers who are academically well qualified for engineering. A limited number of officers completing the three-month course with very high standing will be considered for extended post-graduate work at leading educational institutions. Applications may be submitted through channels at any time, in accordance with AAF Regulation 20-36.

## Two Other Fellows

The small PT-17 biplane was letting down for a landing on the mile-long, 150-foot wide concrete runway. The landing was proceeding well enough when, still short of the runway, the plane suddenly dropped to the ground. The landing gear buckled, the plane pitched forward, a wing tip caught the ground, and a shaken-up pilot and passenger climbed out after a hard ground-loop.

After staring at each other a moment, they turned and walked to operations to file their accident report. The pilot, a British Flight Officer, nervously explained the mishap to the operations officer.

"Sorry about it," he said, then pointed to the passenger. "I thought he had it and he thought I had it and the bloomin' thing just landed itself."

## Miami Exodus

Army Air Forces schools at Miami Beach for the training of officer candidates, preflight cadets and basic soldiers will be transferred to the San Antonio Cadet Center and Sheppard Field in Texas. Between April 15 and July 1, a total of 139 Miami Beach hotels, previously taken over by the Army for training and housing facilities, will be returned to civilian use. An estimated 20,000 officers and men, now training at Miami Beach, will complete their work at the present location. Steps already have been taken to send all future classes to Army-owned installations, and the full shift of the program is expected to be completed by mid-summer. The War Department has pointed out that the transfer is made possible primarily because the increasing number of trained AAF personnel being moved overseas has made Army-owned facilities available.

Miami Beach will continue as the site for operations of the Air Transport Command, AAF Redistribution Station No. 2, and the Rehabilitation and Convalescent Training conducted by the Air Surgeon.

## Wait Up for Me!

Lieut. John J. Davis, pilot of the B-17 Mrs. Satan, Queen of Hell, noticed that a fuel tank was leaking a few minutes after taking off on a mission over Europe. He turned back to have this repair made, after asking his leader to hold open Mrs. Satan's place in the formation.

The Fortress returned to the home field and two fuel tank leaks were repaired. They were preparing to take off again when the pilot heard a bumping noise from the landing gear. Lieut. Emil L. Johnson, navigator, got out and saw a huge lump on the left front tire. A further survey showed that the rear tire was flat, so the ship was taken to its hangar.

Lieutenant Davis was told he might as well forget this mission, but the pilot was a determined individual. He was going along if he had to walk. A fast-working ground crew changed the two tires, and once more the Fort taxied out on the runway and took off. Just inside the enemy coast, Lieutenant Davis overtook his formation and proceeded over the target to drop his bombs with the others.

## Parachutes

LOST:

No. 42-73861, seat type, return to Operations Officer, AAF Pilot School (Basic), Majors Field, Greenville, Texas.

No. 41-1436, return to Operations Office, Clinton County Army Air Field, Wilmington, Ohio.

No. 42-333584, return to Operations Officer, Birmingham Modification Center, Bechtel-McCone-Parsons Corp., Birmingham, Ala.

No. 41-8196, seat type, return to Ajo Army Air Field, Ajo, Ariz., or, Williams Field, Chandler, Ariz.

No. 42-645780, presumably lost in a PBY which was delivered to New Orleans in March. Return to, or notify, Pfc. John J. Bullock, 2nd O. T. U., Hq & Hq Squadron, Homestead Army Air Base, Homestead, Fla.

## Redistribution

The Redistribution Center cartoon feature which appeared on Page 25 of the April issue of AIR FORCE was intended as a semi-humorous portrayal of the recreational phase of the redistribution program and was not intended as an illustrative summary of the redistribution operation. That operation has been explained as follows:

"Developments produced by the war in the realm of science, engineering, chemistry and mechanics have their parallel in the organizational and personnel advancements which have been made in our armed forces. An example is the thoroughly realistic but obviously necessary activity known as the AAF Redistribution Center.

"This vital AAF mission is conducted under the policies laid down by General Henry H. Arnold, and is directly supervised by his Assistant Chief of Air Staff for Personnel, Maj. Gen. James M. Bevans. It is designed to further the war effort by insuring the maximum utilization of AAF personnel returned from overseas combat. Redistribution is devoted to the serious purpose of administrative and medical processing to determine what assignments returnees are best fitted to perform and where their experience and ability can best be used.

"This processing is conducted under conditions which impress upon the mind

of each man the work yet to be done and the important part he must perform in the AAF program. The returnee reaches his new duty station physically and mentally equipped to do the job selected for him, whatever that job may be.

"Redistribution is a link in the personnel chain, an attempt on the part of the Commanding General of the AAF to win the war more quickly by the proper employment of its manpower."

### Too Late for Elrod

Staff Sgt. William Elrod of Cincinnati, a radio gunner who returned recently from the South Pacific, appreciates the value of a new provision in that area which states that a combat flight of three hours or more may be considered a mission, regardless of what occurs in the air.

"I was flying with a crew on their first mission, although it was the thirteenth for me," explained Elrod, now an instructor at Sioux Falls (S. D.) Army Air Field. "After dropping our bombs on Gasmata, thirteen Zeros came after us. We headed out to sea and they knocked out two of our engines.

"After reaching northern New Guinea, the ship crashed into the surf. We waded ashore and hiked back to the field with our clothes soaking wet. We didn't get credit for the mission because we didn't bring the plane back."

### Reading Matter

Bulk distribution of a special edition of "Instrument Flying, Basic and Advanced," TO No. 30-100 series, has been started by Publications Distribution Branch, Air Service Command. One copy is to be given each pilot for his personal file, with local distribution to be supervised by station commanders. Distribution also is to be made to cadets at AAF flying schools at a point in the training program to be determined by the commanding general of the Flying Training Command. Some 250,000 copies have been printed for this personal distribution.

### Ominoreg!

We have just been apprised of the strange mishap which overtook a paratrooper at Fort Benning during maneuvers. This young man leaped from his plane, yelled "Geronimo" properly enough, but instead of going down he went up. As his many friends and acquaintances floated to the ground, just as they had been taught, this young man floated higher and higher until he became greatly concerned. With no more control over his movements than a wisp of thistledown, the paratrooper was tossed about on the point of a thermal wave. He spent half an hour watching his outfit fighting fierce mock battle on the ground. In time, the thermal wave released the young man and he came down to join his battalion as a fresh reservist.—The Editor.


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## BRIEF



## DEPARTMENTS




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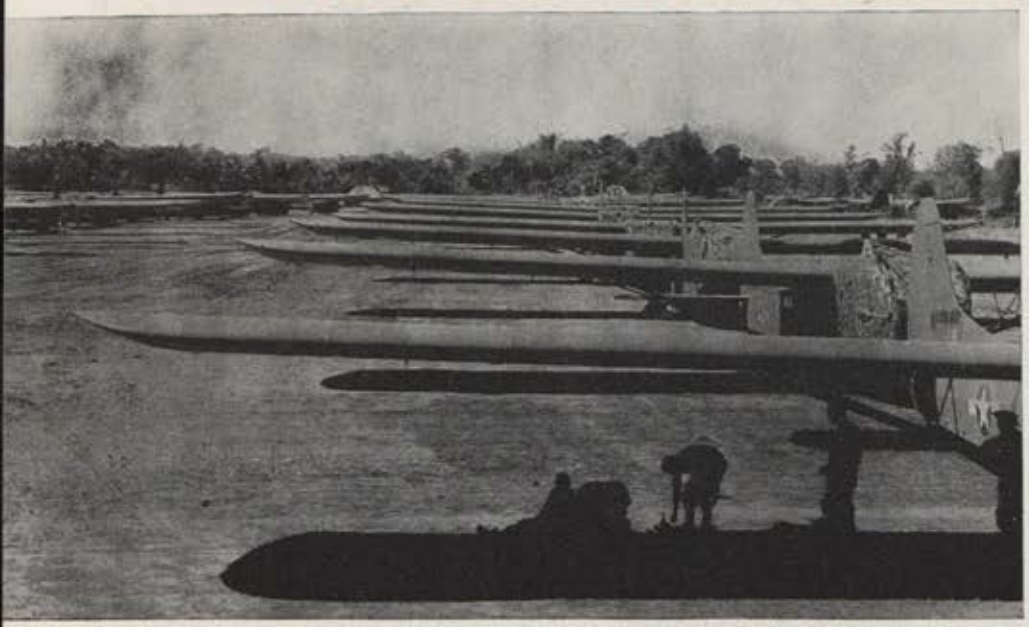
# OUR TROOP CARRIERS IN BURMA



Ready for their vital role in the invasion of Burma are these CG-4A glider planes which transported infantry and artillery units and tons of materiel to points behind enemy lines.

**'Troop Carrier Command's operations over Burma have proved conclusively that with air superiority there is no such thing as encirclement.'**


## Squadron Leader H. B. Dickson, RAF

**EASTERN AIR COMMAND, SOUTHEAST ASIA**


SINCE the first day of 1944 when troop carrier operations were begun on the Burma front, the Troop Carrier Command in Southeast Asia has established a radical new principle of warfare.

During thousands of sorties the command has dropped millions of pounds of supplies to combat troops—often within rifle shot of the enemy. It has carried infantry and artillery units many miles behind the Japanese lines; it has evacuated hundreds of sick and wounded from points behind those lines. And its work is just beginning.

When Lord Louis Mountbatten, Supreme Allied Commander in Southeast Asia, asked Maj. Gen. George E. Stratemeyer to form an Allied operation air force for the war against the Japanese in Burma and Southeast Asia, General Stratemeyer set up the Eastern Air Command with four air arms under it. These consisted of a Tactical Air Force, a Strategic Air Force, a Photo-Reconnaissance Force and a Troop Carrier Command.

It was only logical to establish the troop carriers as a separate force for, in the unique Burma war, air supply of ground troops has been an all-important factor since 1942 when General Stilwell's retreating forces were maintained by RAF and USAAF planes during their march from Burma. The command, as set up, comprises equal numbers of RAF and USAAF squadrons, with the RAF units nearly double the size of those of the USAAF.

Brig. Gen. William D. Old was selected to head the troop carrier operation. He had taken active part in earlier supply-dropping operations in Burma and had served as chief of staff of the 10th Air Force, whose combat organizations now were to be turned over to the Allied Eastern Air Command as operational units of the strategic and tactical air forces. General Old took command of all USAAF and RAF troop carrier squadrons in India.

Regarded as one of the most skillful pilots in the theatre, General Old leads many flights personally. He once headed a squadron of Allied troop carriers into the Arakan on a stormy day when several other flight leaders had turned back. That flight, on which ammunition and supplies were taken to an isolated British division, is believed to have been the turning point in the Japanese offensive in the Arakan. British-Indian troops, sustained by air supply, fought their way out of an encirclement which threatened them with disaster; the Jap offensive was turned into a Jap defeat.

In January of this year, General Old's Troop Carrier Command began its career by dropping thousands of tons of supplies to Lieut. Gen. William J. Slim's 14th Army. The effort was stepped up in February when the battle for the Ngakyedauk Pass reached its climax. The 7th Indian Division was encircled, and supplies could not reach them by road.

GENERAL SLIM, Air Marshall Sir John Baldwin, commander of the Tactical Air Force, Eastern Air Command, and General Old conferred with members of General Stratemeyer's staff. Together, they found the answer to the problem. Air Marshal Baldwin's Spitfires and Hurricanes were to provide top cover for General Old's C-46s and C-47s which would

Mules such as this stubborn fellow being coaxed aboard a transport plane are but one of many thousands of supply items flown by the Troop Carrier Command to front line forces in Burma. The mountain range between India and Burma makes normal methods of communication impractical.

attend to the supply job. A few hours after the message giving the details of the encirclement had been flashed to General Slim's headquarters, the transports were on their way with fighter escort.

By day and by night they flew every conceivable commodity, from guns to newspapers, to the troops. The 7th Indian Division and the Japs were locked in a complicated series of maneuvers which resembled a game of chess. Each time the Japanese expected to checkmate the Allies, the Troop Carrier Command converted a pawn into a queen and made the Japs run for cover. During this hectic period, many troop carrier pilots flew as many as sixteen hours a day. As a result troop carrier's February tonnage far exceeds the January figure.

But behind the scene, in Lord Mountbatten's and General Stratemeyer's headquarters, an even greater job was being planned for Troop Carrier Command—the airborne invasion of Burma. It was the job of the Troop Carrier Command to fly in the majority of British ground troops to airfields constructed behind enemy lines, after Col. Philip G. Cochran's Air Commandos had flown in the airborne engineers and built landing strips capable of accommodating the C-47s. Some indication of the rising offensive against the Japanese may be gained from the fact that, in March, the supply tonnage and the sorties flown by Troop Carrior Command were fifty percent greater than in February.

From the figures available to date, it appears that April will be the most successful month—both from the standpoint of numbers of sorties and of tonnage dropped—in troop carrier's brief history in Southeast Asia.

In its operations over Burma, the Troop Carrier Command has demonstrated a new concept of warfare. In the past, it has been considered a military axiom that the cutting of the lines of communication of a force dooms it to destruction. Encirclement is fatal. The Troop Carrier Command has proved repeatedly not only that it is practical to supply an encircled force so it can function effectively against the enemy, but that it is possible to continue this process indefinitely. To quote a member of General Old's staff, "Troop Carrier Command's operations over Burma have proved conclusively that with air superiority there is no such thing as encirclement."

In other theatres, troop carrier units have transported and supplied ground troops for short emergency periods, such as the troop carrier operations during the invasion of Sicily. Following the initial invasion or attack and the establishment of normal transport facilities by boat, train and truck, the units have reverted to their routine transport operations.

The India-Burma border, however, is a geographical freak. The walls of mountains which run north and south between the two countries make normal methods of communication impractical and, as a result, any and all warfare in that area becomes, from the aspect of the Troop Carrier Command, a continuous operation. For months, USAAF troop carrier squadrons supplied General Stilwell's troops along the Ledo road. More lately, Troop Carrier Command squadrons have been doing the same thing for the American and Chinese troops under General Stilwell in north Burma as they advance down the Mogaung Valley. There, as elsewhere along this 1,200-mile front, they evacuate the wounded and sick from forward airfields, supply the advancing troops with everything they need, including mules and bullocks, and frequently drop a few bombs on Jap troop concentrations for good measure on their return flight to their permanent bases.

TROOP carrier units also are currently providing a continuous flow of supplies to the special forces in north central Burma, and to the Imphal, Arakan and Kaladan sectors. Each of these is a separate front, and each represents a continuous commitment for Troop Carrier Command.

Many of the operations are performed at night, when pinpoint navigation and split-second coordination with ground troops in receiving and transmitting signals is essential. Supplies are dropped not to the rear of the troops, but directly at the front line within easy range of enemy small arms fire. As a result, many aircraft return to their bases in damaged condition—one came back recently with more than 1,000 bullet holes in its wings and fuselage—but actual aircraft losses have not been substantial.

When commitments from the various fronts exceed the number of aircraft that Troop Carrier Command has available, additional planes and crews are borrowed from the Air Transport Command.

After treatment at an advanced base, wounded and sick personnel are seen being transported in a C-46 to a rear hospital. Evacuation of non-effectives is among the TCC's many tasks.

Just as the aircrews operating in Troop Carrier Command are both American and British, so too are the brains which direct this tremendous operation. Topping General Old's staff as deputy air commander is Group Capt. F. K. Donaldson. Lieut. Col. Willard West and Maj. Frank E. Sears also are on his staff. The former has a high reputation for his ability to organize new units, while the latter commanded the first American troop carrier squadron on the Burma front, which was cited for its operational record under his command. Wing Comdr. E. B. Fielden, who flew with the RAF in World War I and has 10,000 hours to his credit, also is in the operational side of General Old's staff. He directed RAF troop carrier squadrons of the Troop Carrier Command in the recent airborne invasion of Burma.

Anglo-American cooperation in Troop Carrier Command is paying off with powerful, deadly efficiency. It has repeatedly been the savior of both well and wounded on this battlefront of mountain. swamp, jungle and river. ☆

Engineers flown in by Col. Philip G. Cochran's Air Commandos are seen constructing a landing strip behind Japanese lines in Burma for planes of the Troop Carrier Command. The completed airfield was capable of accommodating C-47s and gliders bearing invading troops and equipment.

# AIR POWER IN THE SOUTH


## By Lieut. Gen. George C. Kenney

**COMMANDER OF THE ALLIED AIR FORCES IN THE SOUTHWEST PACIFIC**


THE air force is the spearhead of the Allied attack in the Southwest Pacific. Its function is to clear the air, wreck the enemy's land installations, destroy his supply system and give close support to troops advancing on the ground.

Clearing the air means more than air superiority; it means air control—air control so supreme that the birds have to wear our air force insignia. Wrecking the enemy's ground installations does not mean just softening them up. It means taking out everything he has—airdromes, guns, bunkers, troops. Destroying his supply system means cutting him off the vine so completely and firmly that he not only cannot undertake offensive action but, due to his inability to replenish his means to wage war, he cannot even maintain a successful defense.

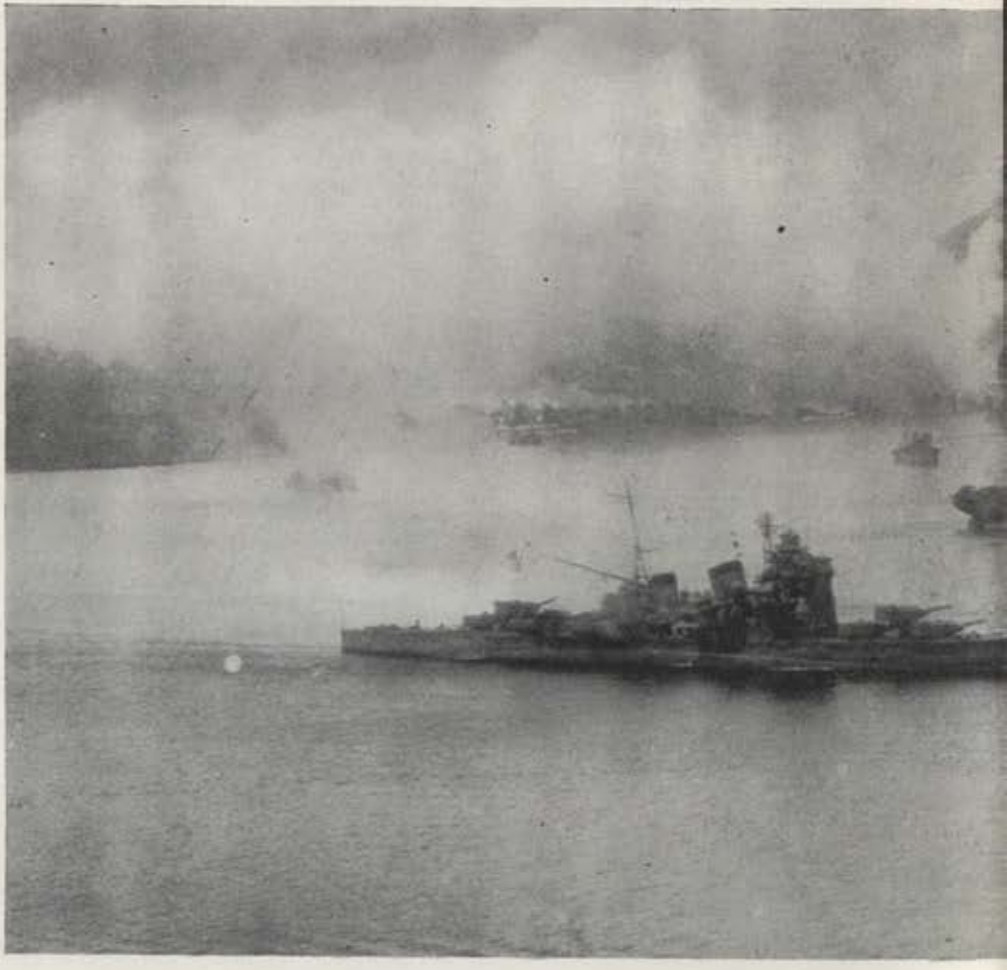
Before we got air control we had to fight for it, and we have had to maintain it by shooting out of the air or burning up on the airdromes every Nip plane attempting to question it.

At the time of my arrival here in July, 1942, we felt we would be lucky if we didn't have to fight the Nip in Australia. When I went up to Port Moresby for the first time, the plane stopped rolling just long enough for me to get out. It took off before the enemy could catch it on the ground. Shortly after that the Nip came over and strafed the airfield. I may have had a lot of plans and ideas but this attack crystalized one of them—the determination to clear the enemy off our lawn so that we could go across the street and play in his yard.

We did not have the strength to do it then. We were like a smaller and lighter man in the ring with a bigger, heavier opponent. There is only one thing you can do in a situation like that. You box. We boxed with energy. We had to duck the haymakers the Nip was throwing at us and at the same time keep jabbing, looking for openings. It was difficult and heartbreaking work. In those days the RAAF (Royal Australian Air Force) was practically the backbone of our forces. The Australian airmen fought valiantly because they knew the next backward step would bring the fighting to their homes. The Americans fought bravely because they knew the step after that would bring the enemy nearer the United States.

From the mainland of Australia we conducted raids on Lae and Salamaua, using the airfields on the small part of New Guinea which was still ours as hopping-off places. We had to be careful and cautious when we staged our planes, however. Else the Nips would catch us on the ground and destroy our aircraft. With all our strength, we set about neutralizing Jap strongholds one at a time.

The first place to be taken out was Buna. During August, 1942, the Nip had fixed up a field there and it was a real thorn in our sides. Only 100 air miles from Port Moresby, his planes would come over the 13,000-foot Owen



# WEST PACIFIC

- ☆ Control of the Air
- ☆ Constantly Changing Tactics
- ☆ Skip Bombing for Greater Accuracy
- ☆ Increasing Forward Firepower
- ☆ Adding Range to Fighter Aircraft
- ☆ Rehearsing for Offensives
- ☆ Dropping Paratroops and Flying Cargo
- ☆ Spearheading Surface Operations

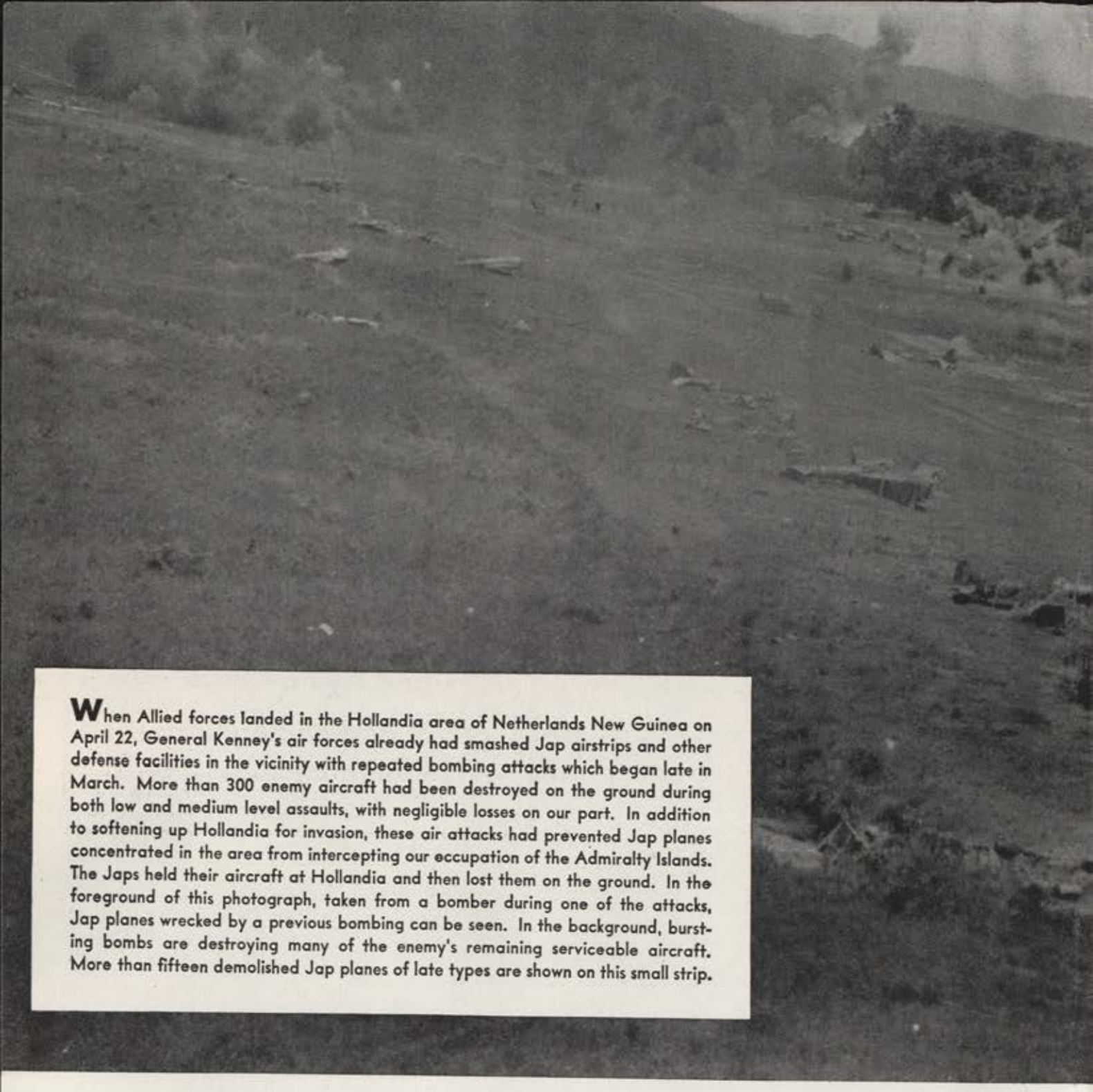
Stanley range and nose over on top of us before our inadequate warning system could give us a chance to get our fighters up. At this time the Japs were within thirty miles of Moresby itself.

The 5th Air Force went to work. Our fighters began to patrol over Buna. If the Nip came up we shot him down. If he did not come up, we strafed him on the ground. In between times, heavies, mediums and light bombers dug holes in his runways, battered down his revetments, burned up his stores and strafed his personnel. The Jap kept filling up the bomb craters and we kept making new ones. He replaced his airplanes and we promptly shot them out of the air, or burned them on the ground. Before long, he tired of the game and didn't bother to fill in the holes on the runway. It had cost him around 75 planes and he decided that it was too expensive.

Employing the same procedure, we then started working on his fields at Salamaua and Lae and by November the Nip was out of our front yard. We could now cross the street and play in his. Meanwhile, the Australians had pushed his ground forces back across the mountains and with complete air control we ferried a division of Americans across the mountains and for the next two months, until Papua was regained, supplied them and the Australians by air. Troops, food, ammunition, artillery, jeeps, in fact, everything that would go into the door of a C-47 went over the "hump" and the sick and wounded came back.

IN the meantime, Rabaul beckoned. Here was the big supply base for all Jap forces in the Bismarck, the Solomons and New Guinea itself. With 150,000 tons of shipping constantly in the harbor and a couple of hundred planes on the main airdromes just outside of town, we had plenty of work on our hands. From Rabaul, too, came the convoys; eight in all, that tried to relieve the Nip forces in the Buna area. From August 1, 1942, to January 2, 1943, when Buna fell, we had not only defeated every attempt to bring convoys from Rabaul to that area but had

This surprise low-level smash at Rabaul caught Simpson Harbor full of Jap shipping. The 10,000-ton Nachi class cruiser in the foreground later was badly damaged; beyond the cruiser, at its port side, is a 10,380-ton transport, Hakusan Maru, which has been hit amidships and burns fiercely. In the background are a 5,160-ton sub tender, two 3,800-ton motor vessels, and two transports totaling 10,702 tons.



**When Allied forces landed in the Hollandia area of Netherlands New Guinea on April 22, General Kenney's air forces already had smashed Jap airstrips and other defense facilities in the vicinity with repeated bombing attacks which began late in March. More than 300 enemy aircraft had been destroyed on the ground during both low and medium level assaults, with negligible losses on our part. In addition to softening up Hollandia for invasion, these air attacks had prevented Jap planes concentrated in the area from intercepting our occupation of the Admiralty Islands. The Japs held their aircraft at Hollandia and then lost them on the ground. In the foreground of this photograph, taken from a bomber during one of the attacks, Jap planes wrecked by a previous bombing can be seen. In the background, bursting bombs are destroying many of the enemy's remaining serviceable aircraft. More than fifteen demolished Jap planes of late types are shown on this small strip.**

probably sunk or damaged a total of 300,000 tons of shipping trying to run our air blockade or in Rabaul Harbor itself. During the same period we had destroyed 1,888 Jap aircraft. Meanwhile, we had to conserve every bit of striking force we could muster.

Production at home had not yet reached the point where aircraft could be spared for this theatre. We rebuilt airplanes so badly shot up they would ordinarily be considered only fit for salvage. We cannibalized the ones we couldn't rebuild and used the pieces to make one or two airplanes that could be made to fly. And we protected those we had in every way we knew how. We built a great air fortress in Port Moresby, where every airplane was closely protected by earthen revetments, wide-spaced dispersal areas and plenty of anti-aircraft guns and searchlights. We installed warning services, established observation posts up in the hills and maintained our fighters constantly on alert. As soon as we owned the ground on the north coast of Papua, we worked like beavers to build the same kind of fortress in the Buna area—a fortress designed to give us more elbow room and to take a heavy toll of enemy visitors who tried to destroy our planes.

In addition to learning how to wrest air control from the Jap, the Buna campaign taught us some other valuable lessons. While our bombing of Jap shipping was getting results, our losses were running too high to suit us, and we were getting too low a percentage of hits. We tried night bombing for awhile to cut our losses and got some surprising results. Bombing at lower altitudes than during daylight, using flares and without

the usual Jap fighter interference with the bombardier's work, our percentage of hits went up.

This latter point was driven home to me one day when I met a squadron of Fortresses just back from bombing a convoy heavily protected by a Jap fighter escort. The planes landed, some without brakes, some without flaps; nearly all of them badly shot up. A sergeant-bombardier crawled out of his compartment which had a dozen bullet holes through the plexiglas nose.

"How did it go, sergeant?" I asked.

"General," he said, "I've got to get some new kind of vitamins. Some new kind that'll make me tough."

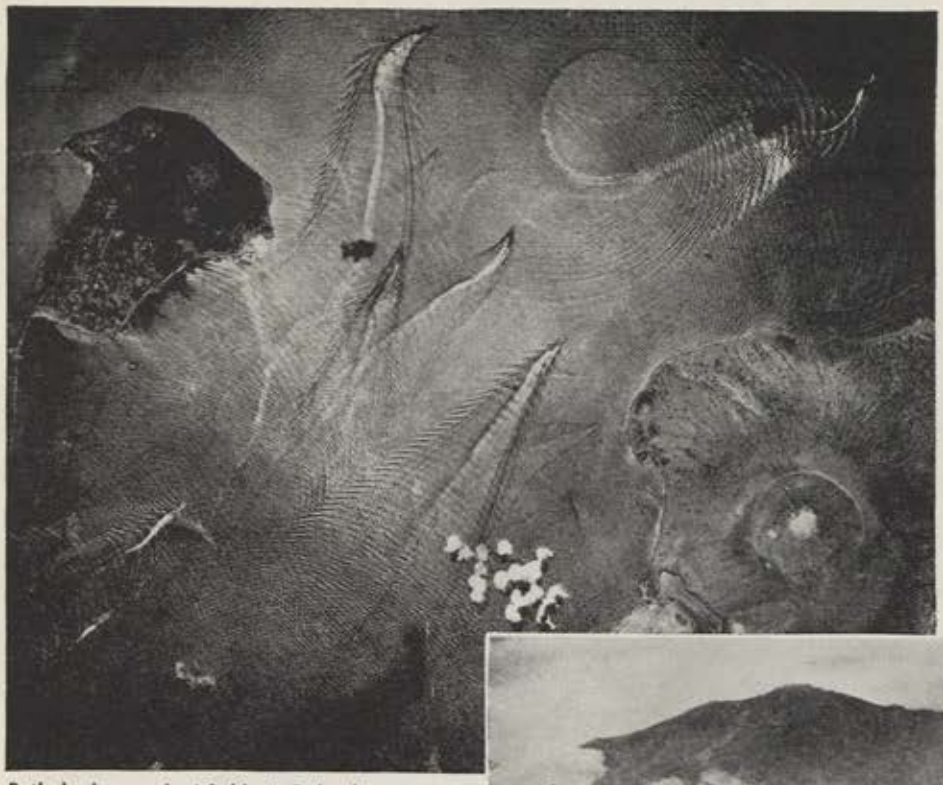
He looked plenty tough to me and I told him so. He only shook his head and went on grimly.

"No, General, I need something to make me tough so that I can keep my mind on my work. When those bullets start coming through the nose and buzz past my ears while I'm bombing, it takes my mind off my job. Today, I dropped my bombs 100 feet too short. That's bad. You ought to give us some new vitamins or something to make us tougher."

It was then that I noticed what had been distracting the vitamin-hungry sergeant and had made him drop his bombs short. His foot was bandaged where it had stopped a Jap machine gun bullet.

However, the hazards of night flying among the tropical storms between Moresby and Rabaul, and the enemy anti-aircraft were still costing us too much. We went to fighter cover for all day bombardment missions and the crews started reading continued stories again.

The question of accuracy still remained



Both harbor and airfield at Rabaul were targets of the November 2 attack. Scurrying like minnows in their frantic efforts to avoid 5th Air Force bombs, only ten of the forty Jap ships (above) escaped damage. The airstrip (right) is under a blanket of phosphorus bombs; five Jap planes can be seen on the ground.

to be solved. Skip bombing, as we call it, gave us the answer. There was nothing new about the idea. Both the British and the Germans had done what they called mast-height bombing and Eglin Field had done some work along that line.

Under the leadership of the late Maj. Bill Benn, one of the most brilliant officers in the 5th Air Force, skip bombing was developed to a fine art. For weeks, Benn practiced bombing methods on a half-submerged wreck outside Port Moresby. He experimented with all types of approaches, sizes of bombs and fuzes. There was no denying that the method was the one we wanted. Nor was there any trouble over the size of bombs. We could use any size. The timing of the fuze had us going for a short while. We improvised by taking an Australian fuze and cutting its delay just about in half. That worked for the time being, until the Australian manufacturers could turn out exactly what we wanted.

Bill Benn taught himself and then trained his whole squadron of B-17s. Finally one night in October, he led six planes down into Rabaul harbor. From 200 feet altitude he sent six Jap vessels to the bottom and brought his six planes back home. Skip bombing became the standard, sure way of destroying shipping, not only in Bill's bombardment squadron but throughout the 5th Air Force.

There was only one thing wrong. We did not have enough forward firepower to take out the deck defensive fire that every Jap boat seemed to have. The B-17s didn't have it and it looked like too much of a job to remodel the Fortress. The A-20 had four forward-firing caliber .50s, but it didn't have much range and couldn't carry big bombs. The B-26 was going to be replaced by the B-25 in our theatre. By the process of elimination it looked like the B-25. We took out the bombardier, put a package of four .50s in the nose, two more packages of two guns each on each side of the fuselage, threw away the bottom turret, put some more gas in its place, balanced the plane with a little lead where necessary, and as soon as enough were ready to equip a light bombardment squadron, we started training.

Six weeks later, on March 3, in the battle of the Bismarck Sea, the bombardment squadron, led by Maj. Ed Larner, had its first action. Twelve B-25 "Strafers," as we called them, sank ten Jap vessels in twenty minutes, scoring better than fifty percent direct hits. The greatest commerce destroyer of the war was born.

We hurriedly remodeled every B-25 we could get our hands on and made the phrase "air blockade" really mean something.

The eight forward-firing caliber .50s generally aided by the two in the top turret have proven good enough to beat down the defensive deck fire of anything we have encountered to date, from luggers to light cruisers. If we ever have to take on heavy cruisers or battlewagons, we will go back to high altitude level bombing but for everything else we feel that we have the cure.

The B-25 is not the only plane that has been modified here. Here every type airplane we get goes through some phase of modification. It is unavoidable. When you get out in the show, unforeseen things happen. In the rapid development of air power it is impossible for Wright Field or the manufacturers to make aircraft that will meet every purpose. For example, no other theatre at any previous time had the barge as a target for a plane. It is not fair to ask the bombardier to keep his eyes glued to the bombsight when the enemy is throwing shells at him. He needs his "vitamins" and he and the other flyers get them through modifications in all our planes.

The B-24 provided a similar problem but for another reason. The first ones we received had five separate .50 caliber guns mounted in the nose. There was not enough room for both the bombardier and gunner during the bomb run. We made a modification which was not original with us. The Hawaiian air depot of the 7th Air

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**The already low incidence of mental 'crack-ups' among our flyers in the ETO decreases as the fury of sky battles rises. Here's why.**

# THE CONQUEST OF FEAR

**By Maj. Arthur Gordon**

**AIR FORCE Overseas Staff**

THERE are two notable things about flying fatigue or combat exhaustion or nervous disorders of any kind among American air crews based in Britain.

One is that such cases are so remarkably rare. The men who fly the heavy bombers to Berlin and the fighter pilots who escort them meet the toughest aerial opposition in the world. On an average mission they encounter hazards as weird and perilous and varied as human beings have ever had to face. Yet the incidence of anxiety neurosis is lower than in any recorded combat unit of World War I, and—so far as is known—has yet to be matched in World War II.

The other significant fact is that as the fury of the sky battles increases and the tempo of the air war rises, the percentage of men seriously affected is going down. One reason for this is that flight surgeons have learned how to prevent advanced cases of flying fatigue. But the main reason is that the combat men themselves understand it, and, when they understand it, it ceases to be a huge menacing threat and becomes a reasonable finite problem which can be analyzed and solved.

The fact that only three psychiatrists are currently assigned to an aerial armada that matches the RAF in size proves that the American airman does not crack easily, even under the worst conditions. In a year and a half of furious fighting there has been just one case of a flyer developing a true psychosis.

This does not mean that all the flying personnel of the 8th Air Force are lion-hearted supermen. They are not. Combat frightens them and they admit it. They would be either liars or fools if they did not. The stress of operational flying is such that everybody engaged in it suffers from fear and anxiety to a greater or less degree. But the realization that a certain amount of anxiety is inevitable does more than anything else to pull its teeth. Understanding of the sort of tricks it may play on a man is almost always enough to render those tricks much less harmful—or at least powerless to interfere with the flyer's job.

IN any form of active warfare the conflict in the participant's mind between fear and the driving forces which make him face danger is obvious. The airman, however, must meet a set of hazards which are peculiar to his profession. Many of them have never been encountered in any previous war.

In their efforts to understand these highly specialized dangers and the attendant mental stresses, psychiatrists and flight surgeons have often accompanied flyers on combat missions. At least one, Capt. David G. Wright of Philadelphia, has been wounded in action and wears the Purple Heart and the Air Medal with Oak Leaf Cluster. Men like these, adding battle experience to their psychiatric training, constantly pass their conclusions along to the combat crews. "You can't fight fear effectively," they say, "unless you know what you're fighting against."

Bomber crews are more likely to suffer from nervous reactions than fighter pilots. The added responsibility for the safety of nine other men, the lack, in some cases, of any sense of individual combat, the comparative inaction during the long tense hours—all these things are partly responsible. In a bomber crew, paradoxically enough, air combat is often too abrupt, the action is too instantaneous. An air gunner on a Fortress or Liberator who gets in one useful burst at an enemy fighter in the course of a six-hour mission may have anywhere from two to six seconds in which to expend the tension that has been built up inside him. This is not enough. From a psychiatric point of view, fighter pilots who engage in twenty minutes or half an hour of violent combat are luckier. Bomber pilots and co-pilots who cannot fight back at all, who have to sit there and take it, are more likely to develop anxiety symtoms than the men who can press a trigger and see their tracers streaking off in the direction of the enemy.

This is only one of the mental hazards. Bomber crews suffer from the further disadvantage of not being able to see the immediate effects of their efforts. Fighter pilots have the satisfaction of seeing the enemy plane disintegrate under the fire of their guns—or at least enjoy the sense of excitement and participation that comes from personal combat. For the bomber pilot, in a sense, there is no victory and no defeat. He may see his bombs fall in the target area, but even so he can only imagine their effect. The eagerness with which bomber crews haunt the photographic laboratories for a glimpse of the pictures which will stamp their mission a success proves that a specialist in any profession likes to feel that his skill and training are not being wasted.

Bomber crews and fighter pilots alike must face the violent contrasts that make up the life of an air fighter based in Britain. One evening a man can be having dinner in a modern hotel with most of the comforts of civilization; the next morning he may be a human clay-pigeon five miles up over Germany. The transition is unbelievably abrupt. There is no time to become adjusted, to get set mentally. An infantryman in the front line has usually arrived there gradually, adapting himself slowly to changing conditions. When he goes into action there has been a preparatory period of days or even weeks. The flyer has no such opportunity, and the incongruity of these pendulum swings between war and peace produce a certain amount of nerve strain.

ANOTHER difficulty peculiar to airmen arises from the basic love they have for their job. To most of them flying is the noblest of all occupations. They seldom verbalize it, but the beauty and balance and perfection of mechanical flight, the sense of detachment from the affairs of earth, the close bond of brotherhood with other flyers—these things are the most important realities in their lives. Flying is their religion. It is deeply shocking to them to see this ideal profaned by combat, to experience the bloody horror that some missions can become, to see their comrades killed by the profession which means so much to them. For many flyers, the constant effort to reconcile flying with death and destruction is no easy task.

Then there are the stresses that result directly from facing great physical danger. Every member of the armed services engaged in combat faces death in a variety of unpleasant forms, but air warfare, being three-dimensional, involves a greater number of separate hazards than any other. The flyer knows, consciously or subconsciously, that on any given mission he may have to ditch in the Channel or the North Sea, he may be forced to bail out with his chute on fire, he may be killed by point-blank 20 mm cannon fire from an attacking fighter or wounded by flak fired by an unseen gunner five miles below. He faces the dangers of aerial collision, of failure of engines on take-off, of frostbite, of anoxia, of explosion in mid-air.

*(Continued on Next Page)*

This variety of possible deaths or fates can and does affect specific people in specific ways. Thus, one flyer may regard one possibility with a particular dread; another flyer may worry about an entirely different eventuality. In extreme cases this fear may become identified with certain dangers, revealing itself as a dread of fire, or over-water flights or even a particular type of aircraft or crew position.

Against all these negative forces are ranged certain powerful incentives that produce a sort of dynamic stability in the average combat flyer—stability being defined as a continuously reforming equilibrium between conflicting motives and impulses.

Most important is understanding on the part of the flyer himself of the interplay between anxiety and these incentives. Once he realizes what is happening to him, he is not nearly so likely to let his fears run away with him.

The next most important factor is probably individual pride. The typical airman is a handpicked specimen whose life has been characterized by more vigor, persistence and self-respect than the average person's. Such an individual is not likely to admit to himself that he can fall down on a job—or to enjoy living with himself if he does.

Besides this personal pride there is crew or unit loyalty. The ties that bind a bomber team together are close; there are often times when the main thing that keeps a flyer going is simply an unwillingness to let the unit down.

One of the strongest incentives, of course, is a very real love of flying. To a less degree, flyers are aware of the importance of the job itself, the necessity for winning the war. But generally speaking, patriotism as such is not an important factor. Nor is hatred of the enemy. In fact, except rarely, there is no real enmity toward the German flyers at all—rather a candid respect for their courage and admiration for their flying ability.

When the pressure exerted by the negative forces exceeds the positive incentives by any substantial margin, the flight surgeon may step into the picture with some simple and common sense remedies.

A flyer beginning to suffer from operational fatigue may come to the flight surgeon with a variety of complaints. The physical symptoms are fairly easy to recognize: heart pounding, dizziness which may be the result of changes in blood pressure, sweating and breathing fast, hands and feet being cold, nausea during or before a mission, a feeling of fullness in the stomach. The psychic symptoms are less obvious; the flyer himself may not be entirely aware of them. They may include a sense of unreality which seems to pervade everything, depression, an inability to concentrate, which worries most flyers considerably, used as they are to split-second thinking and decisions. Irritability is another sign. Anxiety, fear, and anger usually go hand in hand, and when a flyer becomes surly and morose, resents authority, lashes out at everything from the alleged stupidity of higher echelons to the table manners of his best friend, the flight surgeon who observes him is likely to decide that the time has come for him to be taken off combat for a rest.

Occasionally, anxiety may aggravate minor physical ailments such as sinus trouble, especially if they are of such a nature as to keep the airman grounded. The symptoms may be perfectly genuine.



The flyer may not even be aware that he is the victim of a neurosis which is exaggerating his condition, but he is. Other misplaced anxiety symptoms—phobias or strong aversions to such specific things as flak, oxygen masks, or even a particular airplane itself—these are the result of an instinctive attempt on the part of the flyer to blind himself to the basic cause of anxiety. The phobia usually attempts to serve the double purpose of allowing the victim to fool himself and at the same time avoid the real cause of the trouble, which is combat flying.

The best treatment for these mild maladjustments—and they usually are mild—is explanation, rest and change. The rest homes maintained by the air force are preventives rather than cures. It is the job of the flight surgeons to determine when a flyer needs a rest and see that he gets it before his anxiety grinds him too thin and his cutting edge loses durability. To accomplish this job, the flight surgeon should be a good listener, and on such close terms with the men that they will talk freely to him. Once a flyer comes to the flight surgeon with his problems, half the battle is won. Often an explanation of the symptoms and assurance that he can handle them himself if he knows what they mean are all that is needed to eliminate them.

Once in a while, operational exhaustion may reach a point where curative action is necessary. Symptoms of this condition were noted among RAF fighter pilots during the battle of Britain and have varied little since, although the incidence nowadays is far smaller. The flyer who reaches this state will almost invariably be suffering from loss of weight. He will be unable to eat or sleep normally. He will look pale, drawn and hollow-eyed. He will be tense, depressed, slow-thinking, irritable and self-accusatory. As a rule he will have complete insight into the cause of his condition. He will not be happy about his inability to continue fighting. His attitude will be "Get me well, if you can, so that I can complete my combat tour." Until he is cured, he will have very little interest in life and absolutely no joy in it.

Seventy per cent of these men can be rehabilitated by methods pioneered by Brig. Gen. Malcolm C. Grow, surgeon, U. S. Strategic Air Forces and Col. Harry G. Armstrong, surgeon, 8th Air Force. The patients return to their units, back to the situation that precipitated the trouble, as well as they ever were—in some cases better. As for the remaining thirty percent, no attempt is made to salvage them for combat, although after careful evaluation they may continue to perform useful non-combatant jobs.

The treatment which reclaims the majority of these men is neither complicated nor dangerous. Reduced to its simplest terms, it is an artificially induced period of mental and physical relaxation that to date has brought more than two-thirds of the patients so treated back to normal. The best description of it was given by an air gunner talking to a pal. "It's a substitute for time," he said.

As a result of such therapy and of the general experience gained by 8th Air Force psychiatrists and flight surgeons during the last eighteen months, signs of operational exhaustion are less prevalent than in the early days of our air effort, even though the number of men engaged in combat has increased immeasurably. The time has passed when flyers, nerves stretched to the breaking point, were known to shoot out the lights like the cowboys of old. Today, flight surgeons are trained to spot such incipient cases early and take appropriate action. All the psychiatric training they get in this theatre is directed toward prevention.

There is plenty of danger left in the skies over Europe today. The air war is still tough. But the men America is sending to do the job are equal to it. They have the motivation and they are capable of gaining the understanding that robs anxiety of most of its dangers. The majority of them will be helped at some point by their flight surgeons but will never need actual treatment. If a few of them should, the treatment is always available. But, all things considered, despite the intensity of the air war, flyers who come to the ETO can rest assured that the chances of their "cracking" are practically nil. ☆

A P-47's gun camera recorded this destruction of an FW-190. The P-47 jumped the FW out of the sun, kept firing until only ten feet away.

# NO REST FOR THE LUFTWAFFE

**Maj. Arthur Gordon, AIR FORCE staff correspondent in the ETO, continues his monthly round-up of AAF operations in that theatre.**

Another P-47 gets its sights fixed on the lead ship of a convoy caught off the Dutch coast. As the P-47 moves in, the bullets splash in front of the trawler then catch it along the deck, starting fires and registering solid hits. During this run the pilot was subjected to heavy anti-aircraft fire from three other ships in the convoy. These pictures were taken from movie cameras mounted in the wings.

As April ended and invasion fever mounted inside Hitler's contracting fortress, the harried Luftwaffe suddenly found itself with a new and painful thorn in its side.

Since January, American heavy bombers based in Britain and Italy had been blasting GAF aircraft factories until production was reduced to a fraction—some experts claimed less than twenty percent—of what had been ordered for the spring of 1944. As a result, thousands of new German fighters had simply failed to materialize. Furthermore, air defense of the Reich against these attacks had been expensive, costing the Nazis nearly 3,000 planes in the first three months of this year.

In an effort to conserve its dwindling forces, the Luftwaffe had taken to sitting on the ground at airfields deep inside Germany unless good weather and visual bombing conditions made defense of key targets essential. Suddenly, in April, even that margin of safety was seriously threatened. In good weather or bad, Americans began sending out their 8th and 9th Fighter Commands to blast the Luftwaffe on the deck.

For a long while, fighter pilots protecting bomber boxes over Europe had been in the unenviable position of a feline-hating dog who has a bone to protect and yet frequently encounters a cat. Chasing a cat in anything like a satisfactory manner involved leaving the bone unguarded, and there was a point in the American air offensive last fall when such neglect was unthinkable. Improved German defensive tactics had made it necessary to protect the bombers at all costs.

Fortunately, long range fighter escort proved the answer to German rocket-carrying fighter-bombers. Our bomber losses dropped from the autumn high, and our replacement capacity increased. The emphasis in the role played by the fighters shifted somewhat. The bombers still needed protection and they still got it, but with invasion just around the corner, the main objective for fighters became the destruction of the Luftwaffe. If Jerry would not come upstairs to fight, then American fighters would go down and beat his ears off on the ground. For the first time, Fighter Command had a strictly offensive job to do.

It was recognized at once by combat

Low sweeps over Nazi airdromes are risky but they pay off in enemy planes destroyed. Here a P-47's gun camera shows hits on parked fighter.

flyers, if not by everyone at home, that destroying an enemy plane on the ground was just as difficult and considerably more hazardous than killing one in the air. Roaring in at tree top level and better than 400 miles per hour, our American flyers had only split seconds in which to aim and fire. The danger of being hit by light flak was high; the chances of bailing out, low. The element of surprise was

an advantage only if the Nazis were asleep. If the attacking plane was damaged it faced a long, hazardous flight across hostile territory. It was inevitable that fighter losses should rise in proportion as ground strafing was attempted.

This did not discourage the fighter pilots unduly. Based on a proven superiority of four to one in air combat their morale was high. It sagged only when, for any reason, their particular group did not seem to be getting a fair share of the fighting. There were compensations for the perils of low-level attack in the excitement of seeing flak towers fall silent, grounded aircraft burst into flames, and locomotives blow up under the fire of their guns. Moreover, they knew their ships could stand considerable punishment. One Thunderbolt pilot limping home with a blown cylinder head found time to attack two German fighters and shoot one down. A pilot of a Mustang that came back with several yards of heavy cable lodged in its radiator happily reported twelve Nazi telephone conversations probably destroyed.

In March, 8th Air Force fighters reported 504 enemy aircraft destroyed, of which 98 were killed on the ground. In April the ground score was much higher. On April 8, they got 48, on April 11, 65, on April 13, 35. Jerry certainly did not like this but there was not much he could do about it except alert his airdromes and try to get his fighters airborne before the Americans arrived. Often there wasn't time and German planes were destroyed in the process of taking off.

The patience, skill and experience required to put 1,000 fighters into the air and have them at the right place at the right time has never received the acclaim it deserves; nor for that matter has the strain on the individual fighter pilot been recognized. Let a man strap himself in a chair and try turning his head constantly as far as it will go for five hours; let him imagine flying under conditions where the cold is so intense that instruments are frozen, the canopy is coated with ice, and his hands and feet are so numb that he can't feel them; let him contemplate engaging German pilots who are relatively warm and rested and who can bail out over their own territory, if necessary. The bomber crews know what it takes. As one Liberator pilot remarked with typical sincerity: "Any time a fighter pilot wants a shoeshine from now on, all he has to do is come to me."

**Over Germany, at 25,000 feet, the automatic camera in the wing of a P-47 filmed this dogfight with an ME-109. In the top frame, the attacking Thunderbolt is on the tail of the ME, but the pilot's first burst goes wide of its mark. The Nazi pilot, in the second picture, has whipped over into a dive, causing the Thunderbolt's second burst to miss the target. But in the third frame, the P-47's eight fifties have started hitting pay dirt. As the pilot presses home his attack, scoring hits on the Messerschmitt's wing, the Nazi pilot breaks off, turning into a steep glide. In the fifth frame, the P-47 is less than 100 yards from the enemy fighter, still pouring it on. Smoke steaming from its engine, another ME is knocked out of the sky.**

BUT until recently fighters have had to play second fiddle to their "big friends." One reason was that long range fighter escort did not make its appearance until the heavies had been operating over Europe for almost a year. The theory that fighter cover could be provided over such targets as Berlin or Regensburg met with considerable skepticism from those who were accustomed to the operational radius of Spitfires or even Thunderbolts without extra tanks. In July, a handful of P-47s first showed what could be done with drop tanks. By the end of the year more than 400 fighters were escorting heavies. In April, 1944, with the 9th Fighter Command lending its strength to the 8th, that number has been approximately doubled.

When word reaches fighter command that bombers will need support over certain targets, intensive work is necessary before field orders go out to the groups a few hours later. Rendezvous must be arranged with split-second timing so that fighters reaching their operational limit will be able to hand over their big friends to succeeding fighter groups. Combat intelligence reports are scanned for latest information on the disposition of German fighter strength. Estimates are made of points at which Jerry will make his heaviest attacks. No effort is made to avoid a fight. On the contrary, certain groups may be assigned to go down deliberately to stir the Germans up. Spread thin in their attempt to guard the long bomber procession, American fighters are outnumbered in most encounters. They cannot guarantee always to frustrate German attacks but can usually prevent repeats. Plans must be made to allow for rapid concentration of strength. A veteran group may know how to squeeze an extra fifty miles out of its limited gasoline supply. Dozens of tricks are used in this type of air fighting. Ambushes are set, traps are sprung. The Germans are far from stupid and the battle of wits is unending.

The three basic fighter airplanes used in the American air offensive from Britain are the P-47, P-51 and P-38. The Thunderbolts, pioneers in deep penetration, still

The P-47 from which these pictures were taken with a 16 mm gun camera surprised a Messerschmitt 110 by diving on it out of the clouds. As soon as he was aware of the Thunderbolt, the Nazi pilot began violent evasive action and went into a dive, as shown in the first frame above. In the second picture, the attacking fighter has caught the left wing of the Messerschmitt with a strong burst. Pieces are flying off the German plane in the third frame and fire has broken out as the P-47's attack begins to bring results. The picture at right shows the Messerschmitt headed for the ground in flames. The Thunderbolt pilot was given credit for a "kill."

predominate in numbers. With their great firepower, diving ability and capacity for absorbing punishment, they are the shock troops of fighter command—fullbacks, to use a football analogy. The Mustangs, less heavily gunned and less ruggedly constructed but with greater range and an even more spectacular record in air combat, are the cavalry. Like ends on a football team, they are fast downfield and deadly on a tackle. The Lightnings, with great range and versatility, usually stay upstairs and give top cover to the bombers. To them went the honor of being the first American aircraft over Berlin.

Lightning pilots have labored under certain handicaps in the European Theatre of Operations. In their exposed cockpits at extreme altitudes they have suffered badly from cold. At times, their half-frozen pilots have had to be lifted from their cockpits. Furthermore, the distinctive silhouette of the Lightning militates against it. The American P-38 pilot has to look twice before he can distinguish a P-47 from an FW-190 or a Mustang from an ME-109. The German pilot can and does take a crack at anything with a twin-boomed fuselage that crosses his path. Recognizing the Lightnings at a distance, Jerry can either avoid combat or wait until he has marked superiority. These factors have been responsible for the comparatively low Lightning claims of enemy aircraft destroyed. Disregarding the consequent lack of publicity, P-38 groups have continued to function quietly and efficiently. They have carried out experiments in high level bombing, which may complement the Thunderbolt's dive bombing when the signal is given for all out support of ground forces.

INTENSIVE though they were, operations of the two British-based fighter commands were only one facet of the gigantic spring air offensive. Heavies of the 8th Air Force maintained their pressure on German aircraft factories. On a typical day, April 9, they hit old targets at Tutow and Warnemunde and revisited Marienburg, flattened exactly six months before in what General Arnold called the best precision bombing of the war and feverishly rebuilt by the Germans. The same day on a 1,700-mile round trip into Poland, they hit a new target, the Focke-Wulf factory at Posen. On April 18, they went back to the Berlin area. Opposition seemed to be weakening. In the 36 hours ending midnight April 19, more than 4,000 British and American planes were dispatched from England. Only 49 were lost. In general, American bomber losses remained at a satisfactory level—under three percent. Fighter losses moved up slightly to more than one percent.

Meanwhile, Italian-based heavies were giving spectacular support to the advancing Red Army by hammering Balkan communications as the Germans scuttled westward out of Odessa. Forts and Liberators of the 15th Air Force bombed Sofia, Bucharest, Budapest and Ploesti. In the Balkans they encountered some 200 enemy fighters but the pilots were not of the same calibre as the defenders of south Germany who offered stiff resistance at Steyr on April 2. *(Continued on Next Page)*

The three pictures below demonstrate how two Thunderbolt pilots collaborated to stop a rocket-carrying ME-110 from attacking a formation of bombers which they were escorting. In the first frame, one P-47 is firing on the Messerschmitt and, as its gun camera films the action, a second Thunderbolt swoops down on the Nazi to help with the kill. The next frames show that strikes have been scored on the left wing of the Messerschmitt, and a moment later both pilots watched the German plane go out of control and spin earthward in flames.

The railroad yards at Brasov, Rumania, are a vital part of the Nazi escape route over the Transylvanian Alps to the west, and Brasov itself is less than 175 miles from the present Soviet-German front in northern Rumania. On April 16, Italy-based bombers of the 15th Air Force struck at this point, scored over 75 hits on the railroad yards, cut lines to the west, damaged adjacent industrial areas and smashed a nearby airdrome during the mass attack.

Both in England and Italy, medium bombers of the tactical air forces kept busy. The Britain-based Marauders flew as many as 500 sorties in one day against marshalling yards airdromes and coastal defenses in Belgium, Holland and Northern France. A-20s also made their appearance over the same targets in Italy. Fighter-bombers attacked bridges and communication lines while mediums of the 12th Air Force turned in some of the best precision bombing of the war.

One thing was increasingly clear: The air war was getting too big for easy simplification, casual predictions or capsule conclusions. There was no questioning the fact that the grip of the air pincers on Germany was increasing relentlessly as D-day drew near. How long the Germans could withstand that pressure, how long they could maintain their facade of fighter strength with replacements reduced to a trickle, nobody could say with finality. The Allies were prepared to keep on tightening the screws exactly as long as proved necessary. ☆

### A Breathless Interlude with Carol-N-Chick

THE B-24 Carol-N-Chick was flying tail-end Charlie in a formation of B-24s over Germany. There were persistent contrails, intermittent clouds and strong headwinds, and the pilot, Lieut. William B. Brown, had a rough time flying behind planes he couldn't see.

Then the Carol-N-Chick went into her dance.

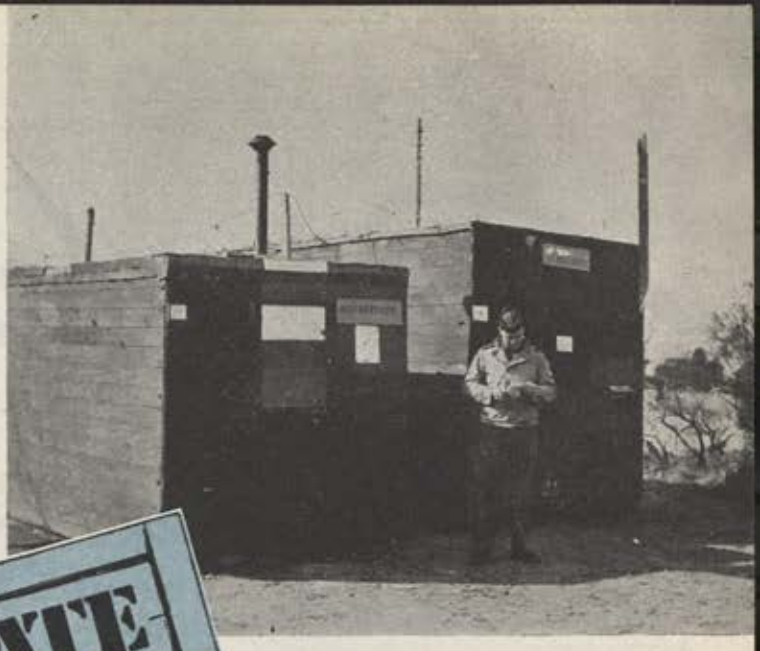
In a blind spot, the Liberator was caught suddenly in the prop wash of a hidden plane. It went up on its tail, hit another prop wash and rolled over on its right side. The big plane rolled back on its belly only to coast on over to the left side, then roll back to the right. The bomber went back and forth, swinging like a pendulum. "It looked like a falling leaf," a crew member in another plane commented later.

Finally, the Carol rolled over on its back, went into a spin at 20,000 feet and dropped at terrific speed, bouncing the crew members from one side of the fuselage to the other. One of the waist gunners, Staff Sgt. William A. Duprey, hung for awhile at the waist window, unable to move against the punishing centrifugal surge of the spin. The other waist gunner, Staff Sgt. R. E. Flamion, anchored himself to his guns.

In the cockpit, Lieutenant Brown and his co-pilot, Lieut. Kenneth W. Barnet, fought the controls with their combined strength. The control wheels pushed into their stomachs until the two men were in great pain. The engines screamed, and the twisting strain of the spin caused the B-24 to creak and groan. Finally, at 10,000 feet, Lieutenants Brown and Barnet managed to pull the ship into level flight.

"Our purpose in going over the Continent," said the bombardier, Lieut. William L. La Bonte, "was to bomb. After our exhibition we were determined to bomb regardless."

Believed lost by crew members of other planes in the formation, the Carol-N-Chick proceeded to the target and unloaded. The bomber was escorted by two P-51s whose pilots had witnessed the dance. Other crew members of the Carol-N-Chick were Lieut. Frederick L. Saltus, navigator; Tech. Sgt. Clarence W. Schrader, engineer and top turret gunner; Staff Sgt. Oliver L. Blone, radio operator; Staff Sgt. Jacob M. Lebovitz, tail gunner, and Staff Sgt. H. B. Johns, ball turret gunner. ☆



This is not Shantytown but a place somewhere in England that the boys call Crate City. Buildings are made of glider packing cases. The barber shop (upper left), once covered glider parts. A soldier (upper right) reads a letter at the post office. A view across the roof tops of a portion of Crate City is afforded by the photograph below.


GLIDERS to carry our troops into the enemy's territory on D-day are given plenty of attention in the assembling of necessary invasion equipment in the United Kingdom. Specially trained mechanics of the 9th Air Force Service Command remove these gliders from their crates and assemble them for their future passengers who are undergoing intensive training on the beaches and the English countryside. At this depot, the gliders are turned over to Troop Carrier units charged with delivering glider-borne troops and equipment in support of landing forces. With American talents for improvisation, personnel at the glider assembly depot have constructed a complete town from the crates which carried these aircraft from the United States. Everything is there, barracks to house personnel and a business section of sorts to provide the men with living essentials. ☆



Below, service command mechanics attach a wing to one of the gliders.

# Dumbo, I LOVE YOU!

**By Capt. L. P. Bachmann**
**AIR FORCE Overseas Staff**

FIGHTER planes circled and zoomed about the seaplane that flew lower and lower as it approached the Japanese-occupied coast at Cape St. George on the southern end of New Ireland.

It was during the early days of the strikes against Rabaul and all the land they could see was held by the enemy.

Below them floated a life raft heavily loaded with human cargo. Four men paddled frantically while their two wounded companions sat huddled in the bottom of the dinghy.

The seaplane soared just above the heavy sea, then settled upon the swells. The hull protested and there was a sound like that of rivets giving way. The sound continued as Dumbo taxied up to the raft but white spouts in the green-blue water gave evidence that the noise was created not by rivets tearing loose but by Jap shore batteries opening fire at the seaplane and the circling fighters. Obviously, the enemy had not previously seen the raft

Back at fighter interceptor control at an advanced base, men guarding the frequency heard conversation between the seaplane and the fighters. There was nothing they could do but sweat it out. They tried to visualize what was happening.

The fighters circled up and out to sea. Then they turned and came diving out of the sun. One after another they strafed the shore line like a basketball team practicing breakaway formations under the basket before a game. The P-40s picked out each battery by its flashes, then fed it plenty of its own medicine.

Before they had found the range of the seaplane, the Jap installations were forced to divert their complete attention to the attacking fighter planes.

As the shore battle reached full fury the six B-25 flyers were helped from the raft into the Navy plane. The idling props revved up, a white wake widened, a hollow appeared under the broad beam and one last swell reached up to slap at the plane. Then Dumbo was airborne.

While the crew gave first aid to the injured men and drinks and food to the others, the pilot contacted the main base to report the rescue and take-off. Then he called the seaplane tender to announce his estimated time of arrival and to request that two litters be made ready.

The men who had been listening up and down the chain of Solomons for the mission's result breathed a sigh of relief.

The P-40s made one more run on the Japs and turned out to follow Dumbo. As they flew by, two of the fighters strafed and sank the abandoned raft to eliminate the possibility of its drifting out to sea and later being reported as a newly discovered craft.

The seaplane was in flight fifteen minutes when it received a call from a Ventura search plane, which had sighted a man on a raft fifty miles from Dumbo's position. Could Dumbo pick him up? Dumbo could but the fighters would have to return to their base, having just about enough gas to get there. Need for a cover was quickly filled, however, when another Ventura searching nearby cut into the conversation and volunteered to do the honors.

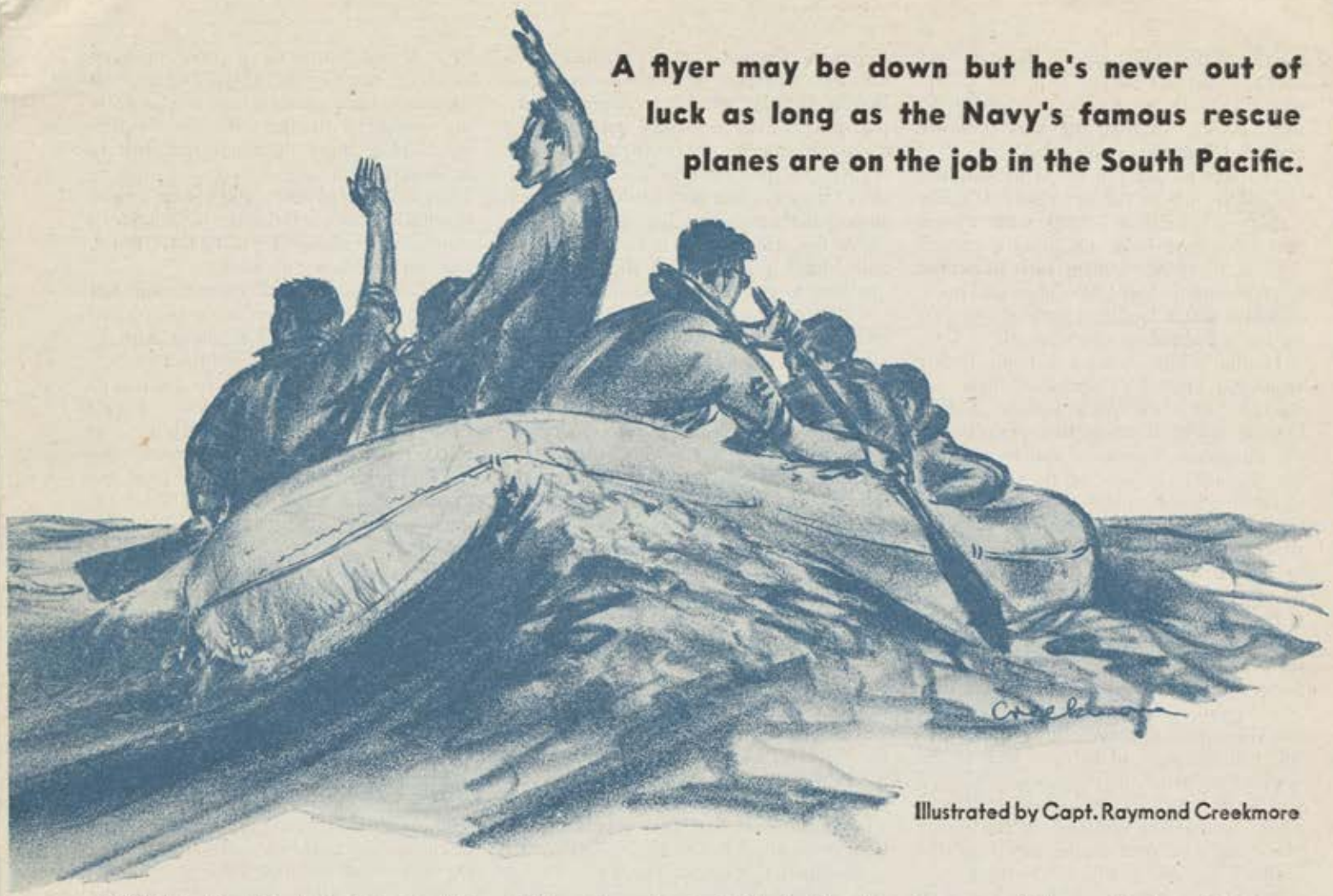
The Ventura was circling over the raft when Dumbo arrived. Seeing that the survivor was in rather poor condition, two of Dumbo's men immediately dove into the water, adjusted a line about the man and lifted him into the plane.

In a rusty voice the survivor, a Marine F4U pilot, explained that he'd been shot down over Rabaul nine days before. He said he had parachuted to ground on New Britain. But that still didn't account for his being so far out in the ocean.

His cracked lips hurt as he grinned.

"I knew Dumbo would pick me up if I could get out to sea," he said. "When I landed I buried my parachute so the Japs wouldn't find any trace of me, but I saved my jungle kit and raft. I headed for the sea. After seven days, I think it was—I can't remember now—I came to a river. I inflated the raft, got aboard and floated downstream, finally reaching the sea last night. I knew all I had to do was wait for Dumbo. And here you are."

# A flyer may be down but he's never out of luck as long as the Navy's famous rescue planes are on the job in the South Pacific.



Illustrated by Capt. Raymond Creekmore

Officially, Dumbo is known as the PBY-5. Sometimes it is referred to as the Catalina or Cat or the Ruptured Duck. But when it flies from the famous seaplane tender, which is the most forward-based ship of the South Pacific fleet, it is called Dumbo.

The insignia of the service is an elephant with a sailor's white hat on his head and K rations, canteens and a machine gun on his back. Seated in a rubber raft, he is scanning the horizon with a telescope.

PBY Dumbo service is not new. In every theatre where combat flying is done over water, seaplanes are used for rescue purposes. The South Pacific Dumbo service is not as extensive nor as elaborate as the British Air Sea Rescue. The two cannot be compared. The English Channel and adjacent waters which are crossed to and from combat are small and well patrolled. The South Pacific expanses are enormous and the area covered keeps changing as the U. S. forces move forward. There is relatively little shipping or any other means of patrolling the water except by air. And yet the percentage of rescues will stand comparison with any similar service. The rate has steadily increased until now more than 75 percent of all flyers shot down in the theatre are rescued at sea.

Before December 1, 1943, the Dumbo rescue service in the South Pacific was similar to that in any other theatre. Dumbos were called out when needed. Generally they were search planes that filled in during an emergency. But with the stationing of the seaplane tender as far forward as our most recently won airfields and the assigning of a certain number of PBYs to the service exclusively, Dumbo really came into its own.

Since then, every consolidated field order issued by COMAIRSOL, which plans all tactical air operations in the Solomons, calls for a Dumbo mission. No matter who flies—the Navy Strike Command's TBFs or SBDs, the 13th Air Force's bombers or fighters or all of them hitting at the same time—a Dumbo is ordered into the air.

Meeting fighter cover at a point the tactical planes will pass on their return from the mission, Dumbo circles, watches and listens for word that some plane is about to ditch. Often Dumbo will trail a plane that is running low on gas or is flying on only one engine. If the plane goes down, Dumbo will go after it and pick up the flyers.

On the rare days for which no strikes are scheduled, the Dumbo crews and planes wait, alerted, at the seaplane tender. A report that a life raft has been sighted may come into advanced headquarters from one of the search planes that cover thousands of miles of water. In a few minutes headquarters notifies the tender giving the position of the raft and the point at which Dumbo will be picked up by the fighter cover.

MEANWHILE, the search plane will circle over the raft, for there is nothing more difficult to see than a raft from the air, as witness the many stories survivors tell of being unable to attract the attention of planes which passed directly over them.

Although flyers downed in the South Pacific have come to have great confidence that they will be picked up by Dumbo, their joy is nonetheless unrestrained as the PBY waddles toward their raft.

"Dumbo's the most beautiful thing I've ever seen," said a P-38 pilot as he sat in the tender's wardroom munching a Dagwood sandwich shortly after his rescue. "Sounds kind of funny now—maybe it doesn't. Anyway I couldn't help it. When I saw the plane I just started to cry."

On a rescue mission, Dumbo flies low and approaches a raft downwind. From the moment he sights the wave-tossed float, the pilot never takes his eyes from it. As the plane passes over the dinghy, two smoke bombs are dropped—two in the event that one fails to work. Dumbo then makes a 180-degree turn, sets down

on the water, taxis up to the raft and drops a sea anchor to halt the plane, whose engines remain in operation. As soon as the survivor or survivors are aboard, Dumbo takes off.

There is no set procedure for landing and taking off in the open sea. It's like making a parachute jump with a seat pack. You just do it. Despite the experience of these Navy men, each of whom has flown more than 1,500 hours and made countless water landings, several Dumbos are badly banged up every month.

Dumbo pilots are used to flying in any weather. One PV squadron flew sea searches for two years before starting Dumbo work. During this period only one mission was cancelled due to weather, for the PBY is one of the safest and slowest planes made. The situation reached the point that one day the weather officer jokingly questioned the need of a forecast. What was the sense? he asked. They'd go up and fly anyway.

But search missions, no matter how important and necessary, are boresome. The men welcome and look forward to the more dangerous Dumbo work. Here they actually can see the results of their flying.

"There probably is nothing more pitiful than the sight of helpless men in the water, even when they're on a raft," said one Navy pilot. "They look so small and weak. When you bring down the rescue plane and taxi over to the survivors, the look of joy and gratitude on their faces pays you back a thousand times. You'd go through anything to help them."

And the New Zealanders who lately have been sharing Dumbo duty with the Navy, feel the same way. So do all the men of the crew, which consists of the pilot or patrol plane commander, the co-pilot, two mechanics, two radiomen and one ordnance man. All of them are gunners, ready for any enemy plane that might attack while Dumbo is in Jap waters picking up survivors.

So efficiently do the search patrol and Dumbo services function that usually survivors are picked up within an hour after they go down. And the speed with which Dumbo works after reaching a raft is something to marvel over.

When the seaplane's nose is pointed homeward, the paramount object of the crew is to get the survivor to the tender's sick bay and in the hands of the medic as quickly as possible. Dumbos do not carry the ship's doctor on missions because of the extra weight involved and because it would be impractical in view of the possibility that all three of the Dumbos might be on rescue flights at the same time.

But the Dumbo is well prepared to administer whatever first aid is required. Before they are placed on Dumbo duty, the pilots and crewmen are given a thorough course in medical treatment particularly pertinent to the type of illnesses and injuries they are likely to find among the survivors. Each seaplane carries a first aid kit which contains splints and blood plasma, and the pilots are qualified to give blood transfusions.

Other equipment taken on each mission includes blankets, towels and coveralls, sandwiches, thermos jugs of hot soup and coffee and chilled cans of fruit juices.

When Dumbo reaches friendly territory, the fighter cover waves goodby for awhile and the seaplane lands in the smooth, sheltered waters where the mother ship is waiting.

ALTHOUGH the actual rescue is the climax of any mission, still the return to the ship is the equivalent of the proverbial happy ending and the realization of the hope to which a man clings as he sits on a rubber cruller far out at sea.

Before the plane has alighted, a launch carrying the doctor has left the tender and is waiting at the tie-up buoy. While the plane is being tied up, the doctor goes aboard to examine the survivor. Sometimes he may administer blood plasma or apply additional bandages before the patient is removed to the tender.

Fortunately most of the flyers are in amazingly good shape and need no further assistance or medication. This is a tribute to their careful training in ditching and emergency methods.

Replacing the launch as it pulls away from Dumbo is a gasoline boat which ties up to refuel the plane. The crew busies itself servicing the plane and in a short time Dumbo is ready for its next mission.

Once aboard, the rescued flyer is carried quickly below deck to the small sick bay. If the patient is in need of treatment he receives the best. But even if the preliminary examination reveals nothing wrong with the man, he is subjected to a more thorough test, just to make sure.

As soon as possible, the tender's communications officer transmits the survivor's name and organization to COMAIRSOL and notifies the man's outfit.

When the medical examination has been completed, the survivor is questioned by the ship's intelligence officer who by that time has already briefed the Dumbo's pilot and crew concerning the latest mission. Through such interviews, a vast store of information on ditching and rescue procedures is being compiled.

Everything possible is done for the comfort of the rescued man. If his clothing is not too badly damaged, the laundry men grab it. Within four hours it is returned—mended, washed, starched and ironed. Should his garments be ruined beyond repair, the supply men determine his size and somehow always come up with a fresh outfit. If the ship's supply is depleted, necessary items are furnished by members of the crew. The service for "guests" also includes a shave and haircut and plenty of good food.

Many survivors who were wounded in combat that preceded their bailing-out or who suffered from exposure before their rescue are evacuated by air to a hospital in the rear as soon as practicable.

When the time comes to leave the tender every man who has been rescued by Dumbo wants some memento of this experience. Thus it has become a tradition that every survivor departs wearing a sailor's white hat—the same sky-piece the elephant wears in the Dumbo insignia.

All rescued flyers are active members of a sort of Dumbo Alumni Association which sprang up spontaneously. Once they are flying again, they return to visit the seaplane tender as often as possible, dropping in for one of the ship's famous meals, to see a movie or to spend a night.

It is difficult to explain the ship's unique attraction other than to say that aboard the tender the principle of the brotherhood of man is practiced in its finest form.

One night recently, a group of South Pacific flyers chanced to gather in a public place. An AAF pilot, discovering that the Navy man standing next to him was assigned to the rescue service, impulsively declared:

"Dumbo, I love you!"

But no one laughed because every other flyer in the room felt the same way. ☆

Two of Dumbo's men dove into the water, adjusted a line about the man and lifted him into the plane.


IN a raging inferno, set and kept alive by bombers of the Allied air forces, Europe's principal war production centers are gradually burning to death.

Plant area after plant area has been set afire from the air. Scores of warehouses, docks, shipyards and rail centers have been reduced in many instances to ashes.

As the AAF's attack on Fortress Europe roars to a climax, the havoc wrought is evidence of the effectiveness of the incendiary—an instrument of warfare that dates back forty centuries, almost to the time man discovered how to produce a flame.

Now in its highest form of development as the airborne incendiary bomb, the weapon under some conditions pays greater dividends per pound of weight than does its high-explosive comrade and its use has increased tremendously in recent months.

In the early stages of U. S. participation in the present conflict, aerial firebombs accounted for only approximately five percent of AAF bomb loads. Lately they have averaged 35 to 40 percent and in some instances loads have been totally incendiary. In a recent raid on Berlin, 350,000 fire bombs were released.

During the month of March, 48 percent of the 4,799 tons of bombs dropped on industrial plants in the vicinity of the Nazi capital were incendiaries.

## Incendiary bombs—modern version of an ancient weapon—pay big dividends in AAF attacks.

Broken down into individual raids, the incendiary percentages were as follows:

| *Date* | *Total Tonnage* | *Incendiaries* |
|---|---|---|
| March 4 ..... | 67 | 48% |
| March 6 ..... | 1,508 | 27% |
| March 8 ..... | 998 | 70% |
| March 9 ..... | 796 | 30% |
| March 22..... | 1,430 | 64% |
| | 4,799 | 48% |

Today's fiery calling cards not only are a far cry from the battle incendiaries introduced in the ancient and middle ages, but they also represent a world of improvement over the crude fire-producing implements of World War I.

History first records the appearance of incendiaries in 2000 B.C.—in the form of flaming arrows shot in India. Centuries later, the Romans catapulted lattice-work bombs filled with inflammable substances, and "Greek Fire," a makeshift hand grenade, is said to have saved the Byzantine Empire from enemy domination for a thousand years. In medieval times, fireballs were floated against shipping while blazing torches were attached to lances hurled by horsemen to ignite fields and buildings.

With the development of firearms, causing armies to engage each other at greater distances, and the substitution of earthworks for battlements, the effectiveness of incendiaries became limited and their use was almost entirely abandoned.

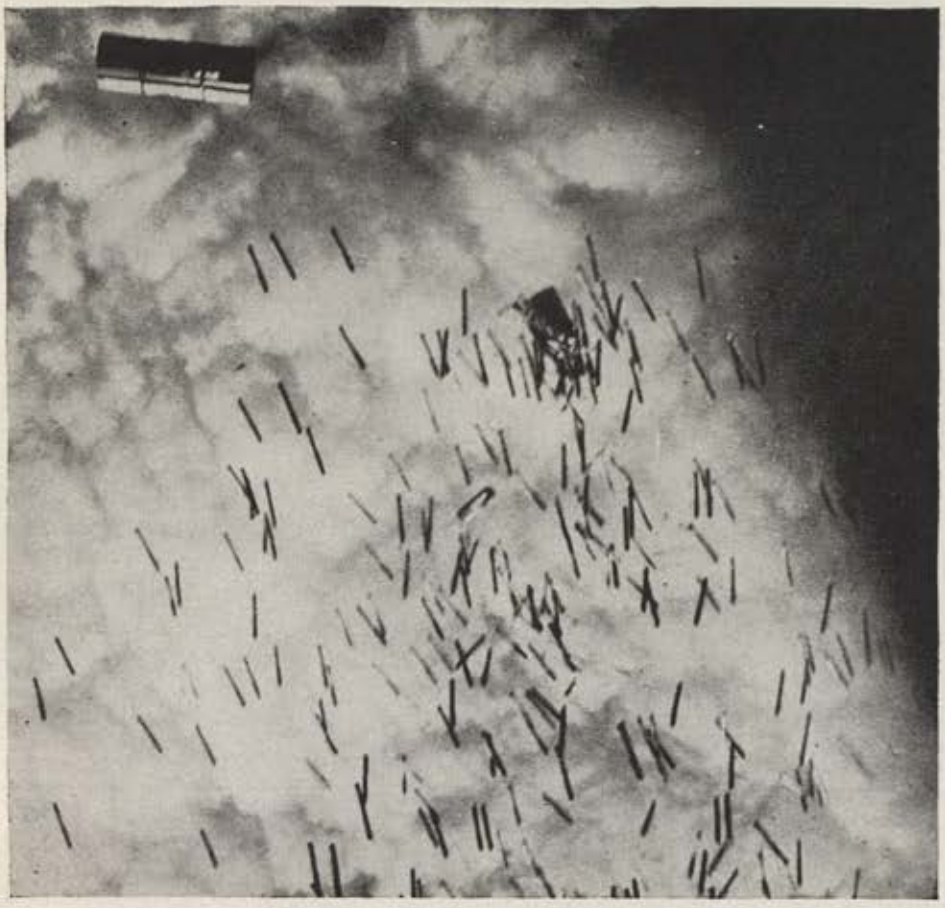
It remained for World War I to revive interest in incendiary weapons and munitions and to provide practical demonstration that they were adapted to modern warfare.

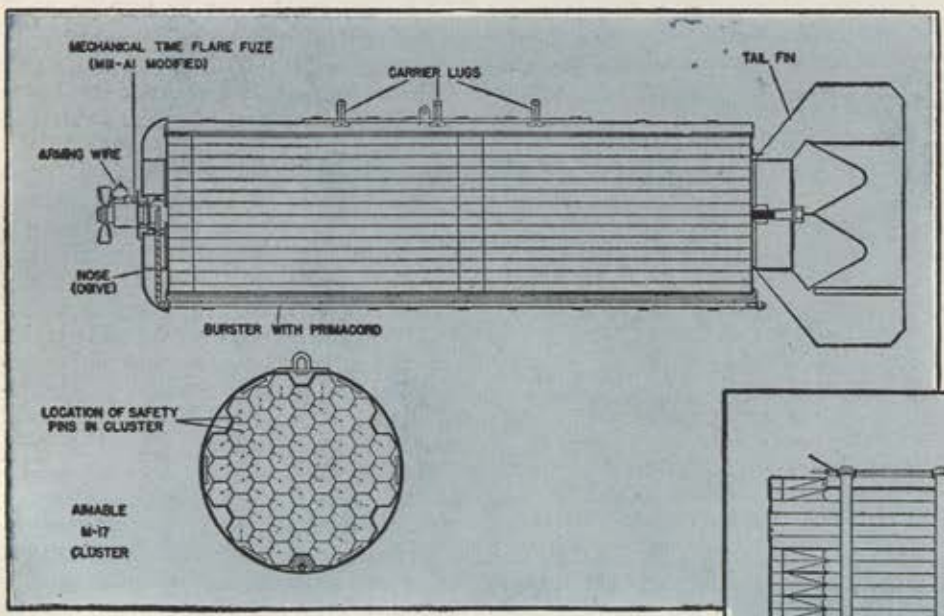
Although the artillery incendiary shell was invented in 1878, it was not tested in combat to any appreciable degree until the early days of World War I, when it was directed as anti-aircraft fire against observation balloons.

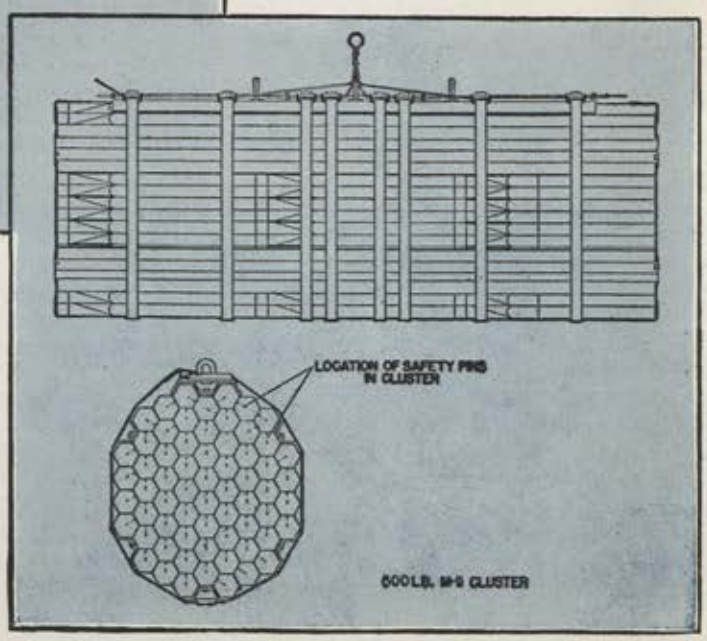
BY the end of 1915, both sides were using improved incendiaries. Earlier in the year, the Germans had introduced flame throwers against ground troops and their Zeppelins had dropped fire-bombs in a raid on London, marking the first use of incendiaries from aircraft.

But the incendiaries of World War I can no more be compared with today's rain of fire from the skies than can the feeble glow of a match be likened to the roaring flame of a blast furnace.

Unprecedented progress in the fields of






Operation of the M-11 cluster, one of two types used by the AAF for dispersal of lightweight incendiary bombs, is demonstrated (top) in photo made during a raid on Nazi shipyards at Kiel. A second or two after leaving bomb bay, one cluster has burst open and is scattering its load. The other, pictured still intact, broke up an instant later. The drawings show both types—the M-11 (right) and the more recently devised M-17 aimable cluster (above). The latter speeds earthward with precision, retaining its packaged fire until reaching a point about 5,000 feet above the target. It affords accuracy far greater than that offered by the M-11, which opens soon after its release.

aviation and munitions has brought incendiary bombing to a high degree of efficiency. So rapidly have improvements in equipment and technique been made since the war's outset that the Nazi incendiary raids on London in 1940 must be considered tame in contrast to the AAF's current devastating attacks on German and Japanese installations.

Several types of incendiary bombs are used by the AAF. They differ in conformation, size and chemical content. Ranging from the two-pound "firestick" to the 500-pound "blockburner," they may be classified generally as magnesium, thermate, gasoline-rubber, phosphorus and jellied-oil bombs.

Choice of the kind and number to be used on a mission depends upon the physical make-up of the target—its construction, composition and proportions.

*Magnesium* bombs come in two varieties—the AN-M52 two-pounder and the M-50 four-pounder. Both have hexagonal, cored, magnesium alloy bodies with hollow, sheet steel tails and they contain a thermate burning composition and an igniting charge. The four-pounder also has a fuze mechanism and a blunt, cast iron nose. Either type burns from six to eight minutes at a temperature of 2,300 degrees Fahrenheit.

Highly effective upon targets difficult to ignite is the four-pound *thermate* bomb, which burns fiercely at a temperature of 4,350 degrees for approximately a minute after impact. The intense heat melts the bomb's tubular body, releasing molten metal which runs in all directions, searing everything in its path and igniting all combustible material it touches.

The six-pound *gasoline-rubber* bomb burns longer than the thermate bomb but at a lower temperature. It has an explosive charge which splatters the sticky substance over a wide area, in which the blazing particles adhere to walls and other

upright structures. Used as an anti-personnel agent as well as an incendiary is the 100-pound M47A1 *white phosphorus* bomb. Containing about 93 pounds of phosphorus, the bomb upon impact scatters the flaming material over an area 50 to 100 yards in diameter, producing dense clouds of white smoke. Upon contact with the human body, the phosphorus causes serious burns which are most difficult to heal.

*Jellied-oil* bombs have proved tremendously destructive in raids on factories, rail centers and shipyards. Three types now in wide use by the AAF are the six-pound M69, the 100-pound M47A2 and the 500-pound M76.

The M69 is hexagonal in shape. Bursting upon impact, it throws flaming jellied-oil from its tail 25 yards in all directions.

The M47A2 has a thin-walled, rolled steel cylindrical body, 45 inches in length and eight inches in diameter. When empty it weighs only 20 pounds. Formerly filled with gasoline mixed with crude latex, caustic soda and cocoanut oil, it now contains jellied-oil which is hurled in flaming chunks over an area 40 yards in diameter. The solidified oil clings to whatever it strikes and burns for several minutes.

THE M76 is the most recent type of incendiary to plague Germany. Known as the PT or gel-filled bomb, it carries a mixture of jellied-oil, finely-powered scrap magnesium and other ingredients. When combined with other incendiary material, the ground magnesium becomes a highly effective fire agent which is exceptionally difficult to extinguish.

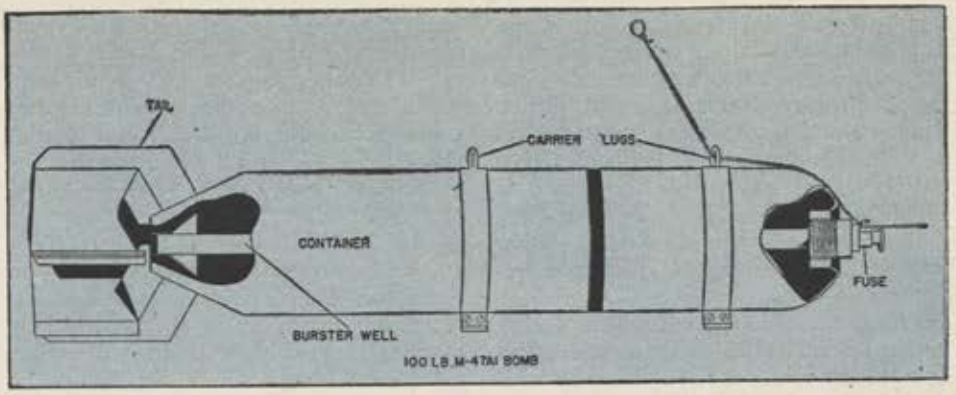
Because of their light weight, the magnesium, thermate and six-pound jellied-oil bombs are released in clusters, later dispersing to fall individually.

The M17 *aimable cluster* is the latest development in incendiary bomb-packing. Having a nose and tail like an ordinary bomb, it speeds earthward with precision. When the projectile reaches an altitude of about 5,000 feet, a primacord charge is exploded by a time fuze and the cluster breaks open to distribute its load over an area 300 feet in diameter.

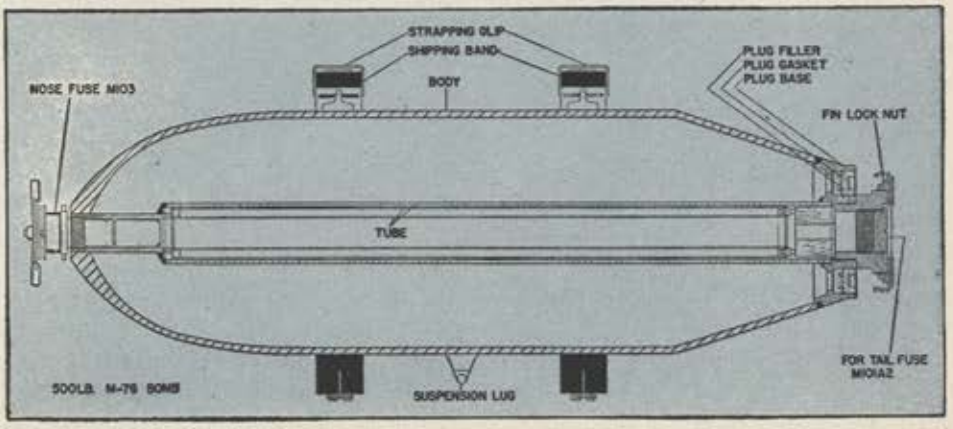
Permitting far greater accuracy, particularly with the small two-pounders, the aimable cluster offers vast improvement over the earlier-devised cluster which opens automatically when released from the bomb bay and disperses its packages high above the target.

The aimable cluster carries 165 two-pound bombs, 110 four-pounders or 38 six-pounders. The older type cluster, in its 100-pound size, packs 51 two-pounders, 34 four-pounders or 14 six-pounders; in its 500-pound size, 192 two-pounders, 128 four-pounders or 60 six-pounders.

Some bombs in each cluster contain a small but lethal charge of TNT. Their delayed explosion discourages extinguish-




Scores of incendiary bombs are seen hurtling on their fiery mission toward the Continental Gummiwerke plant, Hanover. Targets such as this plant, which was the Nazis' chief producer of airplane tires, are highly vulnerable to the destructive fires created by incendiaries.



ing attempts by the enemy. Normally, incendiaries are used in conjunction with high-explosive bombs. One technique calls for three waves of attacking planes. The first and third drop high explosives and the second unleashes fire-bombs. The initial release causes wreckage that is highly vulnerable to incendiarism and the high-explosives of the third wave scatter flaming debris to harass and hamper firefighters.

Efficient also is the tactic of releasing both types of bombs simultaneously. The heavy incendiaries can be dropped with the same precision as the high-explosive egg.

The effectiveness of the combined use of incendiaries and high-explosives was demonstrated in the AAF's destruction in February of the Japanese supply base at Ponape in the Caroline islands west of Truk.

After repeated raids with high-explosive bombs on February 19, the attack with fire was begun with the dropping of 840 gasoline-rubber incendiaries along with 570 hundred-pound general purpose bombs.

Two days later, an all-out incendiary siege was launched. Warehouses, shops and other vital installations were showered with 5,264 gasoline-rubber bombs and fifty-four 500-pound general purpose bombs.

Hades had nothing on Ponape. The southern waterfront, where half the warehouses were situated was one vast conflagration. Great fires had cut a wide swath through the heart of the town. Explosives showered sparks and debris and flames and smoke were visible twenty miles from the target, despite partial cloud coverage. In all 300 buildings, including a radio station, were destroyed that day.

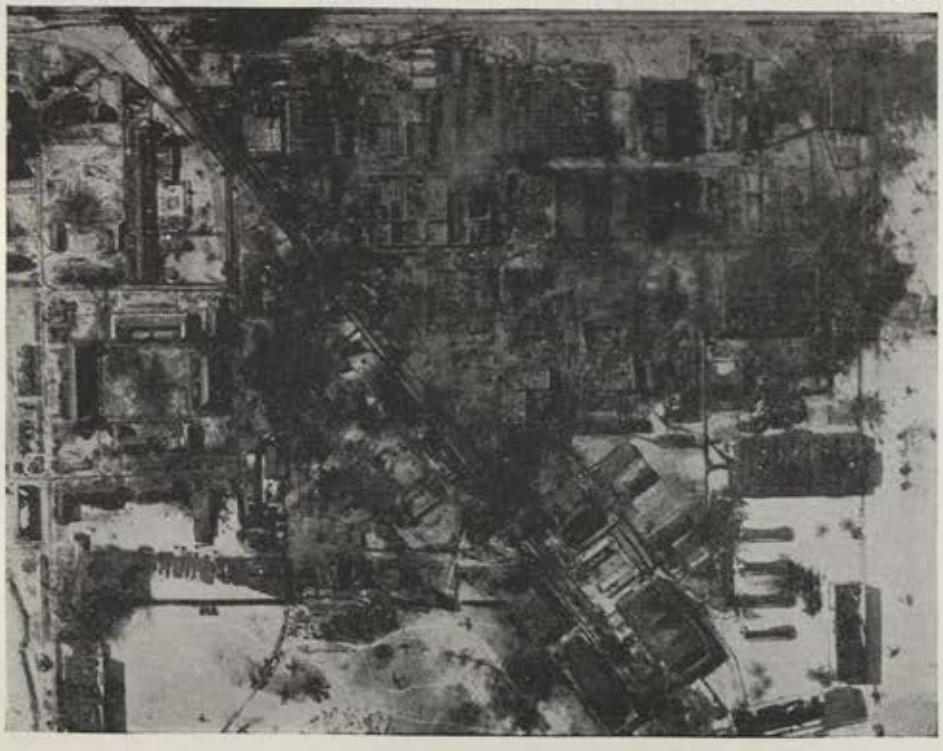
The AAF bombers returned on February 25 to complete their devastation of the town. The first waves prepared the remaining structures for the final kill by blasting them with 210 hundred-pound demolition bombs. Then the deluge of fire began. Concentrating on the waterfront, town and seaplane base, the planes dropped 4,786 thermate bombs and 1,204 gasoline-rubber bombs. At the height of the fury, twenty-one 500-pound general purpose bombs were poured into the howling inferno.

As the attacking bombers returned to their bases fire and smoke from the scene of chaos were visible for sixty miles.

Stepping-up of AAF incendiary raids toward their present frequency began last July 26 when Hamburg was hit with 56 tons of fire. Three days later, fire-bombs were used exclusively in a raid on the Nazi shipyards at Kiel. B-24s dropped 202 hundred-pound clusters and sixty-seven 500-pound clusters.

The Steaua Roma company's oil tanks were completely destroyed in the August attack on the refineries at Ploesti, Rumania, and in a September raid the U-boat building yards at Emden, Germany, were vitally damaged by fire. Schweinfurt's roller bearing factories were virtually eliminated in October by 88 tons of incendiaries dropped with 485 tons of high explosives. The same month the Focke-Wulf fighter plane assembly plant at Marienburg, East Prussia, was gutted by fire touched off by 1,300 M47 jellied oil 100-pounders released with several hundred general purpose bombs by Flying Fortresses. The same type of oil bomb was used in the Armistice Day raid and succeeding attacks on the important rail center at Munster, Germany.

Evidence of the devastating effect of combined use of incendiary and high-explosive bombs is seen in this picture of the Messerchmitt fighter plane plant, an adjacent locomotive and tank works and a nearby airdrome at Gotha after a raid by 8th Air Force Liberators on February 24. A total of 3,623 high-explosives prepared the targets for 1,436 fire-bombs that followed. Destroyed were ME-110 production shops and storage houses, the locomotive works, six hangars and many planes on the field. Other structures in the target area were severely damaged.



As the AAF's use of incendiaries increases, so does the work of the Air Chemical Office. Headed by Brig. Gen. Edward Montgomery, the office has four divisions, each with specific duties.

The technical division studies developments in the chemical munitions and equipment field and receives reports on the combat performance of its materiel from theatres of operations. The requirements division tabulates needs of the AAF in all parts of the world and initiates procurement. The supply division expedites shipment and the operations and planning division controls activation, training and assignment of aviation chemical units.

The Chemical Warfare Service of the Army Service Forces has the heavy responsibility of supplying incendiary materiel to all armed forces of the U. S. and, in considerable quantities, to those of the Allied nations. By far its biggest job, however, is procurement of incendiaries for the AAF.

Although four CWS arsenals are making incendiary bombs, production is mainly the task of private industry. Converted into fire-bomb manufacturers are hundreds of plants which formerly turned out baby shoes, silverware, vacuum cleaners, washing machines, kitchen utensils, outboard motor boats, fireworks and many other highly diversified peacetime products.

So great was the speed and efficiency with which factories were changed into munitions producers that even during the hectic early days of U. S. participation in the war incendiary bomb supply never failed to meet the AAF demand.

The first incendiary bombs rolled from the assembly line four days after the attack on Pearl Harbor, only three and one-half months after the CWS had been assigned the tremendous burden of drawing plans and organizing production. By the end of 1941, the bombs were being manufactured in large quantities and the unceasing flow has swelled month after month ever since.

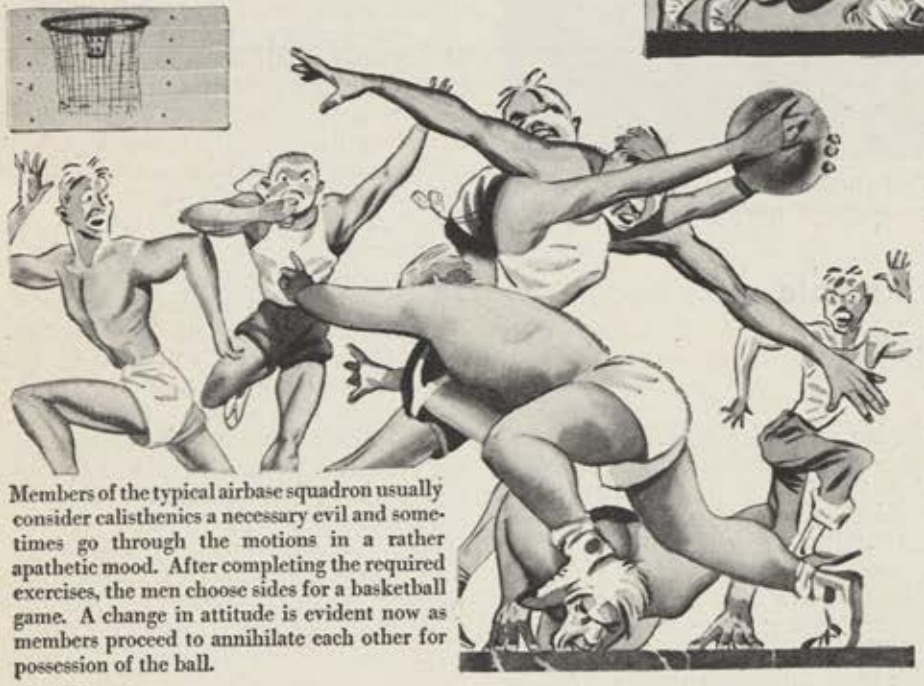
Besides developing and producing incendiary bombs, the CWS also tests them. No new-type bomb is sent overseas until its effectiveness and mechanical efficiency have been proved. ☆

# PHYSICAL FITNESS
## (DOMESTIC)

By Lieut. Wm. T. Lent

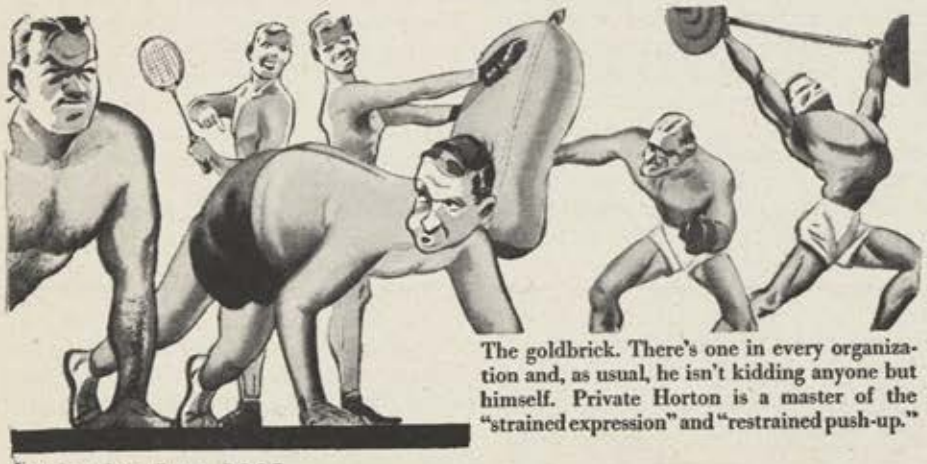
Nowadays many a Washington apartment doubles as a gym and groans to the cadence of the leg lift as Headquarters officers comply with the memorandum on morning and evening workouts. Colonel O'Gripe's wife is in hearty accord with the program that is making progress toward one goal in particular—that of deflating her husband's bulbous mid-section.


The post order, calling for fitness tests for all men under 40, catches Major McNicol, base finance officer, with his muscles down. In his first trial he gives his all on the pull-ups despite distractions by mythical PT gremlins and a diabolical-appearing instructor who keeps score.



Members of the typical airbase squadron usually consider calisthenics a necessary evil and sometimes go through the motions in a rather apathetic mood. After completing the required exercises, the men choose sides for a basketball game. A change in attitude is evident now as members proceed to annihilate each other for possession of the ball.

The greatest stimulus to physical fitness is the competitive spirit. Colonel Newlife is nearing 60 but voluntarily takes the test monthly. Here he proudly displays his rating card to a couple of junior officers. It's a cinch the youngsters will be out to beat the colonel's record of 60 sit-ups, 12 pull-ups and 55 seconds for the shuttle run.



The goldbrick. There's one in every organization and, as usual, he isn't kidding anyone but himself. Private Horton is a master of the "strained expression" and "restrained push-up."

# PHOTO-RECONNAISSANCE

## A One-Man War

Cameras replace guns in the nose of the F-5 (stripped-down Lightning). A net saving of about 400 pounds increases the normal speed and range.

### By Herbert H. Ringold

**AIR FORCE Staff**

IN England, A-2 wanted to know how many freight cars the Germans had at a particular marshalling yard and whether the cars were loaded or empty. In the South Pacific, the Navy requested information concerning the precise nature and location of all hidden reefs in the waters just off Arawe, New Britain. Bomber command in China required a report on the number of enemy aircraft based at an airdrome on Formosa, including specific details as to their type, armament and dispersal position. In india, facts were desired to show how and where the Japs were getting freight cars over a section of the Irrawaddy river after the only bridge over it had been bombed out. Allied headquarters in Africa wanted to know the location of enemy airdromes on Sicily, the number, type and placement of all defensive artillery protecting the fields, the best method of approach for our ground forces and the strength of the enemy troops.

Photo-reconnaissance supplied all of this information.

At the marshalling yards in occupied France, pictures established that the Nazis had 186 freight cars. Interpretation by men familiar with railroad procedure determined that approximately 95 of the cars were fully loaded. Strafing planes were sent out to shoot up the works.

When landing boats invaded Arawe, the helmsmen carried small photographs which charted the location of the hidden reefs protecting the invasion point. Pictures given to the attacking troops showed the exact position of enemy gun installations. Our landing casualties were "extremely light."

Bomber command in China was informed that fifty Jap planes were based on Formosa. A detailed map was drawn up from pictures supplied by photo-reconnaissance and the complete method of Japanese aircraft dispersal was indicated. The target was attacked in the morning; that afternoon PR pilots found that thirty of the enemy's planes had been destroyed. No further missions were needed immediately.

"Photo Joes" in India discovered three different places where the Japs were putting freight cars on barges and floating them across the Irrawaddy river. An operation was scheduled to break up this important supply line.

In the Mediterranean theatre, photo-reconnaissance planes flying out of Malta provided Allied headquarters with detailed information on twenty enemy airdromes on Sicily. The Sicilian air war was waged largely on the basis of these photographs, and the strategy of the ground forces was not finally determined until recon pictures showed where and how the infantry could best attack.

PR pilots have one assignment: find out everything about the enemy. Exactly how much damage did the Fortresses do to Regensburg? Are the Japs moving convoys down to reinforce Truk? What are the principal German flak installations on the bomber route to Berlin? What is the type, class and name of the German boat hidden in a Norway fjord? Do the Japs have barbed wire protecting their airfield on Bougainville? Everything the enemy has done, is doing and will do —that's the information the PR boys must get.

To bring back their pictures, they fly wherever the bombers go—and, now and then, where the bombers won't go. Their planes are completely unarmed. There are no escorting fighters. They fly up to nine-hour missions without co-pilots, automatic pilots or box lunches. Usually, the missions are flown above 25,000 feet, which means oxygen all the time—and you can't eat through an A-10 mask. They fly on instruments over unfamiliar territory through weather which sometimes turns back the bombers. Yet they have no navigators or radio operators. The PR pilot fights a one-man war.

They often cover one target at 30,000 feet and another from 300 feet, both on the same mission. At high altitudes they have to watch for enemy fighters; on the deck they must dodge flak and small arms fire and, at the same time, pilot

**Without guns or escort, our PR pilots stick their noses into the enemy's business for information which helps determine what we do, when we do it—and then proves what we did.**

their planes, navigate, line up the target for a good photograph, watch their instruments and keep a sharp eye out for targets of opportunity.

However, PR pilots feel that they are in less danger than other combat airmen in the AAF. Capt. Joe D. Scalpone, veteran photo-recon pilot, comments: "Protection? We have more protection in our unarmed planes than the boys in the bombers. We've developed a technique for staying out of trouble. That's easier than fighting your way out."

Photo-recon pilots won't be able to tell their grandchildren about the enemy planes they shot down. When an enemy is sighted, their instructions are to get out of the area immediately. But Col. Karl L. Polifka, CO of a recon group, argues, "The average fighter pilot, if he's lucky, knocks down ten enemy planes before his flying career is over. The average PR pilot at the end of fifty missions will have photographed a thousand targets, which is a hell of a lot more important."

The vast majority of PR missions are made in stripped down P-38s—F-5s. Modification of the Lightnings for photographic purposes included the removal of guns and firing mechanisms weighing 900 pounds, and the installation of camera equipment totaling 500 pounds. The net saving, together with a smoother nose made possible by removing gun ports, has greatly increased the normal speed and range. Extra belly tanks are part of the standard equipment.

Camera installations are of two types. In one instance, two cameras take overlapping pictures, shooting straight down from a single window. The trimetrogon method, on the other hand, consists of three cameras shooting three different surface views. One is parallel with the ground and is flanked by two others whose optical axes are depressed thirty degrees below the horizon. The result is a horizon-to-horizon photograph.

There are three standard camera types. The K-17 with a six-inch focal length used for general orientation and for charting purposes; the K-17 with a 12- or 24-inch cone and the K-22 with a 24- or 40-inch cone for large scale pinpoints over strategic targets from great heights; and the K-18 with a 24-inch focal length for strip photography. When minute detail is not required, the small focal length may be used. The resulting photograph will cover a large area but show only its general characteristics. When information concerning a specific installation is needed, the larger focal length is used to provide a picture covering a very small area but indicating its characteristics in precise detail.

Working the camera is a PR pilot's simplest job. All he does is push a button and the camera works automatically. But determining the right time and the proper position requires a high degree of training. Night photographic work has added to the complexity of PR missions. Magnesium flash bombs are dropped to light up the target area. Recent experiments with Edgerton flash units—a system of electric charges—have been made with considerable success. All night missions are flown in B-25s or A-20s.

According to the table of organization, photo-reconnaissance units in combat areas are directed by a priorities board which operates under the theatre commander and determines the over-all policy. Actually, PR units are highly flexible organizations, operating for the air forces, various branches of the ground forces, the Navy and our Allies. In the Mediterranean theatre, it was not unusual for PR pilots to fly missions for bomber command, the French Army, the Royal Navy and the American Infantry, all in the same day.

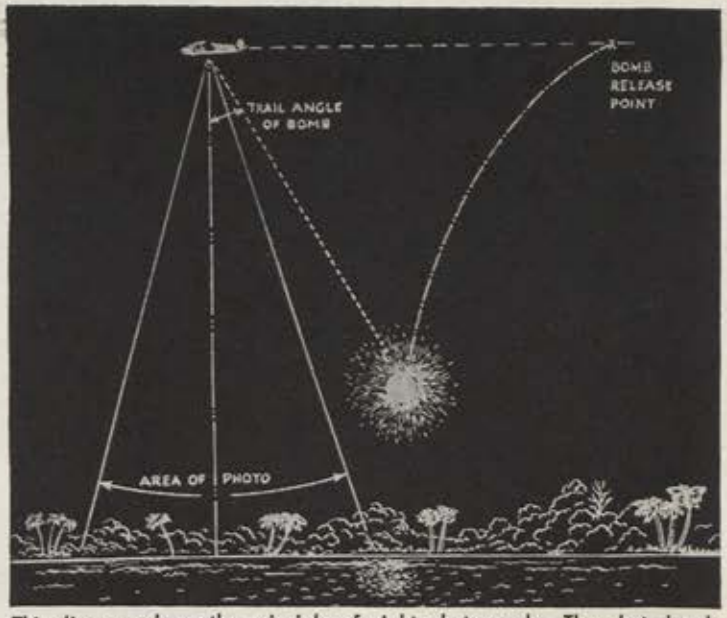
An examination of the function of photo-reconnaissance units in the various theatres will show that although the type of their work varies with the needs in each theatre, their overall purpose is always the same. Find out as much about the enemy as the enemy knows himself.

One of the principal functions of photo-recon in the European Theatre of Operations, for example, is bomb damage assessment. It is necessary to determine exactly how much damage our bombers have done to their targets. To get this information, PR pilots fly over the bombed area, often within an hour after the bombers have left. They wait at least that time for the smoke to clear and then they come in generally from above 25,000 feet, take their pictures and get out in a hurry. Within a day, higher headquarters can determine if the mission was successful, and if and when another attack must be scheduled.

IF the target has been bombed successfully, PR pilots watch it on a regular schedule. The enemy will usually begin to rebuild, and we want to know exactly how he's coming along. His activities are carefully followed while he is using up valuable man hours and critical material. Then, when he is just about finished, the bombers come back. That is one of the answers to why the heavies keep returning to Brunswick, Hamburg, Wilhelmshaven and other consistently at-

Returning from another mission, a PR pilot found this target of opportunity. Interpretation determined that it was a synthetic rubber plant in Germany, high on the bomber priority list.


At right is the photo flash bomb used for night aerial photography. At the peak of the flash, it provides about one billion candlepower. Above is a close-up of the bomb's fuse head.




This diagram shows the principle of night photography. The photo-bomb explodes behind the plane and a photo-electric cell works the camera.

The photograph below was taken from a B-24 at night from 10,000 feet. The glare on the left resulted from the explosion of the photo-bomb.

tacked areas. Hamburg was covered every day to see how many more raids would be required to knock it out. The submarine pens at Vegasak were watched once a week, for a month. They were hit when the Nazis had them almost reconstructed.

In addition to bomb damage assessment work, PR pilots have a routine job of watching important German installations just to find out what's going on. Sixty-five enemy ports from France's Mediterranean to northeastern Germany are covered at varying intervals, some as often as every two days, others once every two months. Four hundred enemy airdromes are visited on a regular schedule. Pictures of 35 factory airdromes are made about once a month. Twenty-nine U-boat construction yards come in for attention once every two months, some every two weeks. In addition, gun installations on the coast, navigation beams and radio detection stations are covered at intervals of from two weeks to two months.

Now and then, a PR pilot will come back with a lucky strike—an important target of opportunity. Maj. James Wright, returning from a routine mission near Huls in southwestern Germany, followed normal procedure by turning on his cameras to use up the unexposed film on the chance that he might find something. He did. Interpretation of his pictures showed that the Germans had built a large, seemingly important factory in that area.

In cases of this nature, the target is not attacked immediately. It is necessary, first, to find out what the factory is manufacturing in order to determine how important it is. Then, bomber command wants to know what kind of material it is made of so they can decide how best to attack it. The location of defending fighter fields and flak installations must also be discovered to pick out the best route and method of attack. Photo-recon pilots looked after that factory with loving care on an almost daily basis. It turned out to be a synthetic rubber plant, high on the bomber priority list. A special mission was made to get it—the entire operation based upon information supplied by photo-reconnaissance.

The Germans realize that our PR pilots bring back vital information. As a result, they give special attention to attacking these unarmed, unescorted planes. From detection devices, they know immediately when a PR pilot comes poking into Europe. PR pilots must master the fine art of faking in order to escape.

Major Wright reported a mission he planned for one of his pilots. He relates, "We sent him across the channel near Dover at Abbeville and faked a route one hundred miles north of Paris. As he went due north of that city, he suddenly cut down to Romilly, fifty miles to the southeast. From there, he made a sharp turn northeast into Paris and covered three important airdromes. Then, he headed for Dieppe on a continued northeast route. But he executed another reversal and turned southwest to take the airdrome at Beauvais. And we finally brought him back on a circuitous route which included a fake into southern Germany. We have to do that kind of flying all the time."

ONE of the most important jobs of the PRUs based in England has been the securing of photographic information vital to the invasion of western Europe. The location of every important highway, bridge, river, mountain, forest and town has been provided to the proper authorities. Practically every enemy airdrome has been covered to show its defenses, the position of hangars, gas tanks, dispersal areas and the best land approach for our ground troops. Artillery maps have been made to show the exact spot of the enemy's installations, and to pick

out proper positions for setting up our big guns. The defenses of Fortress Europe are no secret; we have millions of pictures so detailed that they even show enemy machine gun positions. From 30,000 feet, a PR picture will reveal as little as a six-foot elevation in the ground. Barbed wire can be picked out with relative ease, and you can count railroad ties.

The European coast has been photographed more often than the most popular Hollywood star. Pictures of certain locations have been taken three times a day to determine the nature of the tides in the early morning, at noon and in the evening. The exact height of barriers erected by the Germans to protect their installations is known by headquarters. What kind of bridge will be needed to cross a certain river? Photo-reconnaissance knows. Do the Germans have 88 mm guns encased in concrete along a certain road? That information is available on PR pictures. Where is the best place to land our bombers in Europe? Look in the files—the photographs are there. Photo-reconnaissance is providing all the branches of the service with complete and detailed pictures showing the position of the enemy, his strength and firepower, and the best routes of attack.

The function of photo-recon units in the South Pacific is somewhat different from that in England. Original mapping work was one of the first jobs given to PR pilots based on Australia and New Guinea. Most of the available maps had been charted back in 1880, so the PRU boys had to map about 100,000 square miles of territory. After the over-all area had been covered, specific operational requests were fulfilled.

There are no landings made in the Pacific without pictures taken by photo-reconnaissance. Every inch of the ground is photographed to show the best attack point, the proper method of approach and the extent of the enemy's defenses. Before paratroops were dropped at Nadszap, New Guinea, photographs showed what the area looked like. Buna and Salamaua were bombed from pictures taken by PR pilots. At Arawe and New Gloucester, every Jap installation was detailed for the invading ground forces.

Remember that attack on Wewak when we caught 200 enemy planes on the ground? That mission was made as a direct result of photo-recon information. The airfield had been watched daily as the Japs brought in their planes. One day, a picture showed that the enemy had aircraft lined up wing-to-wing-tip. That was the beginning of the end.

On missions over Rabaul, our bombardiers carried small photographs showing the position of whatever installations were still standing. In the Marshalls, our landing troops had pictures of beach contours, elevations and enemy positions, all provided by PR pilots. Photo-reconnaissance is building up a similar file on every island along the route to Tokyo.

In many instances PR missions are successful if they provide negative information. Such was the case in operations over the Wakde Islands, north of Rabaul. Information was received that the Japs were pouring planes into these islands, and headquarters wanted to know exactly what was going on. Usually, PR planes fly alone, but this mission was so important that two planes were dispatched just in case one did not return. But both ships got back with information that the Japs had only fifteen planes in the islands. As a result, our bombers were able to hit Rabaul in strength without worrying about interception from Wakde.

Photo-recon planes need not go down on the "deck" to get detailed information. Even the naked eye can determine detail from this photograph taken from about 30,000 feet over France.

DUE to the importance of naval activity in the Pacific, much of the photo-recon work there has to do with enemy shipping. When pictures are taken of an enemy vessel from 30,000 feet, first phase interpretation can indicate the type of craft. Second phase can tell you its name. And, PR pilots jokingly claim, that third phase interpretation can count the number of men on the deck and indicate whether the fourth man from the left had a shave recently.

Down in the South Pacific, PR men fly long hours over open water and jungle. Often, they fly up to seven- and eight-hour missions. On the Wakde operation, Maj. Alex Guerry was gone for seven and a half hours. As he says, "That's a lot of sitting on your rear end." But requests for photo-recon missions are numerous and the vast distances create an added problem. Maj. John Foster is reported to have told a liaison officer of the 5th and 7th Air Forces that "you want a picture of every wave between New Guinea and New Britain, and a shot from behind every tree on every island in the Pacific."

In the Mediterranean theatre, the photo-reconnaissance situation was different again. The job there was more of a tactical nature, with operations being conducted in direct support of the attacking ground forces. Following the 5th Army in Italy, photo-recon pilots made three missions a day right over the battle lines to pick out the German defenses and help select artillery targets. One of the neatest tricks pulled by the PRUs was the way they watched the enemy attempt to evacuate Bizerte. German boats were observed coming down from Corsica. When they landed at Bizerte, pictures were taken regularly. From the size of the boats, experienced photo-interpreters determined exactly how long it would take the enemy to load them. When the Nazis had their ships fully loaded with retreating troops, the bombers came over and hit them in force.

In the battle of Sicily, PR helped

Allied headquarters predetermine exactly what the Germans were going to do. When it became apparent that the Luftwaffe would have to evacuate Sicily, our next move was to decide where they would go. At Gerbini, they had used a system of satellite airfields so it was suspected that they would probably do the same thing when they fell back on Italy. Foggia was selected as the point to which they would most likely retreat, so PR pilots mapped it long before the Germans moved in. They covered the fields there on a daily basis. When the Germans did transfer their planes to the satellite airdromes around Foggia, photo-reconnaissance showed the actual location of every airfield and the precise position of each airplane on the fields. Attacking fighter pilots carried photographs with them detailing these locations and the fields were strafed with great success.

During the attack on Pantelleria, photo-recon coordinated with bomber command to an unusual degree. PR pilots went over the target just before the bombers attacked. Then they swung out to sea while the strike was made. After the heavies left, the PR planes came back and had a "before and after" shot on the same roll of film.

Coordination from a time standpoint was also worked out with precision. Flying out of Malta at first light, PR planes photographed all the airdromes on Sicily, then continued to Tunis for a landing. Their films were processed in an hour and a half and flown to Strategic Air Force headquarters before 1300. The bombers went out after the indicated airfields in the afternoon and photo-recon pilots followed within an hour after the attack. That evening, bomber headquarters knew the exact damage done.

In Italy, as in England, continual routine missions are run to watch the important German installations in the northern part of the country and in southern France. Most all strategic bombing targets are selected from pictures provided by photo-reconnaissance.

The function of photo-recon units in India and China combine all of the operations of every other theatre. Original maps must be made of uncharted territory, bomb damage assessment is provided, and information for bomber missions comes in on a daily basis.

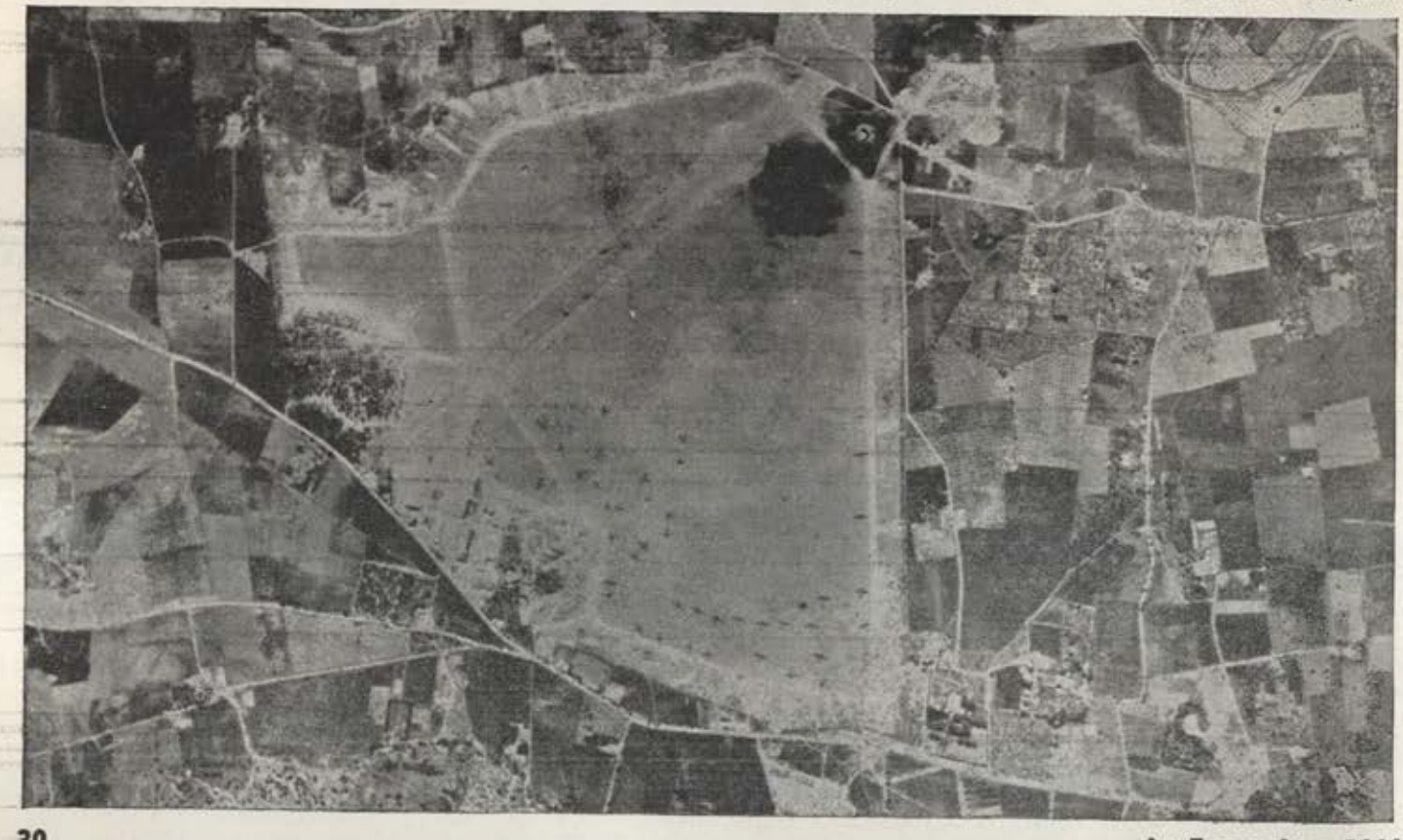
THE Myitnge bridge over the Irrawaddy river in Burma had been the target for a great number of bomber attacks until it was finally knocked out. But photo-reconnaissance proved that the Japs were still getting materials across without using the bridge. From pictures taken on a daily basis, interpreters were able to count the number of freight cars on both sides of the river. A series of pictures showed that the number of cars on the far side was increasing while the number on the near side was decreasing. PR pilots covered the area thoroughly and discovered three places where the Japs were using barges. That was all bomber command wanted to know.

Bomber crews in India attacked an important railroad roundhouse in Burma, but reported that only half of the structure had been hit. A second mission was planned, but photo-recon pilots proved that the structure actually had been completely gutted. Photo-reconnaissance saved the bomber crews a mission over a target which had already been destroyed.

In Burma, most operations stop during the monsoon season. But there is a dry area in central Burma where it was thought the Japs were continuing their activities. Headquarters wanted to know what was going on in the area so they would have information on hand when our bombers would be able to get off the ground. PR pilots flew through the weather on an eight-hour mission to a point about 450 miles from their base. They found boats going up the river, carrying supplies to a construction camp which was building airfields. When the weather cleared, that area was first on the list for our bombers.

In every theatre of operations, wherever our aircraft are based, photographic reconnaissance planes are stationed nearby to provide Operations with the necessary attack information, select special targets and indicate the damage done to them. The over-all job of photo-recon was best summed up by a PR pilot in a letter home. "My job," he wrote, "is sticking my nose into other people's business." ☆

**Photo-reconnaissance pilots make routine missions over all important enemy airdromes. From this picture taken during the battle of Sicily, interpreters counted 122 German aircraft on the Milo airfield. There are 60 single-engine aircraft, 29 medium bombers and 33 transports.**



# Sky Quirks

**By Lieut. Herbert G. Dorsey, Jr., and Lieut. Oscar Shaftel**

ARCTIC, DESERT AND TROPIC INFORMATION CENTER

PROBLEMS of visibility faced by flyers and ground travelers in arctic and desert regions should be thoroughly understood and mastered for successful operations. Refraction phenomena and some special varieties of mirage, caused by thin air, ground haze, dust storms and other atmospheric factors in these areas, may not have been even paragraphs in training textbooks back in the States.

The extreme transparency of the air in both arctic and desert terrain has given rise to this formula in judging distances: "Be extravagant, then multiply by three."

Those parts of mountains which normally can be seen over the earth's curvature appear dark and solid even at a distance of 100 miles. And flying high, with vision less hindered by the earth's rotundity, Admiral Byrd, Henry George Watkins and Sir Hubert Wilkins reported seeing or photographing capes and mountains in the arctic and antarctic at a distance of 200 miles.

A disadvantage of this exceptional visibility is that novices on snow or sand become overconfident of their ability to reach shelter or vegetation. Unwary pilots, in addition to misjudging flying distances, often make landing mistakes by underestimating altitude and leveling out high.

Clear air is clean air. Great visibility results from the absence of foreign substances in the air, especially water. The cold air of the northern winter can absorb little moisture. On the other hand, there is almost no moisture in the desert to be absorbed. And there is little smoke cluttering the air where the population is so small as in these regions.

Arctic and desert skies are not always clear, however. In the northern summer the air absorbs moisture, just as warm air does anywhere. Desert air is less clear at mid-day than during the morning and late afternoon. The great heat at the surface about noon causes the air to rise in convection currents. The resulting turbulence is likely to swirl loose dust and sand into the air. At morning and evening, when temperatures close to the ground and higher up are nearer equal, there is less blowing around of dust.

Dust and sand storms may make a return to the airbase difficult. The pilot must watch for breaks and clear spots and get down through them quickly before they close. Since the storms move, the pilot by appraising their direction and speed can decide whether to try to beat them into the field or to wait them out. Sometimes a narrow dust area may go as high as 10,000 feet, yet the airplane can be through it in a minute or two. An extreme of this is the dare devil, a dust swirl which may reach hundreds of feet into the air. These are easily avoided.

Another useful detail is that often dust will be set going by wind in a valley, but at higher levels there will be no dust because hillsides and hilltops are weathered and swept bare of loose sand and dust.

A dangerous visibility condition in the north is ground haze resulting from a combination of low cloudiness and new snow. Without sun, there is no shadow. All surface objects are obscured, and contrast or relief is lost. A ground traveler can fall into an open crevasse, which is invisible right before his feet.

When this haze occurs, it is even hard to keep one's balance because there are no points of reference such as the horizon. A man straightening up suddenly from a bent-over position may fall over backward because he has no way of knowing when he is perpendicular.

THEN there is the ever-present danger of encountering the ferocious polar bear. In the haze, the animal's fur blends with the snow-covered landscape. By the time the bear's black nose and claws catch the traveler's eye the huge, shaggy-haired killer is poised for the attack. Escape, except through dropping the animal by a quick, lucky shot, is impossible.

Experienced pilots dread "flying in milk." Because of limited visibility and lack of contrast, it is difficult to determine whether the plane is at twenty or 200 feet. Even with fair visibility, altitude is hard to judge. There are several reports of plowing into the snow or hitting a wing tip when the pilots thought they had plenty of altitude.

It doesn't take an Einstein to know about refraction—the deflection of light rays in passing from one medium to another of different density. For example, a stick appears bent when placed part in, part out of water. Refraction occurs also when the air through which light travels varies in density. Light travels faster through rare air than through dense air. Thus visibility changes as the temperature changes at different levels, expanding and contracting air.

SURVEYORS must make adjustments in their figures for air temperature and altitude, although ordinarily the effects are slight. The higher one goes, the less the air pressure, because there is less air above bearing downward. But this thinning of the air is offset to some extent by the tendency of the air to get colder with higher altitude, and therefore to contract. On the other hand, when the upper air, in addition to its low pressure, is also warmer than ground air and, therefore, all the thinner, refraction of light is emphasized. These "temperature inversions" cause interesting visibility effects.

One effect of the bending of light rays in rarefied upper air is the "superior" mirage, the result of warm air layers over colder ones. Objects at great distances seem larger. They loom and come closer. Objects far over the horizon suddenly become visible. The portion of light in the higher, thinner air will move faster than that in the lower, denser air, and the path will be curved toward the earth. Light rays originating below the horizon will thus be curved around the earth.

This looming or towering effect is a common phenomenon in high altitudes. Usually, however, superior mirage illusions in the north involve great distances only, because the range of temperature differences is slight (ten degrees centigrade in layers hundreds of feet thick) and the rays thus are bent in flat curves.

Temperature inversions can bring to the view of an observer either on the ground or in a plane landmarks hundreds of miles away. The distance of the objects seen is deter- *(Continued on Page 56)*


This is the Caproni aircraft factory at Reggio in northern Italy, before an attack by bombers of the Mediterranean Allied Air Forces.


Wellingtons and Flying Fortresses blanketed about 29 acres of the 50 acres which the Caproni factory covered. The photo above shows how the area looked following the attack. The hangars, assembly shops, work shops and other installations either have been destroyed or seriously damaged. Black areas dubbed in the picture below indicate components which were completely knocked out.



As part of the January offensive, Centocelle Airdrome was bombed three times by B-17s. The devastating attacks made the Germans place an unserviceability cross on the field, warning pilots not to land.

# BLASTING NAZI FACILITIES IN ITALY

THE Mediterranean Allied Air Forces assist ground operations in Italy by flying a double-barreled offensive against Nazi rail communications and aircraft installations. The campaign against the airdromes was started in January in support of the Fifth Army's landing at Anzio. By January 21, all but one of the major Rome fighter fields were unserviceable, bases for long range German bombers were battered, and the Nazis were seriously handicapped by the destruction of their long range reconnaissance base. The important fighter fields near Rome were reduced to a jumble of ruined buildings and craters. An intelligence report for this period states: "In the course of these operations a total of eleven airdromes were attacked and rendered unserviceable or damaged so severely as to interfere seriously with their operational utility." The MAAF has followed up these attacks with bombings of Nazi airdromes and aircraft factories all the way up to the Alps, in a continuing effort to keep the Luftwaffe pinned to the ground.

Liberators of the MAAF recently struck at the Gorizia airbase in northeastern Italy with excellent results. The photo at left shows how the airfield looked to the B-24 crews as they came in for their runs. The picture at right was taken at the height of the attack which destroyed 33 German planes on the ground. A few planes managed to get into the air but most of these were knocked down by fragmentation bombs.


The Ciampino airfield, German fighter base, is in reality two fields with common hangars and service buildings between them. The photograph at left, taken before the attack picture (right), shows the bomb damage of previous AAF assaults. At the bottom of the left photo is the Ciampino race track, now used for airfield installations. The attack by 15th Air Force Fortresses on January 19 rendered both fields unserviceable.

# PREPARE FOR INSPECTION

## TIMELY ADVICE FROM THE AIR INSPECTOR

*Administrative* ☆ *Tactical* ☆ *Technical*

*Matters presented here are informative only and are not to be considered as directives.*

▸ *Expecting a Discharge?* While awaiting discharge, a man will find it advantageous to acquaint himself with the following subjects covered by the directives indicated:

(1) Procedure for continuing National Service Life Insurance in civilian life. (WD Cir. 336, 1943.)

(2) Availability and location of employment centers. (Sec. IV, WD Cir. 40, 1944.)

(3) Provisions for receipt of mustering out pay. (WD Cir. 50, 1944.)

(4) Requirements and procedure for obtaining the honorable service lapel button. (WD Cir. 79, 1944.)

(5) Advisability of filing an application for disability pension (Veterans Administration Form No. 526) before discharge, if being discharged for disability (WD Cir. 13, 1944, as amended by Sec. V, WD Cir. 84, 1944.)

(6) Procedure for entering claims for items of pay and allowances remaining due and unpaid subsequent to discharge and final payment. (WD Cir. 45, as amended by Sec. I, WD Cir. 86, 1944.)

(7) Advisability of consulting competent legal counsel concerning any will that may have been previously executed. (WD Cir. 97, 1944.)

▸ *Strong Batteries:* Many a pilot has wished his airplane batteries had more "zip" in an emergency. Technical Order O1-1-66 was written to assure adequately charged batteries in flight, but technical inspectors report that auxiliary power plants are not being utilized for engine starting and ground testing of electrical equipment as prescribed by the directive.

▸ *Unit Funds:* Do you know the following points about unit funds?

They will not be used for the purchase of motor vehicles for the duration of the war. (AR 210-50, Ch. 11, 14 February 1944.)

Payment of premiums on bonds of Army mail clerks and assistant mail clerks is a proper charge. (AR 210-50, Ch. 12, 23 February 1944.)

▸ *Conservation:* Crew chiefs can save time and plane parts by avoiding unnecessary replacements. A crew chief overseas was noted replacing a rudder because it had two small bullet holes in it. Inspection showed that the interior was undamaged and that the rudder could be repaired by using some dope and fabric.

▸ *Overseas Baggage:* An officer going overseas never quits worrying about his personal baggage until he sees it stowed away in his theatre of operations quarters. He can greatly lessen his worries, however, by following the prescribed procedure.

Sec. II, WD Cir. 92, 1944, points out that serious congestion, delays and inconveniences have been experienced at ports of embarkation and staging areas through


the forwarding of personal baggage to these installations, transportation charges collect. Authorized allowance of baggage should be forwarded through the nearest transportation officer under government bills of lading. If this is not feasible, baggage should be shipped with transportation charges prepaid.

▸ *Facts and Figures:* How much space is authorized per man on board a troop train? What is the procedure followed by an air task force commander? How are supplies classified and distributed to units in the field during combat? These and hundreds of other questions are answered in the new edition of FM 101-10, "Staff Officers' Field Manual," a compilation of technical and logistical data and pertinent facts regarding organization. The book should prove handy for inspectors.

▸ *Will Making:* Every person in the military service should give prompt consideration to making a will, if he has not already prepared one. Legal assistance may be obtained from designated officers or from any civilian attorney.

It is highly desirable that all commanding officers urge military personnel to give immediate attention to this matter instead of waiting until arrival at a staging area or port of embarkation. However, a will to be legally effective, must be the free and voluntary act of the per-

▸ *Name, Rank and Number:* It is "name, rank and serial number" only. Inspectors questioning personnel as to what information may be given the enemy have received a variety of answers which show this basic lesson has not been well taught or well learned. Remember, it is "name, rank and serial number" only.

Cartoons by Jim Rawls


son making it and under some circumstances the drawing of such a document is unnecessary or undesirable. Therefore, commanding officers will not order or direct any person under their command to make a will. (WD Cir. 97, 1944.)

▸ *Night-time Maintenance:* An overseas report on an aviation engineer unit contains a training tip that may be applied to many other AAF organizations. It is the importance of being familiar with the operation and servicing of equipment at night. The report states much equipment is serviced only at night, and sometimes the only light is a candle cupped in a can.

▸ *Tire Blow-outs:* Inspectors report airplane tires are not being given the careful checks due them and many a crew may be "riding for a fall" in a landing. Particular emphasis should be placed on slippage of tires on rims (TO 04-1-11, 8 June 1943.), peeling and cracking of rubber, twisted valves, and oil spillage (TO 04-10-21 December 1943.)

▸ *Beneficiary Changes:* "Are there any men in the squadron who have been married recently?"

A field inspector, who makes a practice of asking this question first whenever inspecting service records, always get an affirmative answer. Examination


of the benedicts' records, however, reveals that in 75 percent of all cases the new wife has not yet been made the soldier's beneficiary. In some instances, the soldier desires that his mother or father remain the beneficiary, but these cases are rare.

▸ *Responsibility:* The commander preparing replacements for overseas shipment is responsible for insuring that they are mentally and physically qualified for such duty as required by Par. 10, POR.

▸ *New Numbering System:* With the publication of AAF Reg. 5-4, 14 March 1944, the Army Air Forces took a big step toward speeding up the indoctrination of personnel in regard to publications. Under the new regulation the system outlined in AAF Reg. O-1 will be adopted as the standard procedure for numbering administrative publications. This system will be used by all air forces, commands, posts, stations and airbases in the issuance of regulations, memoranda, instructions or other such publications.

When the transformation of numbering systems is completed, AAF personnel, transferred from one command to another or from one station to another, will know where to look, for instance, for a local directive on personnel. It will be in the "35 series." Formerly, an air force might have placed personnel matters in a "75 series" while an airbase was using a different number in filing the same type of publications.

▸ *Needless Casualties:* A medical officer inspecting hospitals overseas was surprised to find many non-battle casualties —patients who had been burned by gas fires or explosions. One soldier had spilled gasoline on his clothes in refueling an airplane. Later, he struck a match on his pants to light a cigarette. He was hospitalized with first degree burns. ☆

## HERE ARE THE ANSWERS

**Q. *How are Service Records of personnel scheduled for overseas shipment indorsed?***

**A.** If the soldier is joining a known shipment for overseas destination, the Service Record will be indorsed to the shipment number and not to the commanding officer of a port of embarkation or the commanding officer of some staging station under the jurisdiction of the port commander. If the soldier is ordered to a replacement pool in a port of embarkation, the Service Record will be indorsed to the commanding officer of the indicated replacement pool. If the soldier is ordered to an overseas replacement depot, the Service Record will be indorsed to the commanding officer thereof, and the special orders effecting such transfer will contain a reference to any project number or other special identifying instructions which caused the soldier's transfer. (AAF Ltr 35-39, 31 December 1943, Subject: "Indorsements on Service Records." Information in this directive supersedes that given in the March, 1944, issue of AIR FORCE.)

**Q. *May an officer be granted leave of absence upon release from active duty?***

**A.** Leave of absence may be granted officers relieved from active duty who are not to be separated from the service. Leave may also be granted officers who are to be separated from the service by resignation, if under honorable conditions, or by honorable discharge (as distinguished from discharge (see AR 605-10 and AR 605-230.) In no case will leave be granted to extend beyond the effective date of the officer's relief from active duty. (Par. 10, AR 605-115, as amended by Ch. 6, 5 February 1944.)

**Q. *Will an entry pertaining to time to be made good under the 107th Article of War be made on Page 7 of the Service Record of an enlisted man who was inducted into the service?***

**A.** Yes. If such an entry is not made, the Service Record does not reflect a true picture of service. For example, if a soldier desired to remain in service after the present emergency plus six months and no entry was made in the Service Record of time to be made good under the 107th Article of War, this time would not be deducted in computing longevity.

**Q. *May reimbursement be received for taxicab fares incurred while traveling on a per diem status?***

**A.** Expenses incident to taxicab rides between places of abode or business and stations, wharves or other common carrier terminals, except air terminals, are reimbursable. (Ch. 5, AR 35-4820, 11 February 1944.)

**Q. *Is the abbreviation "AAF" proper in official correspondence?***

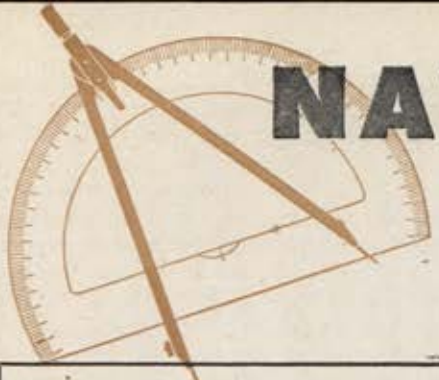
**A.** In all cases where verbal or written reference is made to the Army Air Forces, the abbreviation "AAF" will be used in place of "Army Air Forces," unless prohibited by Army regulations. (AAF Memo. 80-8, 16 December 1943.)

**Q. *What limited service officers and warrant officers are considered qualified for overseas service?***

**A.** Those whose defects are static in nature and not subject to the development of complications. (WD Cir. 102, 1944.)

**Q. *Is a certificate required in the remarks section of the payroll in those cases where additional pay for flying is claimed by enlisted persons?***

**A.** Yes. Change 7, AR 345-155, 8 February 1944, states that a certificate will be entered on the pay rolls of enlisted persons where additional pay for flying duty is claimed.



# NAVIGATION PROB


## By Lieut. Ralph N. Phillips

9TH AIR FORCE


Lieutenant Phillips wrote the accompanying article from notes taken during fifty operational missions over western Europe in the hope that new navigators would gain from it some idea of what to expect if they should be assigned to duty in England. Lieutenant Phillips was graduated from navigation school at Mather Field, Calif., in October, 1942.

To a 9th Air Force B-26 navigator, England resembles nothing so much as a patchwork crazy-quilt. There are none of the straight, well-defined roads and fences to which one becomes accustomed in the States, no space between the towns, no high tension lines to follow; only a hopeless conglomeration of winding roads, vari-colored fields and hills, an occasional railroad and five-mile visibility due to smoke haze. When visibility reaches ten miles, the group weather officer declares that a meteorological phenomenon exists. You do pilotage from 12,000 feet over territory where a mile off course means a strong dose of flak.

In trying to follow course on a British map with a scale of 1/500,000 in which one inch equals eight miles, I soon realized that one major change in my training would be learning to read and do pilotage from British maps. They show wooded areas quite accurately, both in location and external shape, and thus provide excellent check points. Small towns are shown as a small black square, and railroad stops are designated by a small black dash, which is all right except for the fact that there are so many railroad stops that have the same population as a small town, and every one looks exactly the same from the air.

On the British larger scale maps, one inch equals four miles and the scale is 1/250,000. This map shows churches, houses and pubs but with a 240 mph ground speed an inch goes by every minute. If you lose a pencil and bend down to pick it up, you may be lost.

This happened to me on the trip in and because of it, one of my rules became: "When over unfamiliar terrain, don't move your finger from the map, or that last check point will disappear." Probably the best check points on British maps, in the order of their importance, are large towns, railroads, woods, lakes and road intersections. Railroad tunnels also are noticeable and from 12,000 feet, prominent hills stand out.

Another great difference between U. S. and British maps is the projection from which they are made. U. S. Sectional and Regionals are Lambert conformal projections, with distance measured from mid-latitude in nautical miles. British maps are modified polyconic projections with a constant scale measured in statute miles. This I found to be an asset after I learned to work with statute miles instead of knots, but this change-over took time.

After reporting to our new CO, I was sent, along with the other replacements and original members of the group, to a school where for a week we received intensive instructions in map reading, aircraft identification, bail-out and ditching procedure, and PW lectures, the last of which I classified as first on my things-I-don't-want-to-go-through list.

**Navigators of our 9th Air Force mediums have many new lessons to learn before they're ready for bombing runs over Europe.**

We later went back to our group and started our training for medium altitude. The practice missions we flew were called "doughnuts" and were simulated raids, with a climb on course, coast out, coast in, initial point, bomb run and target.

These "doughnuts" brought up two more changes from the type of pilotage to which I had been accustomed. The first was the necessity of making out flight plans in advance, with certain check points listed and ETAs shown. This method must be used because there isn't enough time to test check points and get ground speeds and ETAs for the next one. These flight plans are made from available metro winds and are just as accurate as the winds are. The necessity for the second change was shown me in a rather drastic way. We had an eighteen-ship formation up on a practice flight one afternoon about to cross the English coast on the way inland and five minutes behind our flight plan. We were merrily on our way to the theoretical IP when six black puffs of smoke suddenly appeared at our left, accurate for altitude and about 200 yards away. Eighteen Marauders broke into violent dividual evasive action, and for the first time, I'll have to admit, it was pretty good. Colors of the day went up so fast they resembled a pyrotechnic exhibition. Back on the ground, I learned that for every XC, group operations must file a "J" form with Flying Control, giving times, places and altitude of crossing the English coast in and out. In training we were allowed a minute's deviation from this time. I firmly believe that the flak was purely a warning, because I have seen examples of British accuracy with their AA. The importance of timing on an operational mission cannot be over-stressed, because attacks and rendezvous are planned to the second; never by minutes.

My group went operational on July 16, 1943, and I found that despite my additional training, I still had plenty to learn. Great Britain is full of balloon barrages, gunnery ranges and restricted areas that we have to go around, for security and safety, and for awhile it was difficult to plan our climb so as to miss these areas and still have room to reach altitude.

THE climb phase usually is easily accomplished, until the formation runs into some unpredictable weather and has to break up to get above the overcast. Immediately after emerging on top after climbing at 1,000 feet per minute at 170 indicated, to get through in the least possible time, the pilot will yell, "Where are we, and where's the formation?" If the navigator is well supplied with luck, he can see the formation reforming and join it, but he must be prepared to give the pilot a heading to the rendezvous which is within thirty seconds of the time given on the field order which comes from bomber command.

If the weather has cooperated with the weather officer and the climb is uneventful, arriving on time for bomber rendezvous becomes the primary objective of the lead navigator. If you can imagine four boxes of eighteen B-26s, all arriving at a certain point within one minute of each other, then each box falling into its predetermined position in the formation without the well-known monkey wrench in the works, you will appreciate the imperative order from bomber command when it says, "be on time."

When the formation has to rendezvous

# LEMS IN ENGLAND

only with fighters, the same maxim holds true. At times, the same group of fighter escort is used as close cover for the separate formations of Marauders going in at intervals of, say, fifteen minutes. Fighters must utilize every second to save gas, so you can understand the situation that arises when the second formation of B-26s is a minute and a half late. Fighters won't wait, and I remember one of many abortives caused by tardiness. Our (36-ship) formation was headed for the fighter rendezvous when the lead navigator saw he was going to be three minutes early. He turned and flew away from the rendezvous for five minutes. By the time we had again reached the appointed place, the fighters were gone and we had to return to base.

On another mission, the navigator had two minutes to kill, so he had the pilot do a 360-degree turn, not realizing that the time required for a single needle width 360-degree turn by a normal formation of B-26s is five minutes.

Being on course, especially when over enemy territory, is of major importance. The courses in and out are routed by bomber command to clear the known flak areas. Recently, one of our boxes was off course to the right and turned directly over Dieppe—a strong enemy flak position—and, as a result, some of the ships returned and were out for repairs.

Evasive action is usually taken at landfall, and I've been on raids when it was necessary to continue evasive action the whole time over enemy territory. If they can't get your course, speed and altitude, they can't hit you. Being exactly on course over the target sometimes will mean a good level bomb run, or a run lavishly interspersed with self-preserving evasive action which may be necessary until the last moment before the run. The navigator must be prepared for this and make allowances both in time and position and still come out even. One navigator in my squadron found his pilot doing violent evasive action over a 10/10 undercast and had to resort to D/R to get to the IP and on the bomb run.

If you happen to be flying as navigator in the Number 4 ship, you will probably be deputy box leader and, as such, you must be capable at all times of taking over and leading the box on formation in emergencies. This requires that the deputy navigator know as much about the target, flak, rendezvous and the flight plan as the lead navigator. Abortives give the navigator another worry, and he must be ready and able to give at any time the heading either to his home airdrome or to the nearest emergency field, depending upon how urgent the case may be.

For every mission there are given two or more emergency fields, the locations of which the navigator should know by sight.

Another duty of the navigator is to get the bombardier lined up on the target.

Illustrated by Capt. Raymond Creekmore

Cooperation between the bombardier in the nose and the navigator, wherever he is, over the interphone has been a great help, due to the more or less unlimited range of vision the bombardier has. The target itself plays a part in the ease or difficulty of picking it up. Marshalling yards are cinches, with the town as a lead, and the point where the railroad tracks widen into a bulge is easily spotted. Airdromes are almost as easily located because of their necessary level area, but their relationship to towns, railroads, roads, woods and canals is also helpful to the navigator. Military installations and gun emplacements are a different story. You are lucky if S-2 gives you so much as "the target is located in the northwest corner of this patch of woods" or "the heart of the target is in the southeast part of this town." When you look on the map, there's no town but perhaps just a small number of houses. The best method of location is by determining the target's relationship to a town, railroad, road or woods, or a combination of any two or three of them. Frequently, at target study, the navigator and bombardier will find that if they leave one point and head directly for another recognizable point, they will be on course for the target, and then all there is to do is spot the target and get it in the bomb-sight.

After the bomb run the primary point to remember is to steer clear of flak areas and coastal towns such as Calais, Boulogne and Dieppe. Once it seemed that Boulogne held a magnetic fascination for one of our groups and whenever we saw flak over the town, we would automatically say "there goes the —th." The Germans have had lots of practice on the mediums.

The navigators who aren't box or deputy leaders can assist the pilot by telling him about what time the formation will turn and the next heading.

The descent and return to base isn't especially hazardous until you find that your field is closed in and they have routed you to a diversion field. Then the boys start wondering why they didn't wear all their heavy clothes, because it's plenty chilly sleeping on the floor in a strange barracks.

There is no remedy for weather over the British Isles and the part of the Continent you fly over in this theatre. Frequently the weather officer would predict no clouds, or at most, from 2/10 to 4/10 over the mainland, but when we arrived there, the cloud cover would be 6/10 to 8/10. This is very disconcerting to a lead navigator, but the switch over to D/R and the flight plan is still available, so the formation goes on in, the bombardier and the navigator both fervently hoping for a break in the clouds over the target. On one occasion we started in for a military installation but the haze was so thick that, when looking into the sun, no check points could be distinguished. We made our run on the target, but we didn't see it until too late. So we made a big 180-degree turn and started in again. There was no flak, so we kept trying. We finally turned for home after the third run and found that another box from our own group had made five passes at its target. ☆

# FLYING SAFETY

**Suggestions from the Office of Flying Safety, Headquarters, Army Air Forces, in the interest of accident reduction.**

*These items are for educational purposes and are not to be construed as directives.*

## Stop Those Maintenance Oversights!

Often the difference between a first-rate mechanic, who wears a tech sergeant's stripes, and just another Joe rests in the attention paid to the small details of a plane's maintenance. In other words, the first rater begins where the average mechanic leaves off.

A mechanic's routine is covered by tech orders, regulations and other official publications, but in the last analysis the mechanic must assume responsibility for his plane's condition. A tech order alone can merely say that a nut must be tightened. It can't wield the wrench.

AAF planes, by and large, receive the care they deserve. But with thousands of planes in operation, it is not surprising that there have been oversights. It is the duty of every mechanic, crew chief, inspector and engineering officer to reduce such incidents to miscroscopic proportions.

The Office of Flying Safety recently made a study of these oversights. Though few in number, when judged by overall operations, these incidents deserve the consideration of every maintenance man. Such things can happen to any plane.

Maintenance oversights fit into a broad general pattern, with the same failures popping up repeatedly. They may be grouped into these three large categories:

(1) Foreign matter and objects in the power plant, including the fuel and oil lines.

(2) Loose or severed connections, defective installations and missing parts.

(3) Foreign objects fouling the controls.

No plane, large or small, is immune to hazards of this kind. A tiny L-1A, for instance, had an engine failure because a washer and screw had fallen inside the magneto housing, left open during maintenance. A heavy bomber recently required a trip to the hangar for removal of a rag from the prop dome.

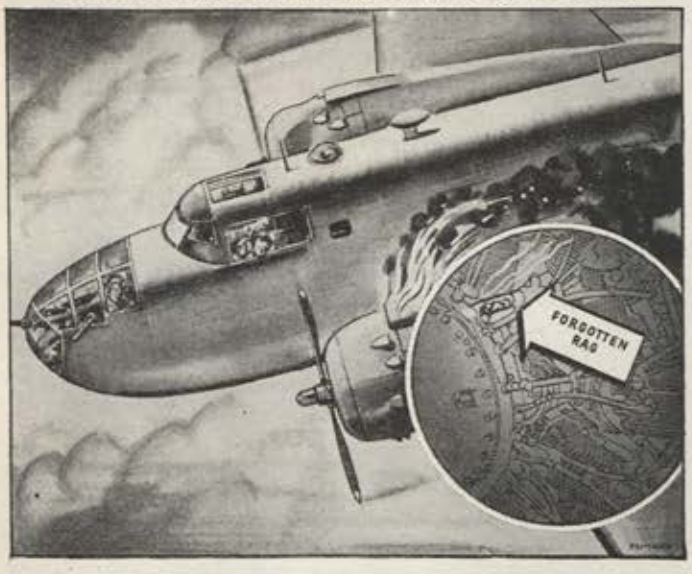
Foreign matter in the power system usually consists of bits of rags, cardboard, masking tape or plugs—material used to close open lines and vents during maintenance. Sludge in the oil sump and tools carelessly left about also have caused engine failures.

No mechanic should rest easy until he knows personally that every plug he inserted in a line has been removed. These plugs can be dynamite. For example, inspection of a wrecked B-24 revealed wooden plugs in both a fuel line and an oil line.

The simplest way in the world to jam the controls of a plane is to use the ship as a temporary storage spot. Recently, the cable controls of a P-51 were fouled by a canvas tool apron, which apparently had been stored in the tail "temporarily."

A tiny three-quarter inch screw, which had been left in the pilot's compartment of a B-25, caused a taxiing accident when it jammed the brake handle. It's likely that a mechanic laid the screw down while looking for some other item, planning to "pick it up later."

Carelessness with rags can bring down the largest airplane.




Beware of foreign objects thoughtlessly left in the cockpit. They can jam the controls.

In a hospital, before a surgical incision is sewn, a nurse accounts for each instrument, clamp and piece of gauze to insure that nothing has been left in the opening. Certainly a $250,000 airplane, with ten lives instead of one at stake, is entitled to equal care before a job is buttoned up.

Rags must be watched carefully around an airplane. Aside from the hazard created by leaving them behind when a job is finished, their careless use during a maintenance or repair operation can cause plenty of trouble. They may tear, leaving shreds behind that later block the fuel or oil system, or they may be misused as in the case of the B-24 which had an engine failure caused by a rag in the oil tank. A mechanic had used the rag, instead of replacing the cap, when he was interrupted while putting oil in the tank.

When an airplane is checked for loose connections or a nut is tightened or a cap seated, it always should be remembered that a plane vibrates and that a connection which is tight today might not be tight tomorrow.

A loose connection in the fuel system can be particularly dangerous because of the possibility of fire. One engine of a B-17 burned when the exhaust ignited

gas dripping from a poor connection at the carburetor.

A similar bit of carelessness destroyed a wing and engine of a UC-78 during a ground test. In this case the fuel hose had pulled free because the hose had not been clamped beyond a nipple on the pump extension. The crew chief subsequently explained that he had missed the faulty installation during a visual inspection because it was out of sight.

The chief's explanation calls to mind the fact that the reverse of the problem also confronts every maintenance man. While a conscientious mechanic is checking out-of-the-way installations he might, in concentrating on these items, have a tendency to overlook things right under his nose.

In one of his mysteries, Edgar Allan Poe described how an object was successfully hidden by placing it in the most obvious spot, where it was certain to be overlooked. An unwary mechanic may be caught in the same trap.

One of the advantages of Production Line Maintenance, with specialists checking over all planes at a base, is that these outsiders will find things that a plane's regular maintenance crew will overlook because of familiarity. A mechanic's only protection against this type of oversight is never to take *anything* for granted.

Frequently a missing part or a loose connection can be traced to the absence of safety wires. An A-20 burned out an engine in flight when the oil sump plug, which hadn't been safetied, fell out.

A mechanic never should leave any job requiring the replacement of safety wires

If gasoline is permitted to escape from a loose connection, fire is sure to result.

until the wires have actually been installed. If he plans to take care of that detail later, some day he's pretty certain to forget.

There is a period in almost every maintenance job which is a fertile breeder of oversights. That's the time when a crew is relieved by another shift. Unless each man going off duty explains to his relief the exact status of the work being performed, there is a chance of a slip-up.

Here's a story which illustrates the importance of unending vigil to keep an airplane tight and shipshape. It might be titled "The $125,000 Cap Nut," because the story starts with this small accessory.

The cap nut, which held the hydraulic line compression fitting to the outboard brake on the wheel of a B-17, worked loose. This permitted the fitting to fall out of place and protrude from the wheel.

When the wheel was retracted on takeoff, the fitting was smashed against the side of the nacelle well. Hydraulic fluid dripped out. The pilot had no brakes upon landing and cracked up the plane. The repairs cost $125,000.

In addition to the monetary loss, this one loose nut relieved pressure on the Axis which a little care and a few turns of a wrench could have kept applied.—Col. George C. Price, Chief, Office of Flying Safety.

### Clearance Made Simpler

The problem of clearances facing AAF pilots without clearing authority—and that means most pilots—is considerably simplified in AAF Regulation 15-23, dated 6 March 1944.

The new regulation enables a pilot to:

(1) Obtain a change in flight plan while in flight.

(2) Receive Army sanction of a change from contact flight rules (CFR) to instrument flight rules (IFR) as authorized by Airway Traffic Control without additional messages.

(3) Clear from bases lacking clearance facilities without setting down at the nearest base with such facilities.

Responsibility for administering these new clearance procedures rests with Army Flight Control. *(Continued on Next Page)*

## P. & I. SAYS:

(The Prevention and Investigation Division, OFS, is composed of veteran flyers. These reports include comments by these veterans on recent accidents. Read and heed.)

MEMPHIS — A P-47 ran out of gas and the pilot was forced to make a landing at an auxiliary field too small to accomodate his ship. The plane struck a small ditch, then fell back damaging the tail section. The pilot previously had noticed his plane was consuming an abnormal amount of gas, but he adhered to his original flight plan anyway.

*P & I COMMENT: The Remedial Action Board, 4th Ferrying Command, noting that the pilot recently had returned from combat, recommended that he be given additional instruction in the problems of domestic flight. This presents an interesting thought and a challenge to this officer and other flyers returning from overseas theatres. Due to war needs, many of these men in their earlier training had little opportunity to master the tricks of flight in the States, such factors as navigation, airways, instrument procedures, AAF Regulations and the like. On their new assignments in this country, they now have the chance to learn the details of the flying profession which will fit them for a place in aviation after the war.*

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SYRACUSE — A pilot flying a P-39 equipped with a belly tank experienced generator trouble and did not have enough juice to extend his gear. He tried manually, but after twenty minutes of cranking he could no longer turn the crank. He slowed the ship down as much as possible and brought it in on its belly. The pilot got out OK, but the plane burned.

*P & I COMMENT: The error standing out like a sore thumb in this accident is that the pilot did not drop the belly tank. In the first place, it is extremely difficult to crank the gear down on this ship at speeds greater than 130 mph. It also is difficult to maintain control at this slow speed when the tank is attached. Secondly, in almost every wheels-up landing where belly tanks have been attached, fire has resulted. Of nine belly landings, seven P-39s burned when they came in with belly tanks attached. Two without tanks did not burn.*

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NEW YORK — On a gunnery mission off the Atlantic coast, a fighter pilot made two successful passes at a tow target. While going around the curve of pursuit he lost sight of the target. Lowering his right wing in an attempt to find it, he discovered he was heading directly into the sleeve.

He tried to skid under the target but his propeller and right wing crashed into the cable.

*P & I COMMENT: This plane made a successful landing at its base but damage to its prop and wing cost many man hours and loss of a valuable plane to training. Fighter pilots have been told again and again that if sight of the target is lost at any time, the attack must be broken off immediately.* ☆

Under the old regulations, a pilot desiring to change his flight plan had either to land at his indicated destination or to circle the field and wait for the base operations officer to approve the change.

Now, all he is required to do is request the change from the nearest range station. The range station requires the following information for forwarding to the Flight Control center:

Identity of the plane, provisions of original flight plan and whether it calls for instrument or contact flight, and hours and minutes of fuel remaining.

If the change is OKed the range station within a few minutes will transmit an approval message prefaced by "Army Flight Control approves . . ."

To change from CFR to IFR, the procedure is the same as in the past. A pilot merely contacts Airway Traffic Control via a range station and asks for assignment of altitude.

The difference is that the request now is coordinated with Army Flight Control, which places the necessary Army approval on any authorized change. This coordination makes it possible for Flight Control to give any advice on conditions deemed pertinent.

Messages approving such changes will start with "Airway Traffic Control approves . . ."

In clearing from a base without clearance facilities, a pilot now needs merely to call the nearest Flight Control center long distance collect and get his plan approved.

If communication is impossible, it is not necessary for a pilot to fly to the nearest base with clearing facilities to file his plan as required in the past. He may proceed under CFR to the vicinity of a nearby range station and file his plan with Flight Control by radio.

Certain classifications of veteran AAF pilots have the authority to clear themselves with the Army. In this group are command pilots, senior pilots, senior service pilots and holders of current green instrument cards (AAF Form 8A).

When these veterans, flying CFR, file a routine notification of change of destination, the range station responds, "Army Flight Control has nothing for you," unless Flight Control has information to offer.

### Personal Responsibility

A visiting RSO found morale especially high in a reconnaissance group stationed at Abilene, Tex. A general assembly of all personnel each morning was credited in large measure for this condition. At the meeting, orders of the day, news of the organization and comments on progress were presented, giving each man the feeling that he was an essential part of the program. ☆

## What's Your AIR FORCE I.Q.?

Grab a mental brace and have a try at this month's AIR FORCE Quiz. Under the customary scoring system, chalk up five points for each correct answer. A score of 90 or above is excellent; 80 to 90, not bad at all; 65 to 80, only fair; below 65, well....

**1. You would most likely find an agonic line**
*a. In the fuselage of bomber-type aircraft*
*b. On a bombsight*
*c. On the instrument panel of fighter aircraft*
*d. On a weather map*

**2. The average rate of fall per second with open chute at 20,000 feet is approximately**
*a. 27 feet*
*b. 64 feet*
*c. 11 feet*
*d. 45 feet*

**3. The Andaman Islands are in the**
*a. Pacific Ocean*
*b. South China Sea*
*c. Bay of Bengal*
*d. Sea of Japan*

**4. The ceiling is considered to be unlimited when the base of the clouds is approximately how many feet above the point of observation on the ground?**
*a. 1,250*
*b. 9,750*
*c. 4,500*
*d. 15,225*

**5. The equivalent AAF rank to Commodore in the Navy is**
*a. Lieutenant Colonel*
*b. Major General*
*c. Colonel*
*d. Brigadier General*

**6. Headquarters of the 9th Air Force is presently located in**
*a. Australia*
*b. England*
*c. India*
*d. Middle East*

**7. To receive the rating of Senior Pilot, you must have five years of service as a rated pilot and how many hours of accredited flying time?**
*a. 500*
*b. 2,000*
*c. 1,000*
*d. 1,500*

**8. The A-24 is a version of the Navy's**
*a. Helldiver*
*b. Corsair*
*c. Vengeance*
*d. Dauntless*

**9. The Jap aircraft popularly referred to as a Sally is a**
*a. Single-engine fighter*
*b. Four-engine bomber*
*c. Twin-engine bomber*
*d. Twin-engine fighter*

**10. The Air Medal holds precedence over the Purple Heart**
*a. True*
*b. False*

**11. A kilometer is how many feet in length?**
*a. 3,280* *c. 4,300*
*b. 5,280* *d. 2,650*

**12. Which plane is inappropriate in the following grouping?**
*a. C-46* *c. C-47*
*b. C-54* *d. C-53*

**13. Our first aerial attack on the Japanese mainland took place on**
*a. August 7, 1942*
*b. April 18, 1942*
*c. June 7, 1942*
*d. February 15, 1942*

**14. Singapore is located**
*a. In Thailand*
*b. On the Malay Peninsula*
*c. On the Chinese mainland*
*d. In Burma*

**15. Benetnasch is**
*a. An important German airdrome near Berlin*
*b. One of the stars in the Dipper*
*c. The name of a new German fighter plane*
*d. A Russian soup*

**16. The distance in statute miles from Henderson Field in the Solomons to Davao in the Philippines is about**
*a. 600*
*b. 3,600*
*c. 1,600*
*d. 2,600*

**17. Key Field is located nearest to**
*a. Key West, Fla.*
*b. Meridian, Miss.*
*c. Oklahoma City, Okla.*
*d. Fort Worth, Texas*

**18. The RAF Sterling is a**
*a. Four-engine transport*
*b. Single-engine fighter*
*c. Twin-engine fighter*
*d. Four-engine bomber*

**19. The Deputy Supreme Commander of the Allied Expeditionary Forces is**
*a. Air Chief Marshal Sir Trafford Leigh-Mallory*
*b. General Dwight Eisenhower*
*c. Air Chief Marshal Sir Arthur Tedder*
*d. Lieut. Gen. Carl Spaatz*

**20. This explosion is the result of what type of bomb?**

**Answers on Page 64**

TECHNIQUE

A Review of Technical Developments in the Army Air Forces

# On the Target

## WITH OBLIQUE APPROACH SKETCHES

THE Allied Air Forces in the Southwest Pacific had an important problem to solve in preparing for the first missions against Hollandia, a section of New Guinea that is one of the least mapped and scantily charted areas in the world. In this rare instance, reconnaissance planes had been unable to obtain satisfactory photographs due to weather conditions over the target area. To overcome this handicap by repeated trips meant the danger of tipping off the enemy.

Yet when the flyers were briefed for their first mission over the new target, they were shown a reproduction of the terrain as it would look from the exact angle and height at which they would approach. The problem had been solved by oblique approach sketches, a new technique perfected by Capt. Harry E. Fraser of the Central Interpretation Unit of the Allied Air Forces in the Southwest Pacific.

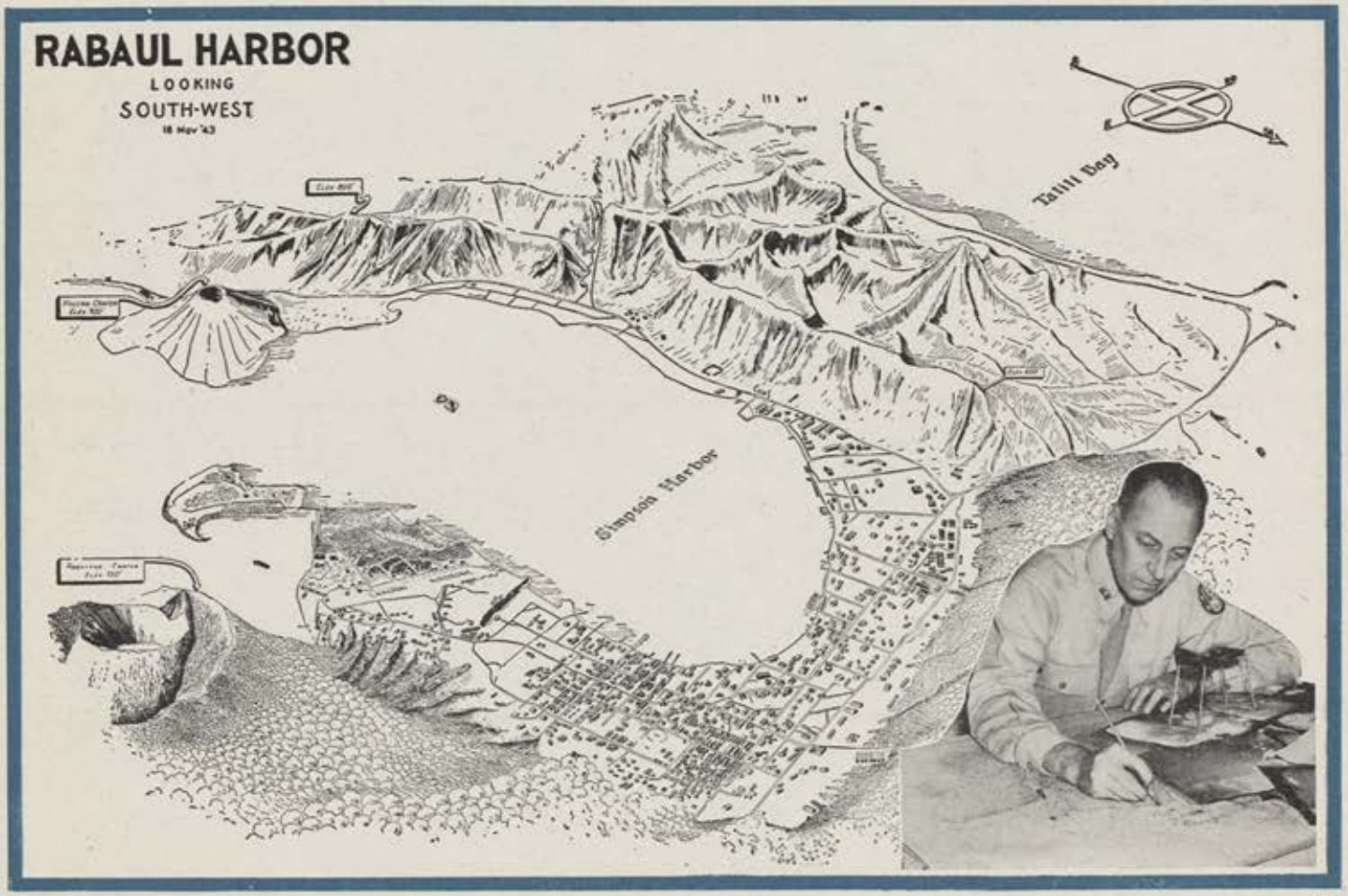
This method does not take the place of photographs since the oblique sketches are essentially a supplement to photography, and it uses pictures to the fullest extent. In the case of Hollandia there were numerous photographs which had been taken at various times, but none was very sharp or clear. Nor could any be fitted in a useable mosaic. Bad weather over Cyclopes Mountain, alongside the target, generally obscured the terrain. By using admiralty charts, however, Captain Fraser was able to piece together the information he needed to clarify the photographs and furnish the details which went into his sketches.

Captain Fraser, an expert photo-interpreter as well as a map-maker, was told at what height and angle the attack was planned and he made the sketches with this in mind. Before finishing the job he did two sketches from two different angles of attack and subsequent missions over the target proved the accuracy of his methods. It had been impossible to get good obliques from the desired angles and his sketches continued to be used. From vertical photographs brought back by bombers, he was able to recheck the originals.

The main purpose of the oblique approach sketch is to show terrain detail that has not been mapped or thoroughly photographed. Another advantage lies in the fact that a photograph is a true reproduction of everything within focus and range. Sometimes a picture can be too much of a good thing and it takes an expert interpreter to pick out the salient points from the mass of detail, while the sketch can be controlled and only the essential material included.

Certain features and key points can be exaggerated and un-

Capt. Harry E. Fraser, who developed the oblique approach sketch, is shown working on his drawing of Rabaul which is reproduced below. This technique provides flyers with a picture of targets from the exact angle and altitude of approach, and supplements recon photos.



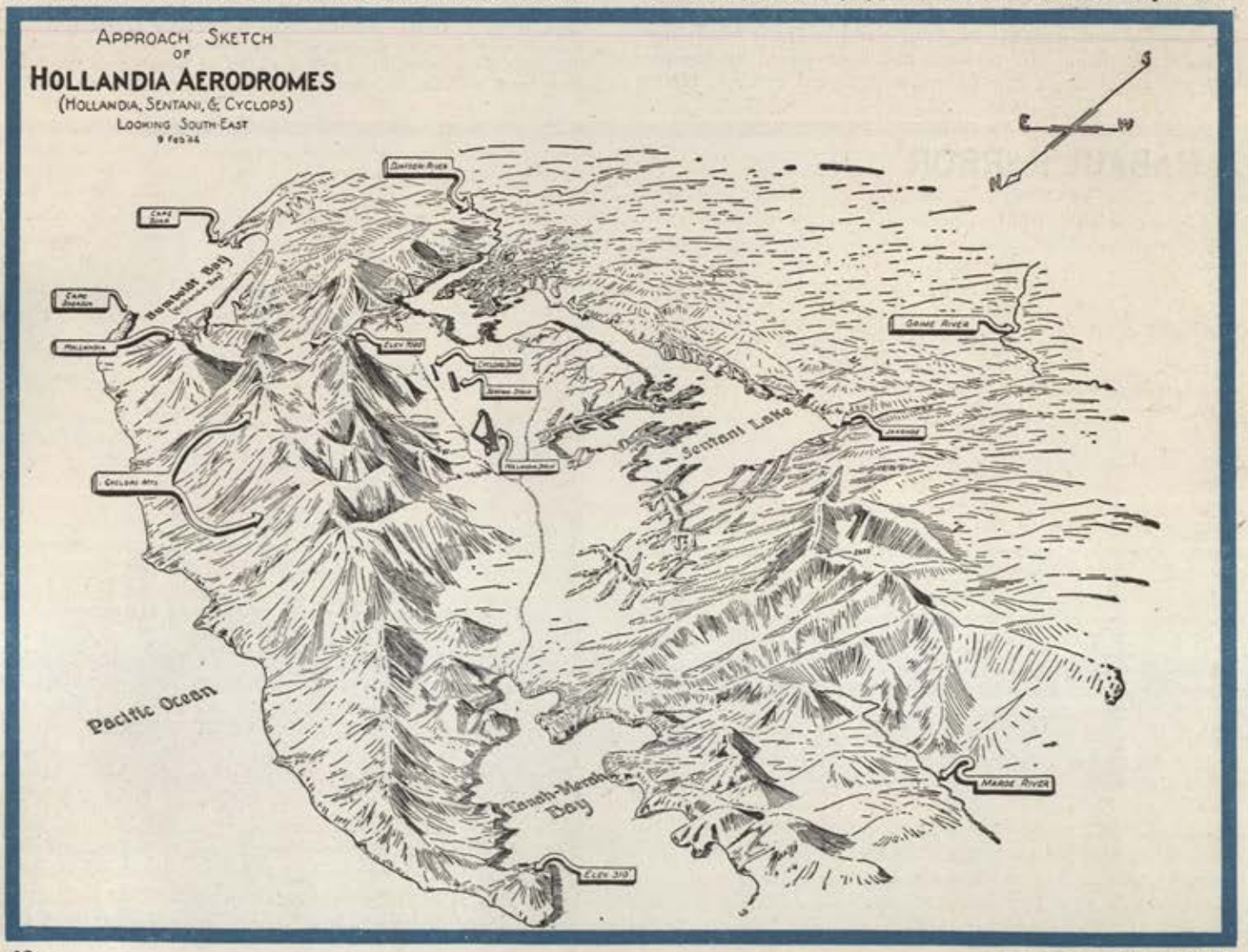
## TECHNIQUE (Continued)

important areas dropped out. Personnel untrained in reading maps and photographs thus can make quick and positive identification when coming in over a target.

All possible information is used in making these sketches, including maps, admiralty charts, stero-vertical photos and trimetregon mapping runs. Through a stereoscope, Captain Fraser studies these details and sets them down to scale on the sketch with a grid. Other experts are then called in to make certain he is correct in his study, thus insuring correct interpretation when the sketches are later sent to the groups and squadrons.

While serving as a photo interpreter in New Guinea, Captain Fraser noticed there was a variation in interpretations intelligence officers gave the maps and pictures in briefing. This suggested to him the need for a graphic method of presenting objectives. He flew missions to check on what the

After studying aerial photographs such as the three above and combining this information with that available on admiralty charts, Captain Fraser was able to produce the oblique approach sketch of Hollandia shown below. When weather conditions prevented the taking of satisfactory photographs over the area, the oblique approach sketches solved the problem in preparation for concentrated bombing attacks.



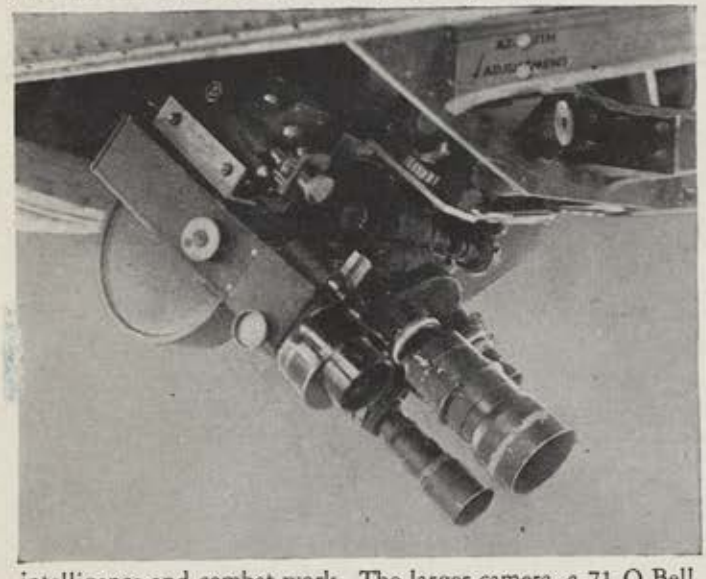
flyers wanted, and he discovered that they sometimes did not use maps because of their complication or because the airmen were too busy—or simply did not understand them. By using oblique sketches when photographs are not available these faults are eliminated.

With the aid of expert interpretation and the extensive use of photographs, Captain Fraser can make a sketch on a 35-inch strip of paper which shows eight linear miles of coast from a height of 10,000 feet with bearing NNW and to a depth of twelve miles, all to scale. He can make sketches to any other specifications that may be required.

A sketch of the Rabaul area done early in attacks against that important target, shows the locale from an angle and height at which it had been impossible to photograph due to heavy anti-aircraft installations and weather conditions. **— Capt. L. P. Bachmann, Air Force Overseas Staff.**

## Double Camera Mount For B-24s

The door camera mount for B-24s, shown in the accompanying photograph, can be fitted into the rear hatch of a Liberator, permitting photographs to be made with two cameras instead of one. The smaller camera, a GSAP, using 16 mm film, is mounted along the finder of the larger camera. Film from the smaller one may be processed quickly and used for



intelligence and combat work. The larger camera, a 71 Q Bell and Howell, shoots 35 mm film which is sent back to the States for historic records and combat study. The mount was arranged by Capt. Theodore Z. Rickman of the 13th Combat Camera Unit. **— Air Force Staff Correspondent in the South Pacific.**

## New Airborne Equipment Solves AAF Cargo Loading Problem

By borrowing a couple of ideas from familiar civilian sources and redesigning them for AAF use, the equipment laboratory of the Materiel Command Engineering Division has devised two handy pieces of airborne equipment that have solved the AAF cargo-loading problem. They are a kit which gives a standard Army truck a high lift body, elevated by a scissors mechanism, and a fork truck, an improvement of the mechanical stevedore used around docks and warehouses.

According to Capt. H. R. Burks, special vehicle projects officer, any landing strip in the world with this equipment can be turned into an air dock. "Every type of AAF cargo plane can be loaded and unloaded, from the C-47 with a door four and a half feet from ground level, to the C-54 with its door nine feet up."

The kit which converts a standard Army 2½-ton, six-by-six truck for high lift duty weighs 1,600 pounds and is designed to be shipped by air to advanced bases where Army trucks of this type are usually present. With the kit, they can be converted by a normal crew in less than a day. The high lift truck works like the familiar city coal truck, the body of which is lifted by scissor members, an adaptation of the Jack-in-the-box principle.

The contents of the high lift truck kit, as it is received by AAF mechanics, consist of a sub-frame with scissors-type lifting members, twin hydraulic hoists, pump and valve, power take-off and operating lever, pump drive shaft with universal joints, valve operating lever and connecting rod, body attaching brackets special cargo-loading tail-gate, which serves as a ramp, and telescoping floodlights with wiring.

The high lift truck can operate in every type of difficult terrain. If one airport is closed out because of soupy weather, the truck can move thirty or forty miles for use at another field which is open. Its loading space, 12-by-7 feet, permits it to carry a full load for some planes in one trip. It is rated 5,000 pounds with a 100 percent overload factor. The ramp tail-gate eliminates precise backing of the truck to the plane door. The driver merely backs the truck within two feet of the plane and then swings the ramp tail-gate on to the plane floor. The two flood lights which fit on the rear corners of the high lift body give illumination for night loading.

The fork truck cargo-loader is a four-wheel tug with pneumatic tires and a front-mounted fork-lift mechanism which is hydraulically operated. The fork is adjustable from ground level to an elevation of twelve feet and is designed to scoop up objects resting on pallet frames or packed in shipping boxes. The fork-lift mechanism can be tilted fore and aft to steady the load when traveling from supply dump to cargo plane. This loading device weighs three tons and is designed to be knocked down into three pieces to facilitate shipment by air. The heaviest of these three pieces weighs 2,000 pounds. Like its companion piece, the high lift truck, it carries two flood lights for night operation.

The fork truck is able to lift freight directly off the ground and can be used to supplement the high lift truck. It will function over reasonably rugged terrain and will handle a rated 3,500-pound load. The fork truck is normally operated by one man. Information for requisitioning this equipment may be obtained from Ground Equipment Branch, Supply Division, Air Service Command, Paterson Field, Ohio. **— Lieut. Andrew T. Rolfe, Equipment Laboratory, Engineering Division, Materiel Command, Wright Field.**

Supplies are loaded aboard an air freighter from a high lift truck.

# 'PER ARDUA AD ASTRA'

**Prepared by the RAF Delegation, Washington, D. C.**

**The record of Britain's flyers is an appropriate reflection of the motto of the Royal Air Force—'Through Hardship to the Stars.'**

DEVELOPMENT of Britain's Royal Air Force from a relatively puny but immensely game outfit at the war's outset into the vast armada which today is teamed for victory with the huge U. S. Army Air Forces is apt exemplification of its motto "Through hardship to the stars."

Now the night-time scourge of Germany while the AAF in England rests for the next day's raids, the RAF in 1939 was composed of a comparative handful of planes and the immortal "few" flyers to whom "never in the field of human conflict was so much owed by so many."

As World War I neared decision in 1918, the RAF dominated the skies in size, speed and power. But following the armistice it was allowed to dwindle in strength until by October, 1920, all but ten percent of its personnel in service at the war's end had been demobilized.

One man above all must be given credit for saving what remained of the RAF and for laying the foundation upon which a great future was to be built. That man was the then Air Marshal Hugh Trenchard, now Marshal of the Royal Air Force Viscount Trenchard. His fervent collaborator in Parliament was Winston Churchill.

It was not until the failure of the Geneva disarmament convention in 1935 that the expansion of the RAF began in earnest. Events on the continent of Europe and in Africa—notably the Italian aggression in Abyssinia—spurred production, technical advances and personnel increases.

But when Britain entered World War II in September 1939, its air power was markedly inferior to that of Germany. In every type of aircraft except coastal reconnaissance planes, in which approximate parity existed, Britain was badly outnumbered.

To the Nazis' 2,500 bombers, the British had about 700. Germany had some 1,200 troop carriers. England had none. The Luftwaffe's 1,500 fighter planes equalled the combined strength of Britain and France. And in the winter of 1939-40, the Germans were said to be building at least seven Heinkels for every British Wellington being produced.

Still, at summer's end in 1940, after less than a year of war which had cost him nothing and won him almost everything, Hitler found that all that stood in Europe between him and the realization of his impious hopes was Britain and the Royal Air Force. Perhaps it is better to say, what was left of the Royal Air Force.

Haggard faces of Stirling bomber crew members reflect strain of a night raid on Berlin as they relax while being interrogated by intelligence officer. The British flyers have repaid the Germans a thousand-fold for the bombings of London and other English cities in 1940-41.

Until April, 1940, air activity by either side was limited. The RAF bomber command made sporadic attacks on the German fleet and carried out extensive "white raids" over Germany, penetrating as deep as Berlin but dropping only propaganda leaflets.

Patrol planes protected British coastal shipping and searched the North Sea and the eastern Atlantic for enemy surface craft and submarines. RAF units dispatched to France at the war's outbreak skirmished with enemy fighters as they reconnoitered western Germany. At home, hit and run raids by the enemy kept defense units on their toes.

But when Norway was invaded April 9, the full, though feeble force of the RAF swung into action. Against terrific odds, Hudsons and Blenheims, operating from British bases, attacked occupied airfields and gave all possible support to the Allied army sent to Norway's assistance. But without proper bases in Norway, neither bombers nor fighters could stem the German masses.

Again on May 10 when the Low Countries—Belgium, Luxemburg and the Netherlands — were invaded, the RAF

valiantly tried to halt the Nazi mechanized advance. Units based in France bombed and strafed enemy ground forces while Hurricanes engaged and destroyed relays of German bombers. But a blitzkrieg supported by the flying hordes Goering had at his command was not to be stopped by the strength the RAF could muster at that time.

Then in the last week of May came Dunkerque. At heavy cost in equipment and personnel, RAF bombers and fighters held off the enemy while the Royal Navy evacuated ninety percent of the more than 300,000 trapped British and French troops. The outlook never was darker. Sorely depleted in power, the RAF faced its fight for Britain's life. The fighter command prepared to combat the all-out air effort Hitler inevitably would make as a prelude to invasion. The bomber command patched its planes and made ready to attack Nazi "invasion ports" across the Channel, and the coastal command continued its campaign against the U-boat menace which had been increased many fold by the Nazis' acquisition of bases from northern Norway to southern France.

BUT the indomitable spirit of the RAF could not be crushed and the Battle of Britain was won. Within two months the slender fighter force destroyed 2,225 Nazi planes to its own loss of 616, while, day and night, RAF bombers pounded French ports where the enemy had assembled barges capable of transporting an estimated 1,000,000 men. The German hope of an easy invasion was abandoned.

Unsuccessful in their daylight attacks during the Battle of Britain, the Nazis reversed their method and in the early months of 1941 relentlessly night-bombed cities, towns and countryside over the entire length and breadth of England.

Learning night fighting tactics the hard way, the Defiant, Beaufighter and Havoc pilots stalked Jerry with increasing success and finally assumed the upper hand. Night raids lessened and, in May, finally ceased. Again German air power had been repulsed by an RAF inferior in number but not in courage or ability.

During those months when Germany was attempting to lay all Britain in ruins, the full strength of the RAF, scant at best, never was available for the defense of the homeland. For many of its crack units were fighting the Axis in Africa, the Middle East and the Mediterranean.

Meanwhile, however, Britain's air power was growing. The aircraft industry, geared to mass production, was turning out planes at an unprecedented rate, while an ever-increasing stream of P-39s, P-40s, A-20s and A-29s and badly needed materials was flowing from the United States. And as further help from across the Atlantic, a gallant band of American pilots — the first Eagle Squadron — was already in the first line of the RAF fighter command, writing its record indelibly in the history of air war.

As Britain drew ever closer to air parity with Germany, the fighter and coastal commands, whose work had been chiefly defensive in character, switched to the offensive. Fighter sweeps and fighter-escorted bomber missions were launched against Nazi-occupied France. The coastal patrol, with new equipment and technique, seriously disrupted Admiral Doenitz' submarine blockade which had been designed to prevent United States supplies from reaching their destination.

In 1942, the U. S. Army Air Forces combined operations with the RAF and materially relieved the pressure on the British flyers. Joining in the support of the British 8th Army in the Libyan desert, AAF bombers and fighters struck Rommel's stubborn columns with regularity and attacked shipping in the Mediterranean, making the German supply problem increasingly difficult. As the U. S. 8th Air Force began operations in England in August, raids on key points in Germany and Nazi-occupied France were stepped up, and the German U-boat offensive was restricted at its source by the Americans' magnificent precision attacks on submarine construction and repair facilities.

In a letter of congratulation to the RAF upon attainment April 1, 1943, of its silver jubilee of establishment as a separate armed service of the Crown, General Henry H. Arnold, Commanding General of the USAAF, declared:

"On many fronts, the U. S. Army Air

Forces look to increasing cooperation with the Royal Air Force so that wing-tip to wing-tip we may fly destruction to our common enemies."

Today, General Arnold's prediction has been completely fulfilled. A colossus of air power—the combined might of the RAF and AAF—is carrying the fight to the enemy in theatres throughout the world and softening him for destruction.

The RAF-AAF teamwork, which earlier proved its worth in driving the Axis from Africa and in the invasion of Sicily and Italy, has reached its peak of efficiency in the European Theatre of Operations. Flying from bases in the British Isles, Allied flyers are smashing Germany's industrial structure to bits.

In a recent report to Parliament, Prime Minister Churchill said:

"The Anglo-American air attacks on

On an RAF airfield in France in the dark days of May, 1941, fighter pilots rush to their planes to repel Nazi raiders. A few days later, the badly outnumbered British airmen held off the enemy while 270,000 troops, trapped on the beaches of Dunkerque, were evacuated.

The Spitfire Mark XII, latest in a long and famous line of fighters, is shown in flight.

Germany must be regarded as our chief offensive effort at the present time. The whole of this air offensive constitutes the foundation on which our plans for overseas invasion stand in the scales."

In announcing the formation of the Allied Expeditionary Air Force, composed of the RAF's 2nd Tactical Air Force and the U. S. 9th Air Force, Sir Archibald Sinclair, British Air Minister, left no doubt that his government believed the combination would be powerful enough to cripple the enemy defenses and drive the Luftwaffe from the skies when the invasion opened. Its job is to provide necessary air cover and support for the Allied armies which storm Hitler's "Festung Europa."

Such is the power of the Anglo-American air might assembled against Germany from the west that the enemy has been compelled to tie down four-fifths of his fighter plane strength for the protection of the Fatherland. This despite the fact that those same fighters would be of inestimable value to the enemy in his struggles on both his eastern and southern fronts.

And what of the future? To quote Mr. Churchill again: "As a result of enormous transportations across the Atlantic, the United States Bomber Force in this island now begins to surpass our own and will soon be substantially greater, I rejoice to say. The efforts of the two forces fit well together, and according to all past standards, each effort is in itself prodigious . . . The spring and summer will see a vast increase in the force of the attack directed upon all military objectives in Germany and German-occupied countries . . . The degree of attack will reach far beyond the dimensions of anything yet employed or indeed imagined."

The story of the AAF and RAF is one of cooperative effort, not only in flying wing-tip to wing-tip, but in a pooling of resources and technical skill. It is a story of British pilots and crews reaping proud victory in American-built aircraft; of American air power based on a solid foundation of RAF knowledge and experience, and of the merging of production, as exemplified by the Mustang, now a peerless fighter. Built in America and powered by an American-designed and built engine, it showed, in the hands of RAF pilots, tremendous potentialities and accomplishments as a long range, medium-low altitude fighter. Now, equipped with a British Rolls-Royce engine built under license by an American firm, it is being flown by AAF pilots with outstanding success as a long range, high altitude fighter.

The RAF today can look back with a sense of pride and satisfaction to a record of glorious achievements and look with confidence and high hearts to the future. It has proved conclusively the quality of British aircraft and the ability and courage of Britain's manhood.

But the long, hard battle has not been without cost. Excluding Dominion and Allied squadrons working with the RAF, 38,300 British pilots and aircrew personnel have been killed, 10,000 are missing, and 10,000 aircraft have been lost.

Great though the price, the heritage of the RAF is a glorious one. Through its epic victory in the Battle of Britain it saved the world for humanity and freedom and laid the foundation upon which our ultimate victory rests. More than any other service it has saved the lives of untold numbers of our fighting men and given the world a living exemplification of the tenets of Viscount Trenchard, the father of the RAF, in his recent interview by American correspondents:

"I am one of those who believe that the air has saved, and will save, untold lives. The firepower of modern weapons on the ground, combined with nature's barriers, is tremendous. The firepower of weapons in the last World War was shown, surely, in the appalling casualty lists, and I feel that without air power today in this war these casualties might entail the sacrifice of the flower of your nation and ours."

"But with air power used properly, as it is being used, and with the air battles won first, as the Germans did in Europe to begin with, and as we do now . . . we shatter the opposing armies or navies with a tenth—with a twentieth of the casualties . . .

"If the air battles are won first, the saving of life, in my opinion, is enormous." ☆

An RAF Typhoon revs up for a trip over Holland. One of the world's fastest aircraft, the Typhoon made its debut several months ago. It boasts high maneuverability and diving speed.

# Roll of Honor

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

## MEDAL OF HONOR

Baker, Addison E., Lt. Col.
*Hughes, Lloyd H., Lt.
*Wilkins, Raymond H., Maj.

## DISTINGUISHED SERVICE CROSS

Anderson, William N., Maj.
Blissard, Grover C., Lt.
Cameron, William R., Maj.
Culpepper, Claude A., Capt.
Duncan, Glenn E., Lt. Col.
Latham, John L., Jr., Capt.
Levi, Nelson, Lt.
Ludwig, Vance P., Lt.
*McCall, Ben J., Lt.
Martin, John C., Lt.
Middlebrook, Garrett E., Capt.
Momyer, William W., Col.
Myers, Joseph, Capt.
Neff, Melvin E., Lt.
Papa, Frank M., Jr., S/Sgt.
Pickard, John G., Maj.
Roche, John R., Capt.
Simon, William C., Sgt.
*Stipe, Leon D., Sgt.
Vance, Paul W., Lt.
Yeager, William H., Jr., Maj.

## DISTINGUISHED SERVICE MEDAL

Cannon, John K., Maj. Gen.
Hardy, John S., Col.
Haynes, Caleb V., Brig. Gen.
Hunter, Frank O'D., Maj. Gen.
Kenney, George C., Lt. Gen.
Ramey, Roger M., Brig. Gen.
Smart, Jacob E., Col.
Streett, St. Clair, Maj. Gen.
Whitehead, Ennis C., Maj. Gen.
Wolfe, Kenneth B., Brig. Gen.

## LEGION OF MERIT

Adler, Elmer E., Brig. Gen.
Barr, Percy M., Col.
Blessley, Roland C. W., Col.
Carter, Lloyd, M/Sgt.
Dahl, Leo P., Col.
Dolejska, Frank, M/Sgt.
Drolshagen, George G., S/Sgt.
English, Leroy S., Capt.
Folmer, Fabian S., M/Sgt.
Geck, Hugo, M/Sgt.
Graves, Frank N., Lt. Col.
Hanlon, Joseph R., M/Sgt.
Hart, John V., Col.
Johnson, Carl L., M/Sgt.
Lee, John M., S/Sgt.
Lindhe, Erik W., W/O
Looser, John A., M/Sgt.
Lynd, William E., Maj. Gen.
Miller, Vavil L., M/Sgt.
Morris, Edward M., Brig. Gen.
Niergarth, Omer, Col.
Nugent, Richard E., Brig. Gen.
Rajda, Thaddeus, T/Sgt.
Ramey, Howard K., Brig. Gen.
Rasmussen, Julius D., S/Sgt.
Roll, Philip A., Col.
*Wagner, Walter J., Lt. Col.
Whitacre, William B., Col.
Williamson, Adrian, Col.
*Wright, Harold B., Col.

## SILVER STAR

Adair, Philip R., Lt.
Apai, Gustav R., Lt.
Aspegren, Cleo I., Maj.
Bailey, Edward E., Lt.
Barrett, William T., S/Sgt.
Barthelmess, Karl T., Lt. Col.
Baseler, Robert L., Lt. Col.
Baumgardner, Dexter K., Capt.
Bechtol, Kenneth E., S/Sgt.
Behling, Fred W., S/Sgt.
Berlette, Leland G., Lt.
Berry, Frederick D., Jr., Lt.
Blair, Samuel V., Capt.
Boucher, Robert N., Lt.
Brody, Barney I., Lt.
Brown, Charley W., Lt.
Buell, William D., T/Sgt.
Burns, Robert W., Lt. Col.
Burnstad, Basil B., Lt.
Busch, Dewey D., Capt.
*Calkins, Ralph P., Capt.
Callaan, Keith S., Lt.
Carrillo, Michael, S/Sgt.
Chase, Allan C., Lt.
Churchill, Henry W., Lt.
Christensen, Harold O., Sgt.
Clapper, John W., Capt.
Clem, Durwood O., S/Sgt.
Clendenning, Raymond A., Sgt.
Collins, William R., T/Sgt.
Constantin, Jules J., Jr., Lt.
Coretto, Frank A., S/Sgt.
Corwin, Charles J., S/Sgt.
Cowie, Robert P., Lt.
Cwiek, Stanley F., S/Sgt.
Czarnecki, Edward J., Lt.
Darnell, Cecil, Lt. Col.
David, William B., Col.
Demont, Russell D., Capt.
De Vore, James L., S/Sgt.
Doolittle, Glenn A., Capt.
Downs, James A., Lt. Col.
Durmeyer, Lloyd D., Lt.
Dyminski, Henry J., Capt.
Eaton, Burton E., S/Sgt.
Elliott, George E., Capt.
Elliott, Robert F., Maj.
Falletta, Charlie, Capt.
Fanning, Grover E., Lt.
Faulkner, Cecil L., Lt. Col.
Faust, Virgil D., Sgt.
Fennell, Max R., Maj.
Filip, Eugene C., Lt.
Fortwengler, William G., S/Sgt.
Free, Willie F., S/Sgt.
Frydel, Adolph P., S/Sgt.
Gholson, Grover D., Lt.
Gibson, John H., Lt. Col.
Gillespie, Calvin E., Lt.
Gooden, Clarence W., Lt.
Graves, Ben L., Lt.
Greenhouse, Stanley, Lt.
Griffith, William W., Lt.
Gross, William Milton, Col.
Grosvenor, William, Jr., Capt.
Guest, Roger T., S/Sgt.
Hager, James S., Lt.
Haney, William F., Maj.
Hardy, George M., Jr., S/Sgt.
Harmon, Thomas D., Lt.
Harned, Leroy A., T/Sgt.
Hart, William D., Lt.
Henderson, Robert T., S/Sgt.
Henrich, Richard C., Lt.
Hicko, Edward J., Lt.
Hicks, Mack B., S/Sgt.
Hocutt, Ealon S., Lt. (& 2 OLC)
Hohmann, Franklin P., T/Sgt.
Ince, James C., Capt.
Irvin, Raymond M., S/Sgt.
Isabelle, Hubert W. J., S/Sgt.
Isler, Weldon, S/Sgt.
Karasin, Bernard, S/Sgt.
Kirby, Marion F., Capt.
Kissack, John D., S/Sgt.
Kitchell, James R., S/Sgt.
Kocher, Edwin G., Lt.
Koenig, David E., Lt.
Korczynski, Michael R., S/Sgt.
Kusman, Stanley J., Capt.
Jackson, Charles A., Lt.
Jackson, John R., Jr., Sgt.
*Jarmon, Altheus B., Lt.
Jarrell, Thurman R., Jr., T/Sgt.
Jett, Verl E., Lt.
Johnson, Gerald R., Lt.
Jones, Kenneth H., Lt.
Jurey, Delca Delmar, Sgt.
Labat, Douglas M., S/Sgt.
Lamb, Robert A., Capt.
Lanham, Clarence B., Lt.
Larkin, Joe M., Jr., Capt.
Lawrence, Claude H., Lt.
Lent, Francis J., Lt.
Leonard, Charles J., Lt.
Lesher, Chalender L., Lt.
Levitan, William A., Lt.
Lewis, Charles H., Lt.
Liles, Albert L., Maj.
Lindbert, Allen, Maj.
Linkous, William L., Lt.
Locker, H. M., Lt.
Lombardo, Pellegrino P., S/Sgt.
Lutton, Lowell C., Lt.
McCarten, Robert D., Maj.
McClelland, William F., S/Sgt.
McGillicuddy, George E., T/Sgt.
McGuire, George O., S/Sgt.
McGuire, Thomas B., Jr., Capt. (& OLC)
McKeon, Joseph T., Lt.
McManus, Marvin E., S/Sgt.
Mahan, Joseph J., S/Sgt.
Manbeck, Lee P., Capt.
Mankin, Jack C., Capt.
Marqworth Dean D., Lt.
Mellinger, Elvin, Jr., Lt.
Mercer, William D., T/Sgt.
Merrill, Charles T., Capt.
Meyers, Leroy C., Lt.
Michaelis, Ralph L., Col.
Migliacci, Jerome A., Lt.
Moore, John T., Maj.
Neal, Geoffrey E., Lt.
Nehila, William J., Lt.
Nelson, Theodore J., Lt.
Newell, Harlow L., S/Sgt.
O'Connell, Max H., S/Sgt.
O'Donnell, Emmett, Jr., Col.
Ogletree, Robert C., Lt.
Ohland, Vernon W., S/Sgt.
Owen, James E., S/Sgt.
Page, Henry L., S/Sgt.
Parent, Hoyt E., T/Sgt.
Parsel, Elmer L., Capt.
Pelander, Jack H., Maj.
Perry, Quincy R., S/Sgt.
Peyton, John Bernard, Lt.
Pilgrim, Gene R., S/Sgt.
Powers, Joe H., Jr., Lt.
Procchi, Joseph J., S/Sgt.
Protzman, Andrew G., T/Sgt.
*Ramirez, Julian M., S/Sgt.
Robins, Jordan B., Lt.
Rohr, Louis W., Lt. Col.
Roughton, Edgar L., Lt.
Rowland, Robert R., Lt. Col.
Rush, George A., Maj.
*Rydeen, Phillip H., T/Sgt.
Savino, Thomas, Lt.
Schaetzel, George E., Lt. Col.
Schilling, David C., Lt. Col.
Schmidt, Ralph L. L., Lt. (& OLC)
Schneider, William J., T/Sgt.
Schwartz, George R., Jr., Capt.
Shaw, Roy M., Lt.
Sheldon, Robert L., 1st Sgt.
Shepherd, Robert W., Lt.
Sippel, Thomas C., S/Sgt.
Slaughter, William A., Lt.
Stahl, Roy D., Jr., Lt.
Stanphill, Belton D., T/Sgt.
Stellmon, Leslie, T/Sgt.
Stevens, Milton A., T/Sgt.
Strickland, Joseph N., Capt.
Svec, Millard, S/Sgt.
Taylor, Charles K., Jr., Capt.
Thompson, John J., T/Sgt.
Thompson, Thomas W., Lt.
Thyng, Harrison Reed, Maj. (& OLC)
Topoll, George G., Lt. (& OLC)
Travis, Robert F., Brig. Gen.
Turner, Howard M., Col.
Vasatka, Theodore T., Lt.
Waldron, George D., Sgt.
Wells, Ernest J., Capt.
Wells, Marshall C., Lt.
Wikle, Logan D., S/Sgt.
Wilson, Barnett C., Lt.
Wilson, Russell A., Col.
Woodward, Robert L., Lt.
Yakinovicz, Frank G., T/Sgt.

## 2nd OAK LEAF CLUSTER TO SILVER STAR

Kinney, William E., Maj.
*Levin, Meyer, M/Sgt.
Neumann, Leslie W., Lt.
Perkins, Everett F., S/Sgt.

## OAK LEAF CLUSTER TO SILVER STAR

Blakeslee, Donald J. M., Lt. Col.
Bong, Richard I., Capt.
Capocefalo, Robert J., S/Sgt.
Caputo, John C., S/Sgt.
Caviness, Sanford L., Cpl.
Cool, Paul E., Capt.
De Russey, John H., Lt. Col.
Ferraguto, Leo H., Sgt.
Fishencord, Harold C., S/Sgt.
Fitzgerald, Harold, T/Sgt.
Fletcher, Arthur A., Jr., Capt.
Forte, Norman L., Jr., Sgt.
Gates, James F., S/Sgt.
Geror, Donald L., Lt.
Ghram, Elmer F., Lt.
Hall, Donald P., Lt. Col.
Hall, Earl O., Capt.
Hansen, Glen R., T/Sgt.
Hawthorne, Henry J., Maj.
Heyman, Alfred A., Lt.
Holsey, Raymond E., Lt.
Humrichouse, William, Lt.
Isles, Harry T., Pvt.
Jaahlainen, Donald, Cpl.
MacDonald, Henry G., Capt.
McClure, Robert E., Cpl.
McGee, Donald C., Lt.
Miller, Elwood E., T/Sgt.
Moore, Malcolm A., Lt. Col.
Myers, Henry V., Lt.
Noller, Robert R., S/Sgt.
Nollmeyer, Edward M., Capt.
Prentice, George W., Maj.
Schiffer, William H., S/Sgt.
Swan, Robert P., Cpl.
Sweedar, George, Sgt.
Takala, William A., Pfc.
Travis, Euel A., Lt.
Wallace, Richard M., Cpl.
White, Edward T., Pvt.
Wilmarth, Clarence M., Lt.
Wrenn, Joseph E., Cpl.
Zeamer, Jay, Jr., Maj.

## DISTINGUISHED FLYING CROSS

Ackley, Gordon E., S/Sgt.
Ahola, Carl R., T/Sgt.
Albert, Robert C., S/Sgt.
Alfredson, Carl A., S/Sgt.
Alleman, Charles R., Sgt.
Allen, George P., S/Sgt.
Allen, Nick A., Sgt.
Altman, John T., T/Sgt.
Altshuler, Dave, T/Sgt.
Amand, Edward J., S/Sgt. (& OLC)
Anderson, Andrew L., F/O (& OLC)
Anderson, Everett P., Lt.
Angevine, Louie M., S/Sgt.
Arriza, Louie D., S/Sgt.
Aspesi, Angelo P., S/Sgt.
Austin, Robert N., Lt. (& OLC)
Avery, Richard H., F/O
Ayers, Eber G., S/Sgt.
Bailey, Albert A., S/Sgt.
Baird, Robert L., T/Sgt. (& OLC)
Ballard, Clayton E., S/Sgt.
Banasau, Ernest C., S/Sgt.
Barcus, John R., S/Sgt.
Bargmann, Allen G. E., Lt.
Barnett, Edward, Lt.
Barnett, Joseph C., S/Sgt.
Bartlett, Richard E., S/Sgt.
*Bartlett, Thomas R., Lt.
Beauregard, Francis, S/Sgt. (& OLC)
Beck, Howard K., Lt.
Becker, Robert H., S/Sgt.
Bedwell, Philip G., S/Sgt.
Beightol, Willis E., Lt. Col.
Bennett, Charles E., T/Sgt.
Benson, Neville C., S/Sgt.
Bergkamp, Alfred B., T/Sgt.
Bernard, Albert F., Lt.
Bernhardt, Edward, Sgt.
Best, James R., S/Sgt.
Biggs, Charles R., S/Sgt.
Bilby, Bedford B., Lt.
Billings, Sheridan B., T/Sgt.
Bilyeu, Hal E., Lt.
Binder, Glenn W., Lt.
Bird, Robert R., Lt. (& OLC)
Bliss, Vincent H., S/Sgt.
Block, Harold, T/Sgt.
Bloom, Irving C., Lt. (& OLC)
Bock, James, Lt. (& OLC)
Boes, Glen H., Lt.
Bond, Fred R., S/Sgt.
Bonorden, Ellis L., S/Sgt.
Booth, Thomas C., S/Sgt.
Boulanger, Clement C. L., S/Sgt.
Bour, William J., S/Sgt.
Bowdon, Edward F., S/Sgt.
Brackendorff, Melvin C., Lt. (& OLC)
Brady, William F., Jr., S/Sgt.
Braly, Roy E., Lt. (& OLC)
Brayovich, Stanley, T/Sgt.
Breedlove, Paul L., Jr., S/Sgt.
Breslin, Edwin R., S/Sgt.
Bresnahan, Leonard H., S/Sgt.
Bridges, Charles T., S/Sgt.
Brisbi, Lloyd W., T/Sgt.
Britt, Richard W., Lt.
Brown, Johnnie, T/Sgt. (& OLC)
Brown, Joseph, S/Sgt.
Brown, Stuart C., T/Sgt.
Brunson, Daniel M., S/Sgt.
Bunker, Walter I., Capt.
Burton, Russell E., T/Sgt. (& OLC)
Byers, Richard G., T/Sgt.
Calcut, Lloyd C., Sgt.
Callahan, Hayes B., S/Sgt.
Campbell, Thomas C., Lt.
Cavey, Max C., S/Sgt.
Cavit, Charles D., Lt.
Ceulemers, George F., Capt.
Chadwick, Jefferson S., Lt. (& OLC)
Chamberlain, Donald M., S/Sgt.
Citti, Nicholas G., Lt.
Clark, Robert J., S/Sgt.
Clarkston, John H., T/Sgt.
Cleveland, John H., T/Sgt. (& OLC)
*Cliff, Howard C., S/Sgt.
Cochrane, Alexander M., S/Sgt.
Colderson, Owen J., S/Sgt.
Cantrelle, Paul A., S/Sgt.
Caroon, Kenneth C., Sgt.
Carrol, John H., T/Sgt.
Carroll, William F., S/Sgt.
Carter, Eldon L., S/Sgt.
Cason, Alfred D., Sgt. (& OLC)
Cole, Melvin J., T/Sgt.
Coleman, Robert E., S/Sgt. (& OLC)
Collins, Nelson R., F/O
Collison, James M., Lt.
Comey, Richard J., Lt.
Confer, Charlie H., S/Sgt.
Connolly, John E., T/Sgt.
Cooper, Harold E., T/Sgt.
Corn, Joel I., Lt.
Cornut, William A., Sgt.
Corrigan, James B., S/Sgt.
Cosby, Walter E., S/Sgt.
Cox, Ernest J., S/Sgt.
Craddock, Daniel A., T/Sgt.

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### By Way of Explanation

The names of AAF personnel to whom awards have been made are now listed in the ROLL OF HONOR only after they have appeared in General Orders. Transmission of this information to Headquarters, Army Air Forces, frequently involves a delay of several months between the time an award is made and its availability for publication in this department.

The number of names that can be listed in any one issue is controlled by the limited space available, and a considerable backlog of unpublished names has accrued. It is intended, in due course, that all awards to AAF personnel shall be listed here. If your name, or the name of your friend or relative, does not appear immediately following notification of the award, please consider the above facts before addressing inquiries to the AIR FORCE Editorial Office.

All ranks and grades given in ROLL OF HONOR listings are those held by the recipient of the award at the time it was made.

* Posthumous

# Roll of Honor

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

(Continued from Preceding Page)

Crampton, Harry W., T/Sgt. (& OLC)
Crawford, James M., S/Sgt.
Creighton, James E., T/Sgt. (& OLC)
Crimmins, John D., T/Sgt.
Crispen, Richard M., S/Sgt.
Crowley, William M., S/Sgt.
Cupina, Joseph T., S/Sgt.
Cupp, Norman I., S/Sgt.
Curry, William T., S/Sgt. (& OLC)
Cybulski, Walter, T/Sgt.
Dabney, William C., Jr., Lt.
Dafoe, Harold E., S/Sgt.
Dahl, Donald R., Lt.
Dailey, Max E., Lt.
Daily, Wendell L., Lt.
Daves, Robert N., S/Sgt. (& OLC)
Davidson, Paul E., S/Sgt.
Davis, Robert C., S/Sgt.
Davis, Roy B., Jr., S/Sgt.
Dawley, Elmer W., S/Sgt. (& OLC)
Debaets, Emiel F., S/Sgt. (& OLC)
Decamp, Marcus A., T/Sgt.
Decker, Donald R., Lt.
Delaloire, John B., T/Sgt.
Demato, Anthony, S/Sgt.
Denbin, William, S/Sgt.
Dick, Wagner W., F/O
Dickinson, Fred A., S/Sgt.
Dickman, Herman T., S/Sgt.
Di Cosol, Don N., Lt.
Discidue, Ignatius J., S/Sgt.
Dietrich, Norris F., S/Sgt.
Dobson, Edward M., Lt.
*Doester, Alexis, Lt.
Doka, Michael, S/Sgt.
Doll, Francis W., Sgt.
Donoho, Melvin D., S/Sgt.
Dougal, Leonard J., S/Sgt.
Drakoulas, Homer, Lt.
Duchene, Donald R., S/Sgt. (& OLC)
Ducote, Clarence J., S/Sgt.
Duffy, Edward A., S/Sgt.
Dukate, Elbert L., Jr., Lt.
Dueckel, William W., S/Sgt.
Durante, Frank V., S/Sgt.
Earnhart, Charles L., Lt.
Eckert, Otto, S/Sgt.
Edelen, Earl T., Sgt. (& OLC)
Edmiston, Grover A., S/Sgt.
Edwards, John R., S/Sgt. (& OLC)
Edwards, Robert L., Lt.
Egan, William J., Jr., Lt.
Eggleston, William E., S/Sgt.
Egle, Ralph W., Lt.
Elliott, Robert C., S/Sgt.
Elmore, Marvin R., S/Sgt.
Emaus, Donald J., S/Sgt.
Empkie, Carmon W., Lt.
Englehardt, Jack B., Lt.
English, Henry B., Sgt. (& OLC)
Epting, Jacob B., Capt.
Everhart, George C., Lt.
Fager, Callistus E., Lt.
Falletta, Charlie, Capt.
Farrar, James Y., Jr., T/Sgt.
Farrell, George B., T/Sgt.
Faulkner, James H., Lt.
Fay, William J., S/Sgt. (& OLC)
Felber, Robert E., Lt.
Felix, Jose R., Lt.
Fenner, Richard D., Jr., Sgt.
Ferguson, Clay V., Capt.
Ferkauff, Oscar, S/Sgt.
Ferrington, Alfred S., S/Sgt.
Finder, Sheldon, Lt.
Finneran, Joseph E., Lt. (& OLC)
Fisher, Harold A., Lt.
Fisher, Richard L., Lt.
Fitzgerald, Mack, T/Sgt.
Fitzpatrick, Clark S., S/Sgt.
Fitzsimmons, William V., Lt.
Flaherty, Joseph E., Lt.
Ford, Howard O., T/Sgt.
Foster, Clifton C., Lt.
Fowble, Edward L., Lt.
Fox, James A., Lt.
Foy, James J., T/Sgt. (& OLC)
Francoeur, Lucien P., S/Sgt.
Franks, Jesse D., Lt.
Frausto, Gumencindo J., S/Sgt.
*Froccaro, Carmine J., Lt.
Frost, Earl, S/Sgt.
Fulcher, Richard F., S/Sgt. (& OLC)
Fulton, George A., S/Sgt.
Fultz, Lalous M., S/Sgt.
Furnell, Paul M., S/Sgt.
Gabehart, James, S/Sgt.
Gaffney, William J., S/Sgt.
Gallas, Henry A., S/Sgt. (& OLC)
Gambrell, Eugene M., S/Sgt. (& OLC)
Gamelin, Henry A., S/Sgt.
Gates, William J., S/Sgt.
Geers, Charles P., Sgt. (& OLC)
Gekas, John N., Lt.
Gentry, Rowland M., Capt.
Gerka, Louis R., S/Sgt. (& OLC)
Gholson, Grover D., Lt.
Gibbs, Jerrold A., S/Sgt.
Gilbert, Oliver C., S/Sgt.
Gilbert, Thomas D., S/Sgt.
Gill, James M., Lt.
Gilliat, William R., Lt.
Giorchino, Edward B., Lt.
Givens, John A., S/Sgt. (& OLC)
Gleason, Raymond L., S/Sgt. (& OLC)
Glitzer, Paul H., T/Sgt.
Godwin, Harold T., S/Sgt.
Goldberg, Jerome J., Lt. (& OLC)
Golec, Walter A., T/Sgt. (& OLC)
Goodgion, James E., Jr., S/Sgt.
Goodmen, Earl E., T/Sgt.
Goodnow, Edward W., Lt.
Goodson, Walter N., T/Sgt.
Goolsby, James R., Lt.
Gough, Eugene E., T/Sgt. (& OLC)
Gouin, Yves J., Cpl.
Gover, James S., Lt.
Gravlin, Zelwood A., S/Sgt.
Grecki, Anthony A., S/Sgt.
Greeley, Bruce P., T/Sgt.
Green, George L., S/Sgt.
Gregg, Harry W., Lt.
Gregg, Hugh E., S/Sgt.
Gregory, Whitney I., Jr., Lt.
Grett, Gerald L., S/Sgt.
Griffin, Edward C., S/Sgt.
Griffin, Robert A., S/Sgt.
Grimes, George G., Lt.
Grimm, Bennett H., Lt.
Grosse, Albert F., S/Sgt.
Grow, Robert E., T/Sgt.
Guani, John, Sgt. (& OLC)
Guillerman, John L., Lt.
Gutknecht, Wilbur S., T/Sgt.
Haddock, Lawrence, Lt.
Hale, James B., T/Sgt.
Hall, William L., Lt.
Halnon, James M., Lt.
Hamel, Edgar O., T/Sgt.
Hamilton, Kenneth D., Lt.
Hamilton, Robert L., S/Sgt.
Hamlyn, Raymond E., Lt.
Hammond, George E., Lt.
Hammond, Roy D., T/Sgt.
Hammons, James W., Lt.
Hansen, Kermit P., Lt.
Harbison, Elwood W., S/Sgt.
Hardiek, Walter D., S/Sgt.
Harmon, Millard F., Lt. Gen.
Harris, Robert A., Lt.
Hartney, George E., S/Sgt.
Haubrich, Sylvester E., S/Sgt.
Hause, Maurice E., Lt.
Hawkins, Earle V., Lt.
Haworth, Carl O., Lt.
Hayes, Henry G., S/Sgt.
Hayes, John J., T/Sgt.
Hayes, Russell D., S/Sgt.
Healy, Brendon D., S/Sgt.
Heckert, Murray L., S/Sgt.
Heisner, Ray A., S/Sgt.
Helin, Theodore, Lt.
Heller, Clayton E., S/Sgt.
Henderson, Elvin H., S/Sgt.
Henslee, Herman H., Lt.
Herbert, Kenneth G., Capt.
Hermonowski, John J., Lt.
Heyer, Edwin H., Lt.
Hickey, Ronald L., S/Sgt.
Hinch, Ralph V., Lt. (& OLC)
Hinchman, Howard R., Lt.
Hinely, Jesse L., T/Sgt.
Hines, Winfred E., Lt.
Hobbs, Charles L., Lt. (& OLC)
Hobson, Robert L., S/Sgt.
Hoffman, Charles A., Lt.
Hoffman, Virgil L., T/Sgt.
Holbrook, Charles T., Lt.
Holen, Arnold M., S/Sgt.
Holland, John E., T/Sgt.
Hollingsworth, Edwin C., Lt.
Holroyd, George K., T/Sgt.
Holt, Guy E., Jr., Lt.
Holweger, Christopher N., S/Sgt.
Homnick, Frederick H., T/Sgt.
Honeyman, George H., T/Sgt.
Hood, Clarence C., S/Sgt.
Hoover, Park L., S/Sgt.
Hosack, Kerfoot D., S/Sgt.
Houle, Robert J., S/Sgt.
Howard, Charles H., Lt.
Howard, Ned A., S/Sgt.
Howie, James M., T/Sgt.
Howie, William M., S/Sgt.
Hubbard, Maynard G., Lt.
Hubbard, Raymond B., Lt.
Huber, John J., Jr., Lt.
Hubert, Adrian H., Sgt.
Huenerberg, Vincent E., T/Sgt.
Huff, Corein C., T/Sgt.
Huffman, Charles M., S/Sgt.
Hulpiau, George E., Lt.
Huneke, Gustav C., T/Sgt.
Hunt, John G., Lt.
Hunt, Nicholas C., S/Sgt.
Huntley, Russell D., S/Sgt.
Hurd, Earl C., Lt.
Hurlburt, Richard C., Sgt. (& OLC)
Hurt, Libert T., S/Sgt.
Huston, James S., Lt.
Iosco, Joseph, S/Sgt. (& OLC)
Irwin, John F., T/Sgt.
Jackson, Dewey O., T/Sgt.
Jackson, Harlan C., Lt.
Jacobs, Frank C., S/Sgt.
Jarvis, Harry L., Jr., Capt. (& OLC)
Jett, Verl E., Lt.
Johnson, Arthur H., Lt.
Johnson, Arthur L., S/Sgt.
Johnson, Vernie F., S/Sgt.
Johnston, Kenneth F., Lt.
Johnston, Paul E., S/Sgt.
Johnston, Robert H., T/Sgt. (& OLC)
Jones, Donald K., F/O
Jones, Fred H., Lt.
Jones, Jack S., Capt. (& OLC)
Jones, Ralph E., Jr., Capt.
Jones, Stanley V. N., Lt.
Jordan, Rufus E., Lt.
Jose, Elmer H., Lt.
Joswick, Jerry J., T/Sgt.
Joyce, Thomas B., Lt. (& OLC)
Judkins, Francois J., Lt.
Just, Robert, Sgt.
Kaiser, James M., Lt.
Kaiser, Louis, S/Sgt. (& OLC)
Kallal, Lawrence B., S/Sgt.
Kalomalos, Peter, S/Sgt.
Kaminska, John E., S/Sgt.
Katz, Theodore, Lt.
Kaylor, George H., Sgt.
Keeling, Clyde E., S/Sgt.
Keeper, William E., Lt.
Kees, Frank D., T/Sgt.
*Kehoe, James G., Sgt.
Kellar, Douglas H., Capt.
Kelleher, Harry A., Sgt. (& OLC)
Keller, Daniel J., S/Sgt.
Keller, Roscoe L., S/Sgt.
Kelly, George H., S/Sgt.
Kennedy, Michael G., Lt.
Kensit, Arthur C., S/Sgt.
Kernan, Robert M., Lt. (& OLC)
Kerns, Albert G., Jr., S/Sgt.
Kessler, Robert S/Sgt.
Kettering, Dell W., T/ Sgt.
Key, James R., Jr., S/Sgt.
Kiefer, Norman C., T/Sgt.
Kill, Joseph F., Lt.
Kimtantas, Charles, T/Sgt.
King, Arnold T., Lt.
Kingman, Walter L., Lt.
Kinnane, John W., Jr., Sgt.
Kipple, James E., S/Sgt.
Kirkpatrick, Joseph A., S/Sgt.
*Kirschke, Robert P., Lt.
Kjeruff, Lauritz T., Lt.
Kleeman, Lawrence L., T/Sgt.
Klein, Donald J., S/Sgt.
Klein, Isadore I., S/Sgt.
Klenkbeil, Julius K., Lt.
Klimpel, Arnold E., Sgt.
Klinghoffer, Leon, Lt.
Klose, Benjamin B., Lt.
Knight, Seymour G., Lt.
Knudson, Cecil C., Capt.
Knutson, Ernest F., S/Sgt. (& OLC)
Kobler, James K., T/Sgt.
Koch, Ross L., S/Sgt.
Koen, Clifford E., Jr., S/Sgt.
Kofoed, James P., S/Sgt.
Kokales, James, S/Sgt.
Konecny, Harry G., T/Sgt.
Kotil, Elwood E., S/Sgt.
Kotkin, Izaac, Lt.
*Kozvik, Walter J., S/Sgt.
Kramer, Roger J., S/Sgt.
Kramp, Leonard J., S/Sgt.
Krause, Harry C., T/Sgt.
Kretzer, Harold, T/Sgt.
Krugel, Stanley S., T/Sgt.
Kuhlmann, Gerald H., Lt.
*Kunze, Owen L., Lt.
Kuroki, Ben, S/Sgt.
Kurtz, Charles H., Lt.
Kyer, Gilbert H., Lt.
Laidlaw, Clarence A., S/Sgt.
Lambert, Floyd E., Lt.
Lancashire, Lawrence H., Lt.
Landry, Joseph A., T/Sgt.
Lang, Jack E., T/Sgt.
Lannie, Edward H., Sgt.
Lanning, Jack B., Lt.
Larsen, Richard E., S/Sgt.
Larsen, Victor H., Lt.
Larson, Carl H., Lt.
Larzelere, Wickham E., T/Sgt.
Lasco, Henry A., Jr., Lt.
Lavin, Richard W., Capt.
Lawrence, Rollo C., Jr., Capt.
Learned, Harold G., Jr., Lt.
Lee, Bert, Jr., Sgt.
Lee David V., S/Sgt.
Leffingwell, Claude V., Lt.
Lehnhausen, Robert J., Lt.
Leibowitz, Aaron P., S/Sgt.
Leising, Frank E., T/Sgt.
Leisure, Earl T., T/Sgt.
Lejeune, Edward G., T/Sgt.
Leming, James O., S/Sgt. (& OLC)
Lemke, Adelbert J., Lt.
Lemke, Herbert M., Sgt.
Lents, Murphy K., Lt.
Lentz, John H., Lt.
Leon, Howard E., S/Sgt. (& OLC)
Leonard, Frank M., S/Sgt.
Leonard, William F., T/Sgt.
Lesniak, Leo L., S/Sgt.
Levy, Theodore, S/Sgt.
*Lewis, Harold E., Capt.
Lewis, Herman W., Lt.
Lewis, Paul C., T/Sgt.
Lewis, Rex E., Lt.
Leyva, Victor, S/Sgt.
Liljergen, Dale H., Sgt.
Lillback, John E., S/Sgt.
Lind, Wilfred N., Lt.
Lindeman, Burdette V., S/Sgt.
Lindgren, John H., S/Sgt.
Lindsey, Virgil B., Lt.
Lipps, Richard, S/Sgt.
Lipten, David, Lt.
Lis, Edward A., T/Sgt.
Liscomb, Russell P., Lt.
Lisiesky, Marshall A., S/Sgt.
Littleton, Joe, Lt.
Locky, Robert T., S/Sgt.
Lofgren, Maurice A., Lt.
Long, George W., Capt.
Long, Joseph D., T/Sgt.
Long, Robert E., Jr., S/Sgt.
Longoria, Robert, S/Sgt.
Looke, Robert E., Sgt.
Looker, Rollin C., S/Sgt.
Lovelace, John Wade, Lt.
Lown, William D., Lt.
Loyd, Henry C., T/Sgt.
Luglio, Benjamin J., S/Sgt.
Lutton, Lyle D., Jr., Lt.
Lycan, Richard G., Capt.
MacDonald, Allan M., Lt.
McAtee, James C., Lt.
McAtee, Patrick H., S/Sgt.
McAuliff, Harold C., Lt.
McBride, Ralph J., Maj.
McCabe, Ernest G., S/Sgt.
McCandless, George, Jr., Lt.
McCaughey, Charles P., S/Sgt.
McClain, James H., Lt.
McClellan, Wilburt A., T/Sgt.
McFarland, Torrence H., Lt.
McGee, Donald C., Lt.
McGrain, Thomas W., Lt.
McGrath, Thomas J., S/Sgt. (& OLC)
McGuire, Edward T., Lt.
McLaren, Hugh R., S/Sgt.
McLendon, Donald C., S/Sgt.
McLeod, Merton J., S/Sgt.
McMackin, Charles G., S/Sgt.
McMenamin, Victor A., S/Sgt.
McNair, Robert W., T/Sgt.
McNamara, Louis J., S/Sgt. (& OLC)
McNeil, William H., Lt.
McNickle, Marvin L., Maj.
McSweeney, Edward F., S/Sgt. (& OLC)
*McWherter, Richard W., Lt.
McWilliams, Major H., Lt.
Mackey, Walter E. Lt.
Mackley, John R., Sgt.
Maddock, Jack E., Cpl.
Magaram, Henry, S/Sgt.
Makin, George J., Lt.
Malone, Hugh J., S/Sgt.
Malone, Maurice C., T/Sgt.
Maloy, Charles L., Jr., T/Sgt.
Mann, Harold J., Lt. (& OLC)
Manquen, Joseph F., T/Sgt.
Marchese, Francis T., S/Sgt.
Markham, Claron E., Lt.
Marsh, Arthur J., T/Sgt.
Marshall, John E., S/Sgt.
Martin, Donald A., Sgt. (& OLC)
Martin, George T., Lt.
Mason, Gerald D., T/Sgt.
Masterson, John J., S/Sgt.
Matson, Kenneth H., Lt.
Matthews, Milton F., S/Sgt.
Mattingly, Joseph B., Lt.
Maucher, Robert A., Capt.
May, John T., Lt.
May, Lee H., Sgt.
Mead, Robert F., T/Sgt. (& OLC)
Mechanic, Bernard, T/Sgt.
Medeiros, Louis C., S/Sgt.
Mendelsohn, Marvin R., Lt.
Mendenall, Harold O. N., Lt.
Merrell, Clinton P., T/Sgt.
Merrick, James L., Lt.
Merrigan, John, S/Sgt.
Metsa, Tauno I., T/Sgt.
Meyer, Harold B., S/Sgt.
Meyers, Charles R., Jr., Lt.
Meyers, Kermit E., Capt.
Michaels, Willard L., Lt.
Migliaccio, Anthony F., T/Sgt.
Millioto, Carmello J., T/Sgt.
Miller, Andrew J., S/Sgt.
Miller, Ernest A., Lt.
Miller, Floyd B., Maj.
Miller, Robert Cobb, Lt.
Milligan, Wallace D., T/Sgt.
Millimer, Joseph E., F/O
Minyard, William T., S/Sgt.
Mitchell, Edward R., Lt.
Monson, Keith C., S/Sgt.
Montemurro, Francis V., Lt.
Moore, Charles T., Lt.
Moore, Harold B., Lt.
Moore, John M., Lt. (& OLC)
Moore, Lynn R., Capt.
Morefield, Luthur W., Jr., Lt.
Morgan, James R., Lt.
Morgan, Maurice C., Capt.
Morree, Robert O., S/Sgt.
Morris, Kermit R., S/Sgt. (& OLC)
Morris, Mark A., S/Sgt.
Morris, Wesley D., Lt.
Morrison, Marvis C., Lt.
Morton, William G., T/Sgt.
Mosco, Marvin, Lt.
Moss, Benjamin M., Lt.
Mostow, Jechiel, Sgt.
Mount, William J., Lt.
Moutier, John L., Jr., Lt.
Muldoon, Bernard R., Lt.
Munroe, George B., Lt.
Munroe, Stewart W., Lt.
Murphy, Charles M., Lt. (& OLC)
Murphy, Gerald E., S/Sgt.
Murphy, Lawrence E., Lt.
Murphy, Phillip O., S/Sgt.
Murphy, William G., Jr., Lt.
Murphy, William J., Jr., T/Sgt.
Murray, Harold R., S/Sgt. (& OLC)
Murray, Robert C., Lt.
Myres, Max M., F/O
Nading, William D., Lt.
Nappi, John, S/Sgt.
Neale, Robert D., Jr., Lt.
Needham, William E., Lt.
Nelson, Clarence W., T/Sgt.
Nelson, Milton, Lt.
Nelson, William J., S/Sgt.
Newman, Herbert J., Lt.
Newmes, Robert G., S/Sgt.
Newport, Walter N., S/Sgt.
Newton, George L., Lt.
Nichols, Cyril E., Capt.
Nicholson, Louis M., Lt.
Nicholson, Paul A., T/Sgt.
Nolan, James F., Lt.
Noller, Robert R., S/Sgt.
Norman, Arnold R., S/Sgt.
Norwood, Feaster A., Lt.
Nosal, John A., S/Sgt.
Nossum, E. J., Lt.
Nunlist, Paul F., Lt.
Nyblade, Walter E., Lt.
Oberste, Marcellus L., S/Sgt.
Ogara, Elmer T., Sgt.
O'Grady, John E., F/O
Ohlemery, Paul L., S/Sgt.
Olsen, Odin C., F/O
O'Leary, Thomas, Cpl.
Olenik, Adolph, S/Sgt.
Olson, Clarence R., S/Sgt.
Olson, Richard H., S/Sgt.
Olson, Robert D., Lt.
Olson, Stanley F., Lt.
O'Mara, Eugene L., S/Sgt.
O'Neal, James B., Lt.
Onyszcak, John, Sgt.
O'Reilly, Robert J., II, Lt.
Ormsbee, Albert G., Lt.
Osborn, Thomas M., S/Sgt.
Osbourne, Glenn C., Lt.
Osburn, Donald J., S/Sgt.
Oser, Albert H., S/Sgt.
O'Sullivan, Donald R., Capt.
Pace, Harold L., S/Sgt.
Paciorek, Marion S., T/Sgt.
Paine, Charles J., Lt.
Paliga, Frank, S/Sgt.
Paolillo, Michael A., T/Sgt.
Papish, Philip G., Lt.
Parish, Kenneth W., T/Sgt.
Parker, Ear R., T/S. (& OLC)
Parker, George H., T/Sgt.
Parker, William H., Cpl.
Parshall, Joseph W., Lt.
Parsons, Joe E., T/Sgt.
Pascoe, Theodore I., Lt.
Passalacqua, Peter C., S/Sgt.
Pate, James E., Capt.
Paul, Daniel W., Lt.
Paulin, Leopold J., S/Sgt.
Paulsen, Earl J., T/Sgt.
Paulsen, Richard B., Lt.
Pearson, Edgar J., S/Sgt.
Peck, James E., Capt.
Pendleton, Richard H., Jr., Lt.
Perry, Horace E., Lt.
Petri, Norbert E., S/Sgt.
Petrie, Louis M., T/Sgt.
Pett, David, Capt.
Phillips, Charles H., S/Sgt.
Phillips, Glenn W., S/Sgt.
Phillips, Phillip P., Jr., Lt.
Picard, Leo J., S/Sgt.
Piccolo, Anthony J., Lt.
Pierce, Donald G., S/Sgt.
Pierce, Richard W., T/Sgt.
Pimlott, Donald A., S/Sgt.
Piper, Ernest B., T/Sgt.
Pitak, B. C., S/Sgt. (& OLC)
Podolak, Stanislaw J., Lt.
Poillion, Charles B., Capt.
Poirier, Meddie N., S/Sgt.
Polaschek, David A., Lt.
Polisky, Harold L., Lt.
Poncik, Victor J., Lt.
Pope, John F., Lt.
Popham, William L., T/Sgt. (& OLC)
Porter, Enoch M., Jr., Lt.
Porter, James L., Capt.
Potts, Charles H., Jr., T/Sgt.
Potts, John W., S/Sgt.
Powell, Hugh S., S/Sgt.
Powell, Herman Thomas, Lt.
Powers, John J., T/Sgt. (& OLC)
Prather, William H., F/O
Price, Hillard S., Lt.
Price, Robert J., Lt.
Price, Robert Y., Lt.
Pribble, Fred A., T/Sgt.
Pruett, Ernest C., Lt.
*Pryor, John E., Jr., T/Sgt.
Purcell, Thomas Q., S/Sgt.
Quigley, Joseph N., Jr., Lt. (& OLC)
Quinlan, Charles P., T/Sgt.
Rabb, Gerald E., T/Sgt. (& OLC)
Ramsey, Ivan W., S/Sgt.
Rans, Robert, S/Sgt.
*Ranucci, Frank F., T/Sgt.
Raphel, Eugene V., Capt.
Raspotnik, Leonard L., T/Sgt.
Rath, Leland J., Lt. (& OLC)
Rauba, Anthony J., S/Sgt.
Ray, James Andrew, Lt.
Reasoner, Robert J., S/Sgt.
Rees, Guy, Jr., S/Sgt.
Regan, Edward B., T/Sgt.
Reid, James H., Lt.
Reiter, Jack, Lt.
Reitz, Lawrence E., T/Sgt.
Rethmas, Vincent C., Lt.
Reuther, Daniel, Jr., S/Sgt.
Reynolds, William J., Lt. (& OLC)
Rhodes, Rexford, S/Sgt.
Rice, Peter J., T/Sgt.
Richards, Dean B., Lt.
Richards, John E., Lt.
Richey, B. O., T/Sgt.
Richotte, Henry, Sgt.
Rielly, John R., S/Sgt. (& OLC)
Riggs, Benjamin F., Lt.
Riley, John E., T/Sgt.
Riley, Robert Kenneth, Sgt.
Riley, Thomas R., Sgt.
Rimke, Clarence R., Capt.
Rispoli, Anthony, Lt.
Ritenour, Arthur B., S/Sgt.
Rivers, Richard T., Lt.
Roberts, Charles L., Sgt.
Roberts, Newell O., Capt.
Robertson, Dallis R., S/Sgt.
Robertson, Edward W., T/Sgt.
Robins, Ralph M., S/Sgt. (& OLC)
Robinson, Adelbert M., S/Sgt.
Robinson, Harry R., S/Sgt.
Robinson, James D., S/Sgt.

(Continued on Page 64)


# CAPITAL TARGETS

Nazi-European capitals—vital centers of enemy production, storage and communications—have felt the full force of aerial blows struck by the Army Air Forces.

While attacks on Berlin and Rome were increasing in intensity, air assaults were launched upon capitals of Axis satellites in the Balkans.

Pictured are four targets blasted by AAF precision attacks. In the Berlin photo, clouds of smoke are rising from the Erkner ball-bearing plant while another cluster of bombs is on its way to continue the destruction.

Over Rome is seen a B-26 which is dropping its bomb load on the Tiburtina railroad yards. Vatican City is shown in the lower right corner of the photograph.

First bomb bursts in the center of rolling stock at a freight terminal record a bulls-eye for AAF bombers in their initial attack on the Hungarian capital of Budapest. Adjacent oil refineries and the Tokol airdrome also were severely damaged.

Dense smoke is seen billowing high in the sky over Bucharest as fires started by bombs destroy locomotive roundhouses, rolling stock and storage areas in the Rumanian capital. ☆



# FROM CALCUTTA TO THE HUMP

The United States Army has taken over the meter gauge Bengal and Assam railroad in India to transport materiels of warfare.

**By Capt. Charles A. Mitchell**
**India-China Wing, ATC**

*and*

**Capt. Robert V. Guelich**
**Air Force Overseas Staff**

GROUND personnel of the AAF and ASF, struggling for the last two years to keep China's only supply line open, knew that much of the success of an Allied offensive into northern Burma would depend upon their ability to keep supplies flowing over India's frail transportation system. No longer could the Orient's one-mile-an-hour ox-cart pace be tolerated as the time approached for General Stilwell's forces to launch their ground and air offensive with the British into northern Burma.

American rail experts took over management of the vital Assam-Bengal railroad; expediters scurried about the docks, escorted river barges and freight cars; construction engineers strengthened cranes while others simplified trans-shipment procedures where rail gauges changed. Broken down and inefficient equipment was supplemented with new materiel. This task of bolstering a worn-out transportation system with few materials and slow-moving, unskilled natives for manpower while battling the climate of the humid, flooded monsoon country was tedious and exasperating but not impossible.

From the States, supplies pour into ships, and sail halfway around the world to be unloaded onto the heads of the frail coolies of India. Ports are jammed with United Nations cargo ships. Cranes—so few that ships have to wait in line for them—drop their lifting platforms into the holds as Indian foremen shout, "Astay, Astay," (Take it easy, careful) at the dhoti-draped Bengali or Punjabi who operate them.

From the hold of a ship in Calcutta comes a 6 x 6-foot crated truck, an aircraft engine, crated wing panels and fuselages, cases of canned food, clothing and hundreds of other military supplies destined for the British, Americans and Chinese. Frequently the equipment, such as a 2,000-gallon gasoline trailer, is too heavy for the crane. Then, the ship's boom goes to work, or a floating crane ties up alongside the ship to do the job.

Flat-wagons (railway flat cars), trucks of all kinds, "country boats" (high-stern river barges) and coolie heads carry the cargo away. Urgently needed supplies such as aircraft spares, high priority freight and mail are rushed to an airdrome for the 4½-hour air trip to Assam. Planes sometimes are cleared from one field at the rate of one every five minutes. Remaining supplies are loaded in trucks or laboriously carried, one box at a time, atop coolie heads to the "go-downs" (warehouses) until more transportation is available. Such labor saving devices as wheelbarrows, power trucks or small hand-pulled freight wagons are rarities. Moreover, the coolie's arms are weak; it usually takes two men to lift a box that one can carry on his head.

To move a crated engine, twenty coolies are needed, and only when the head man synchronizes them with the ancient chant of "Hey, saw . . . hey, saw . . ." are they able to budge the box.

SINCE they do not understand English, the sergeant who supervises the gangs has to know Hindustani, Urdu or one of several dozen other dialects. His words may carry a Brooklyn or Brookline accent, but if he yells loud enough with plenty of gestures, working nine times harder than the Indians, he'll keep the supplies cleared away from the unloading dock so another ship can move into the slip and unload its cargo.

While officers and GIs cuss and sweat on the docks, the "country boats," rationed like all other forms of transportation to ASC and ASF by the British, drift away and hoist their small sails to start their trip of more than three weeks up the Hooghly and Brahmaputra rivers to the "ghats" (landings) in Assam. If

**Transportation difficulties are the rule, not the exception, in the CBI theatre, and those encountered on the road to Assam are among the toughest.**

the tide is running out, they pull up to shore until it turns. If there is no wind, the boatmen walk fore and aft with long oars to propel the barge slowly upriver. During the dry season, silt and sand bars sometimes delay shipments for weeks.

Trucks leaving the dock areas for the supply depots move at the same slow pace, for they must traverse the narrow streets that are jammed with carts pulled by plodding bullocks and water buffaloes. Gears grind and whine as each truck creeps along at a snail's pace, stopping when an Indian woman complacently ambles across the street with a basket of dung on her head, crawling forward again behind a cart piled high with rice or dripping bags of molasses being pushed by four ragged, straining natives. There are no other streets, no by-passes; our supplies move at the same pace the Orientals move. Sometimes it takes three to four hours to drive through such masses of humanity.

Arriving at the "go-down" area, problems begin anew. Most of the warehouse space is spotted in abandoned jute mills. Entrances must be enlarged, walls reinforced, lighting systems installed, bins built, natives hired and trained. Truck assembly areas frequently are clogged because shipments can't be scheduled properly; an empty yard today may be overflowing five days later, even though natives and GIs work continuously to assemble the vehicles. One jeep assembly line would blast all theories of production line efficiency, yet the corporals, sergeants and unskilled natives keep putting the jeeps together and driving them away.

The vehicles aren't driven very far, however, for there is no passable road from Calcutta to Assam. All vehicles must be transported by rail, at least halfway to their destination in Assam.

Railroads are unlike any in the States. They originally were constructed to transport tea and rice when schedules were not of much importance and traffic was light. Most freight was packaged in boxes and sacks that could be carried on the heads of natives. There was no need for cranes or gasoline pumping stations.

With the deluge of large quantities of heavy military equipment for the support of our air and ground forces, the rail system bent almost to the breaking point. Rails, with one spike to a tie, spread under the heavy loads and derailments occurred frequently. Warehouse space at transfer points soon was crammed to overflowing for all of our supplies had to go to the end of the last branch line. The problem was similar to that of reversing the flow of a river, forcing all the water at the mouth back through one tributary system. The small channels of the subsidiary soon overflow. But there was only one rail line to Assam so the supplies of war materials had to be forced through it as fast as possible.

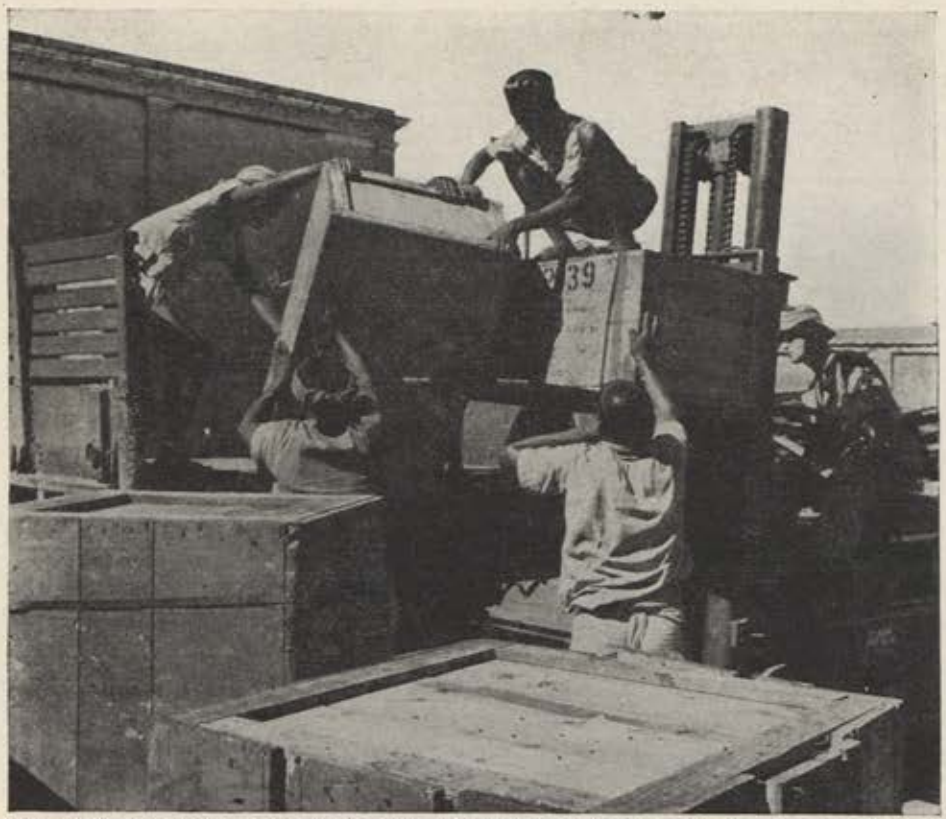
As soon as enough flat-wagons are allocated to form a military train, they are loaded with vehicles, supplies and personnel and started out of Calcutta—sandwiched between civilian freight and passenger trains. Because the rail line is heavily over-loaded, progress is unbelievably slow. From one to three days are required to make the first leg of the trip to a whistle-stop where some freight is transferred to narrow gauge cars.

Transhipment takes time, but there is no alternative. Gasoline drums are slung from the shoulders of four coolies when it must be moved uphill; otherwise the drums are rolled. Heavy equipment is moved by an electric hoist, one of the few to be found along rail lines. Bulk gasoline is pumped from broad gauge to narrow gauge cars. Frequently, there are not enough narrow gauge cars available to permit transfer of all equipment, and much of it is diverted into go-downs and storage areas. Large AAF trailers can be shipped only on extra long flat wagons, and since there are very few such wagons, the trailers often have to wait many days for the special cars to be returned to this transhipment center.

FORTUNATELY, a second transfer point between the two railroads is useable. It is here that most vehicles, personnel and remaining supplies are transferred. Vehicles drive directly from the broad gauge flat wagons onto the narrow gauge wagons—provided there are empties on the siding. However, some trucks have to have their left rear dual wheels and left fenders removed to avoid sideswiping other trains.

Some trains leaving this center are routed down a branch line to the river where personnel and freight are loaded on a steamer, thereby reducing the load that has to be carried by the railroad and saving one ferry crossing. *(Continued on Next Page)*

These AAF supplies are nearing the end of their journey from the United States, one of the long routes which supply our forces around the world. Here native Indian laborers assist in unloading boxes from a river barge near an air depot from which they will be issued to fighting units.



One enlisted man and an American made fork truck load Air Force supplies at a warehouse in India. Indian laborers help with the crates which will be loaded on trucks and taken to transports.

Farther up the main line, vehicles are unloaded, re-assembled, ferried across the river and driven out on a passable road that leads to our bases in Assam. This last lap to the tea plantation country takes but a few days, depending on the weather and, during the monsoons, on the number of road wash-outs.

Heavier freight on the main line continues to a railroad ferry where the loaded flat wagon must be laboriously shuttled across the river. Here, personnel and freight from the river steamers are reloaded on the train to begin their last leg of the tedious journey to upper Assam.

When supplies and equipment reach Assam's bases, they are distributed promptly to dispersed ASC and ASF warehouses. Some are sent immediately to engineers and troops extending the Ledo road. Some are parachuted to advance patrols in Burma, to our air-supplied flight strips and to ATC crews "walking back" from bail-outs over the Hump. Other supplies are loaded promptly into the Commandos and Liberators of ATC's India-China Wing that 24 hours a day fly the shuttle route over the Himalayas from India to China.

In China, transportation is almost as difficult, except that gasoline and oil and repair parts are more scarce; roads are almost impassable and railroads are restricted to about twenty miles an hour.

A copy of ATC's freight manifests for one day would show more than 200 different types of materiel being sent to the 14th Air Force and to ground troops under General Stilwell. These items have been brought to Assam from the States by the normal water and land route in three to six months or longer, and by air express in as little as four days.

Transportation difficulties are the rule not the exception in this war theatre. Even after receiving its supplies in upper Assam, one ASC unit takes three and a half days to get supplies to an airfield only forty minutes distant by air; its trucks must drive over monsoon-washed roads, be loaded onto rail wagons, ferried across a river, carried farther by rail and finally unloaded to drive the last stretch on their own wheels.

Tea factories serve as headquarters, as warehouses and barracks; tea-pickers carry and load freight in the China-bound planes; dust in the winter and mud in the summer hamper operations. Yet supplies are flowing to our troops in ever-increasing amounts by plane, river barge, rail, coolie and sometimes by ox cart. Life for our supply men is far from glamorous, yet they, as much as the men at the front, are the soldiers who are fighting the Japs in the CBI theatre. ☆

Lack of rock for roadbeds is a problem since most of the rocks available are sandstone which is ground into fine powder under the heavy traffic. Native Indian laborers, working on the Ledo Road, search a stream bed for harder stones which are picked up by truck.

# ON THE LINE

A MONTHLY MAINTENANCE ROUNDUP PREPARED IN COLLABORATION WITH THE AIR SERVICE COMMAND AND THE TECHNICAL INSPECTION DIVISION, OFFICE OF THE AIR INSPECTOR

### A Good Pilot Helps . . .

"We pray for a good pilot more than anything else," says Tech. Sgt. Michael C. Leon, crew chief of a B-26 with 66 missions to its credit. "The reason is that with a good pilot we have much less work to do."

This expresses the virtually unanimous belief among mechanics, engineering officers and pilots, too, of this 12th Air Force B-26 group, that the pilot plays a primary role in the maintenance of his airplane.

Members of this group should know. A veteran of fifteen months of combat duty, many of its Marauders have flown 60 or 70 missions, with over 500 flying hours.

Tech. Sgt. James E. McCarthy, crew chief of a 70-mission B-26, says: "There's no question that a good pilot aids in maintenance. He knows immediately when something goes wrong and how to correct it. Besides, he usually knows how serious it is. You won't find a good pilot coming back early from a mission with minor trouble."

Not only does a good pilot help by locating serious trouble, but he also causes less wear on the plane to begin with. One of the chief ways a good pilot will keep his plane flying a few extra hours is in the right use of trim tabs.

"No two planes fly quite the same way," observes Tech. Sgt. Earl H. Holtorf, crew chief for a B-26 that in 67 missions had but two early returns for mechanical troubles and had never had an engine change when it went down, a flak victim. "One will drop its right wing a little. The next will drag its tail. A good pilot knows the exact way to trim his plane to correct for these little tricks and get maximum performance. If a plane is trimmed perfectly it's going to take less power to keep up with the formation. Less power—less wear on the engines."

The pilot's use of power settings is another important factor in prolonging—or shortening—the life of a plane. "A good pilot won't have to change his throttle settings often," states Tech. Sgt. John W. Johnston. "But a poor pilot will be pushing his throttles up and back, up and back all the time—trying to speed up and then slow down. That sort of thing will wear out an engine quicker than anything I know."

The difference that "know how" in the use of the throttles will make is reported by one crew chief who claims that there will be a difference in gas consumption of sometimes 100 gallons for the same distance by various pilots. In each case, the more experienced pilot brings back more gas in his tanks.

Inexperienced flyers occasionally bring planes in for mechanical troubles which don't exist, due to their failure to understand fully the use of instruments. This means headaches for the ground crews, who must look for nonexistent troubles—and it mars a plane's mission record.

"A good pilot can tell his crew chief what the trouble is when something goes wrong," comments Capt. Richard F. Fenton, squadron engineering officer. "Then the mechanics can go right to work without wasting time experimenting. This puts the plane back into the air hours sooner."

Different speeds and altitudes require different rpm settings for the props. The wrong rpm at the right place will play hob with the engine and put circles under the crew chief's eyes.

The operation of the plane on the ground is important also. "Simple factors such as the way you taxi a plane, and knowing the best fuel mixture to use in idling or running up the engines will add a lot to a plane's life," adds Capt. Ray M. Lien, another squadron engineering officer. "And a pilot who uses brakes the right way is a real help to the ground crew."

The right use of brakes plus good landings is shown in the case of a Marauder with 66 missions and over 500 flying hours. It still sits on its original, factory-issued tires.

"It means that the pilot made a lot of good landings," the crew chief figures.

First Lieut. Harold B. Bloch flew forty combat missions with no early returns due to mechanical troubles. Most of the missions were in a B-26 which after 470 hours of flying time and nine months' combat duty still had its original right engine.

"There's no doubt whatsoever that a pilot who tries can add 50 to 100 hours to the life of his plane," claims Lieutenant Bloch.

Since the average mission the B-26s fly is close to four hours, that extra 50 to 100 hours adds up to one or two dozen additional headaches for the Axis.—Staff Sgt. Robert A. Wade, 12th Air Force.

The fast-moving war in the Pacific, which finds the AAF leap-frogging from island to island as new advance bases are established or captured, calls for adroitness and skill on the part of the ground crews. On Makin in the Gilbert Islands, a 7th Air Force crew with a mobile unit makes ready a newly-arrived fighter for its first mission against the Japs.

### Competition Does It in India . . .

Without the wealth of facilities for maintenance and repair and with fewer spare parts than mechs back in the States, engineering and maintenance crewmen of a station of the India-China Wing, Air Transport Command, are hanging up new operational records for their airplanes.

# ON THE LINE (Continued)

Take the case of No. 822—now this station's flagship. During February this C-47 flew a total of 360 hours and 10 minutes for an average operational day of 12 hours and 25 minutes.

Considering that domestic U. S. airlines shoot for ten hours per operational plane per day, the station claims an India-China Wing and GI operational record on the basis of No. 822's per day mark with only field equipment.

Staff Sgt. Howard E. Tietze was the ranking crew chief aboard No. 822 during her record-making February runs; his assistants were Cpls. Clarence Armstrong and Richard Griffin. In civilian life they were factory production foreman, service station attendant and molder, respectively.

Sergeant Tietze reports that the highest number of hours put on his plane during any 24-hour period during February was 18 hours, 25 minutes. The only time lost through mechanical difficulties was a four-hour delay at a central Indian base when a generator had to be changed.

The engines were droning just as smoothly as they were when the plane was first delivered as Sergeant Tietze taxied the big plane into the hangar for the regulation engine change.

No. 822 won out in a contest initiated between the crew chiefs on all ships by Capt. Charles Orne, engineering officer at the station. He promised the three chiefs special prizes—ranging from beer to cigars—if their plane flew the most hours during the month; also that a flag would be painted on the side, just below the pilot's window. A pennant, which contains an ATC insigne plus the station numerals, now appears on the side of No. 822.

The results of the first month of such competition among the crew chiefs were very pleasing to engineering and operations sections. For the entire month, the station's planes—all of them—operated for an average of 10 hours and 25 minutes per plane. Col. K. C. McGregor, commanding officer of the Western Sector, ICW-ATC, had set a ten-hour goal for all sector planes. Col. James W. Gurr, commanding officer of the station, declared: "The fact that three planes during this period broke the highest record ever made by any other plane is significant. It shows that a real effort is being made by all crews and ground maintenance personnel to perform the mission assigned to us in the most efficient manner possible."

Second in the February race was a C-47 crewed by Staff Sgt. Russell E. Estes, Sgt. Morris O. Cardin and Cpl. Warren J. Kimmel. Staff Sgt. James E. Small, Cpl. Quinton E. Martin and Pfc. William R. Ferguson won third place honors.

### News on Technical Publications Used in AAF . . .

*TO Distribution Changed* — Revised TO 00-25-3, dated 1 February 1944, outlines the new method of distributing TOs and SLs. The new plan saves time and money and permits each activity to designate the number of technical publications needed. Under the former method, an arbitrary figure of distribution was set up by headquarters, Air Service Command. Mechanics, who use and keep TO files up to date will find that the new system produces the right TO at the right time.

With the aid of the base technical inspector, who is responsible for local distribution, activities now fill out and mail ASC form 3070 to MT6, Headquarters, Air Service Command. Activities now are encouraged to order only those TOs pertaining to their own work responsibilities, but in quantities sufficient to meet the needs of using personnel.

Time is saved since publications are now distributed as soon as received from printer, and field activities get needed information faster.

*Accelerate Circulation and Technical Books*—A measure for the authorization and control of technical libraries and textbooks is provided by AAF Reg. 50-9. The new method speeds up obtaining these books, with an AAF specialized depot maintaining adequate stocks of titles on the approved lists. Time is saved since previously separate lots of books were ordered from publishers.

An approved list of 600 titles was carried formerly; this list now has been expanded to 1,000. Magazines are also available; the approved lists are contained in TO 00-25-14. However, magazines are shipped direct from vendor, rather than the specialized depot warehouse. Another function of the centralized depot is to receive obsolete or excess books in possession of any AAF continental activity to be redistributed to other activities.

*UR Digest Appears*—Purpose of the UR Digest is to provide field activities with a twice-a-month consolidated report of all unsatisfactory reports received during the two weeks preceding publication, and to inform of action on difficulties. The information provided covers equipment affected, number of failures reported, cause of failures and corrective action, either completed or in process.

The big advantage of the system is that the digest furnishes a medium for sending information on unsatisfactory conditions to all activities, rather than limiting the answer to a problem (which may be of a general nature) to the activity submitting the UR.

The digest is published as TO 00-25-25. Each supplemental issue is identified by a suffix letter in alphabetical sequence: 00-25-25A, 00-25-25B and so on.

### P-38 Has 135 Missions With But Two Early Returns . . .

The other day my 15th Air Force field phone jingled and Capt. Elfege F. Austad, engineering officer of this fighter group said, "We have a crew chief who has set some kind of a record on P-38 maintenance. A mechanic, named Oyer, at the Black Falcon squadron has only two early returns in over 100 missions."

So I chiseled a jeep from the group adjutant and drove down to the line to see Oyer. As I drove up to the plane, I could see they were pulling some kind of inspection. Mechanics were swarming all over it. So I asked a sergeant what was happening. He replied, "This is the 100-hour inspection." And then nonchalantly he added it was the 700th hour.

Seven hundred is a lot of combat hours. In this group, there are only two planes that have ever had 700 hours, and this plane, "Old Faithful," had 705 hours and 20 minutes in air full of flak and enemy fighters.

I asked for Oyer and he stepped from the gang of mechanics.

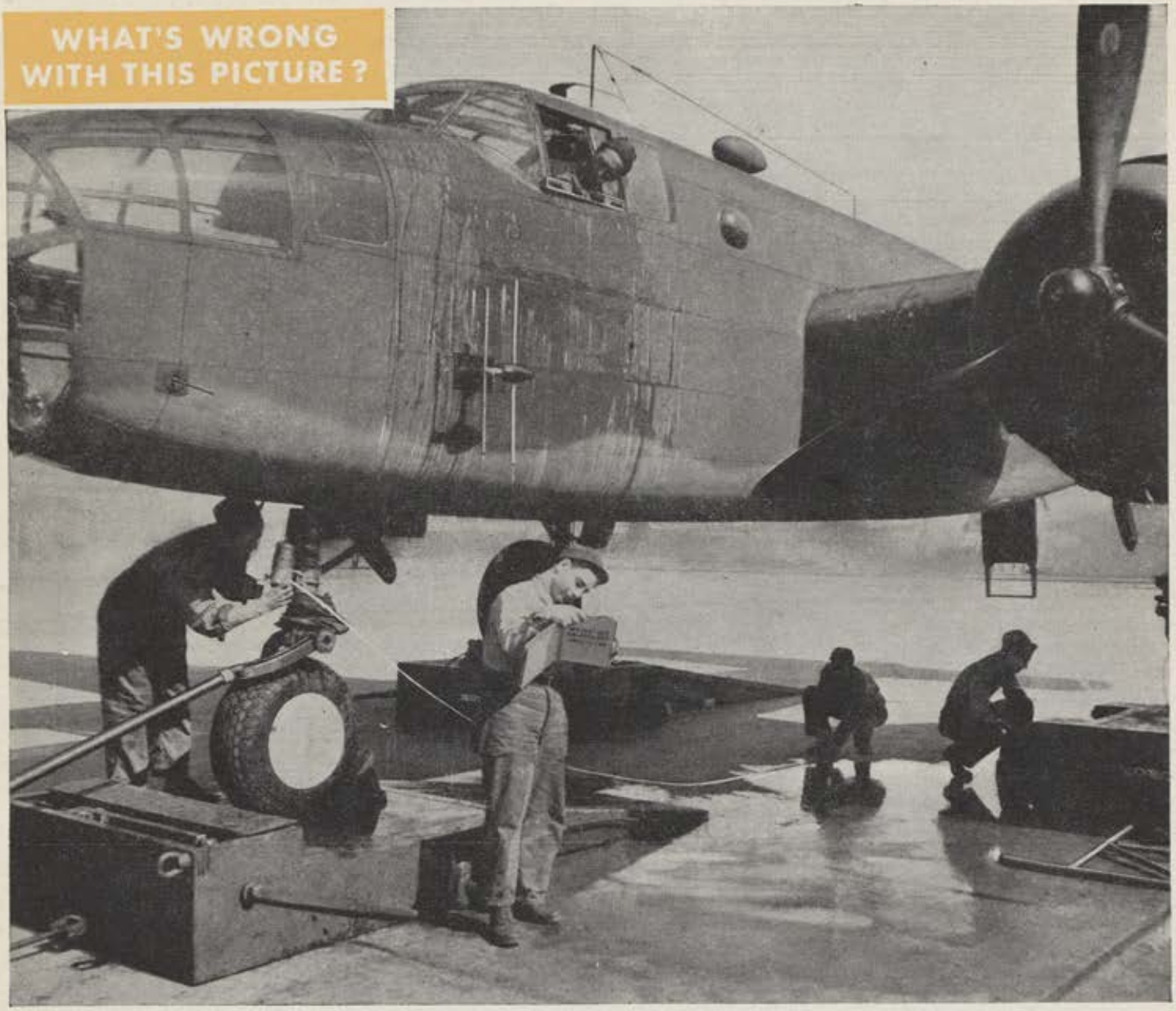
Tech. Sgt. Kenneth M. Oyer, Hutchinson, Kan., is a modest, quiet boy. But he likes to talk about P-38s. He has been a crew chief on a P-38 since the first one came to this group back in 1941.

While his pilot, Lieut. Roger Stemen, Quincy, Mich., flew his P-38 in the first mass movement of fighters across the Atlantic, Sergeant Oyer went across in an AAF transport plane in June, 1942. After a short stay in England he came to North Africa with the invasion forces. Since then, this first P-38 was lost in combat and "Old Faithful" was received February 7, 1943.

Oyer and his assistant, Sgt. Chester G. Green, Attica, Ind., don't like names painted on their planes. Their first pilot, Lieutenant Stemen, said he didn't want any names and, since he had such good luck, they decided names just weren't lucky for them. Yet, they refer to their plane as "Old Faithful."

But the record the P-38 set in the group was not 705 hours and 20 minutes nor the 135 missions over enemy territory. The record is that the plane has had

## WHAT'S WRONG WITH THIS PICTURE?



THE type of scales used to weigh this B-25 called for exercising the utmost care to avoid jarring and damaging nosewheel landing gear assembly and the scale's mechanism. To proceed with weighing in a merry boner-laden manner means grave inaccuracies when loading time comes around. The men posing the mistakes in this picture are going to bring about a dislocated center of gravity in the plane—and lopsided loading and improper balance in flight are almost inevitable results.

Nearly all boners in this month's picture are covered by AN 01-1-40, "Handbook of Weight and Balance Data," and violations are exceedingly dangerous. When improper loading results from such errors the operating characteristics of the airplane are adversely affected. Abnormal stresses on the airplane's structure can have drastic results.

Posing this picture in the interest of better weighing practices ON THE LINE are (left to right) Pfcs. Earl F. Hill, Sr., and Harold K. Bright, Pvts. Estill Lomelino and Rudolph L. Krug, Jr., and, in the cockpit, Pfc. Clifford H. Walker, all of the 478th Air Base Squadron, Patterson Field, Ohio. These men point out the seven boners in the picture which are listed on Page 64. Can you find any more?

only two early returns from mechanical difficulty in all that time.

Sometimes the work was a little tough, especially the July days in North Africa. When the sun was so hot it was impossible to touch the plane or engine, Oyer and Green changed engines at night and in the early morning. Then, there was the time in the Middle East when they had to change innercoolers on the desert in the middle of a sandstorm. They worked night and day during the invasions of Sicily and Italy when "Old Faithful" was flying more than a mission a day strafing and fighter-bombing.

All in all the plane has come through 135 missions, 90 escorting heavy and medium bombers and 45 strafing and fighter-bombing. Only once was she shot up badly. On a strafing mission to Sardinia she came back full of flak holes.

Master Sgt. Emil Reist, group aircraft inspector for the past twelve years, pronounces "Old Faithful" as still "a first-class combat plane." He should know for in his 22 years with the AAF he has held the jobs of crew chief, flight chief and line chief, and has worked on P-38s since the Army first received them.

The three swastikas painted on the nose represent three enemy aircraft shot down in one day over Bizerte by Lieut. George Bancroft of East Winsor Hill, Conn.

"Old Faithful" is scheduled for retirement soon for she is a little out of date now. But her record will remain as a mark for the envy of all crew chiefs in this group.—Lieut. Albert M. Hall, 15th Air Force. ☆

## SKY QUIRKS

(Continued from Page 31)

mined by the altitude of the inversion layers and the extreme differences in temperature in these layers. This atmospheric quirk has caused explorers to be as much as 300 miles off in their plotting of newly discovered land and to bludgeon each other for placing land where it wasn't.

About a century ago, Charles Wilkes, a British naval officer, placed Cape Carr in longitude 133 degrees east. This location was attacked by Sir Douglas Mawson, who proved he had sailed right over where Cape Carr was supposed to be. Later, Mawson made the same mistake himself. In 1929-30 he mapped the coast of a newly discovered arctic region from a seaplane. The next year, he sailed for 300 miles over his own charted "land." Superior mirage explains both mistakes.

Bob Bartlett, the famous arctic and antarctic skipper, once while sailing east of Greenland saw Iceland raised by mirages at a distance of 300 miles.

In direct contrast to the looming effect of the "superior" mirage, there is the stooping or sinking effect of the "inferior" mirage, which occurs when rays from the base of an object are curved down more rapidly than those from the top, giving apparent vertical contraction or a seeming squatness.

When the density of air above the ground does not decrease normally, because of a rapid fall in temperature, objects usually seen above the horizon sink below it. This effect is frequently caused by cold air moving over open water. In the desert the temperature range of various air levels is much greater than that in the north. Hence the curvature causing the mirage is much sharper, and mirages can involve much shorter distances.

On the desert or in hot weather a mirage may simply be an illusion caused by shimmering heat waves which seem like water. When driving on a hot day we have all seen such a haze on the road ahead of us.

Other "visions" are due to refraction of actual objects, such as lakes, houses or ships, by air layers of different density. They can be either inverted or right side up. Proof that these are not figments of the imagination is afforded by two facts: (1) they can be seen by more than one person at the same time and (2) mirages have been photographed.

"Sky maps" can be of great use to the alert pilot or navigator. In the arctic, a uniform overcast with clouds at a very high level reflects the surrounding terrain. Where level ice is found uniformly covered with snow, the sky map on the clouds above will show a uniform white, or "ice blink." Broken surfaces, such as pressure regions, pack ice and drifted snow areas, will be indicated by a mottled appearance of the lower surfaces of the cloud. Blue or green ice is indicated by greyish patches on the sky map. Open water, timber and snow-free terrain show up as black areas in the cloud reflection.

The ancient Polynesians, who were magnificent navigators, have handed down a sky map lore which can still be of great use to flyers and castaways on a life raft. A small cloud in a clear sky is likely to be a sign of an atoll, the sand of which reflects more heat than the surrounding water. The lagoon of the atoll will be reflected on the underside of the cloud. Lagoons and other shallow waters will be reflected in the sky itself, even when there are no clouds. ☆

# Portland Women Volunteers Assist in Convalescent Training

Soldiers at the Portland (Ore.) Army Air Base are receiving valuable extracurricular instruction in their spare time these days from volunteer members of the women's club who have undertaken two major projects on the post: speech correction for men with cleft palates and other speech impediments, and the operation of a hobby workshop near the station hospital for convalescing patients.

Stutterers, stammerers and others suffering from various speech defects can now receive half an hour of training three times a week from a woman volunteer who is a qualified speech pathologist. This speech rehabilitation follows clinically approved methods. Recordings are made before speech correction is started and at prescribed intervals throughout the training. Included in the instruction is training in muscular control of the speech mechanism, auditory stimulation, proper breath control and other corrective exercises.

Routine dental treatment at the base brought to light the men who needed such treatment. Where possible, dental appliances were supplied but, although these can take the place of lost tissue, they do not assure restoration of normal speech. Medical officers claim that only the utmost patience and hard work of a skilled voice teacher can help a patient achieve speech normality.

The hobby workshop, one of the first to be sponsored by an AAF women's club under the women's volunteer branch of the Personal Affairs Division, is operated in cooperation with the AAF's convalescent training program. Patients are given a chance to try their skills at jigsaw and hammer, at watercolors, leather-work, plastics or ceramics. Moreover, every hour they spend in the workshop is logged in their official CTP record.

The project was begun by Mrs. Dale D. Fisher, wife of Colonel Fisher, base commanding officer. She recruited officers' wives on the post who were qualified arts and craft teachers to supervise and instruct at the workshop. So far, the patient-students have turned out many models of camouflage construction built in conformity with Army camouflage standards. They are to be used for training purposes in AAF schools. Model planes also have been made for use in recognition schools.

If materials can be obtained, the instructors hope to encourage students to create original models of new designs for aircraft, automobiles and other machines.

On the lighter side, imaginative patients have produced such articles as wood-carved boxes, historic ship models, fancy lockets and decanters. Wives, mothers and sweethearts of these hospitalized men are on the receiving end of many handsome, handmade gifts turned out in the workshop.

Scrap leather becomes billfolds, key and cigarette cases, hand-tooled belts and covered boxes. Gimp ends up in bracelets and dog-tag chains. Enamel paint designs transform salvage bottles, decanters and spice sets into valuable gifts. Salvage plexiglas is turned into attractive pins and lockets by the students.

Painting and sketching classes are popular with war posters and cartoons in top place. Enthusiasm is high also for original designs carved on linoleum blocks for block-printing on paper and textiles.

The work at the shop is relaxing and interesting, and soldier-patients find it a welcome respite from hospital routine. Convalescent training officers, finding in the instruction both worthwhile recreation and valuable therapy, hope to enlist the aid of women volunteers in similar projects elsewhere in the country. ☆

# THIS IS YOUR ENEMY

**The Enemy's B-17** ☆ **Jap Paper Bombs** ☆ **Nazi Fighter Tactics**

These items were found on a dead Jap pilot in the Southwest Pacific. They include neck pouches, cigarettes, prayer pieces, good luck charms, currency, pieces of silk and a pair of gauntlets.

**STILL MORE ROCKETS.** In addition to plane-launched rockets, the Germans are using a ground rocket against aircraft. Many of our bomber formations have been subjected to the shells which seem to be as large as the heaviest anti-aircraft projectile. Most of them have been fired in pairs, leaving black trails of smoke as they shoot up from the ground. At the top of their trajectory they give the appearance of flying horizontally for a short period, and generally explode at this point in great bursts of flame.

**THAT B-17 AGAIN.** A Nazi-manned B-17 cropped up again recently to give some of our bomber personnel a few anxious moments. The bomber, captured and reconditioned by the Germans after being forced down over enemy territory, tried to get "friendly" with some of its American cousins when the latter were returning from a raid on Brunswick.

The tail gunner of a bomber in the No. 3 place, high position in the combat wing, saw a B-17 approaching from six o'clock out of an overcast, slightly below the formation.

Our planes went into a cloud and became separated, and the gunners on the bomber from which the strange B-17 was sighted lost track of other planes in the formation. They did see, however, flashes, but not tracers, from the top turret and left waist guns of the stranger. It fired for several seconds with its guns pointed at our planes.

As the enemy B-17 came out of the cloud, it stopped firing and came up on the AAF plane about 600 yards below. The tail gunner could see no lettering of any kind on the tail fin. One faded star without a circle was seen on the left wing, and the entire plane was painted a faded brown. The tail gunner warned the ball turret man about the plane. The strange B-17 fired again from its top turret at the U. S. Fortress, and our ball turret gunner returned the fire, observing several strikes on the enemy. The strange B-17 went on underneath and disappeared in a haze. It inflicted no damage.

**GIRLS NEEDED.** The Reich Labor Service of Young Women has ordered a number of girls to serve in the intelligence offices of the German Air Force. They are needed for clerical duties because of the expansion and strengthening of the German home-based air forces. The girls serve only in German territory and do not go to the front lines.

**MINES.** Some ingenious methods of killing Allied soldiers with mines have been used by the German army in Italy.

A spherical anti-personnel mine made of concrete represents one of the more recent developments. It is about ten inches in diameter and is loaded with shrapnel. This mine can be planted with trip wires running out in several directions. By reducing the explosive charge in the mine, it can be used as a sort of grenade, the soldier rolling it down hill like a lethal bowling ball.

The Germans have been using many kinds of materials in their mines, some having bakelite igniters, others metal. Occasionally they are imbedded in tar. It is healthy practice to expect them anywhere and looking like anything.

Another booby trap is a smoke cannister which is tripped with the usual wire. It has no morale or casualty effect itself but in daylight hours it lets German gunners know that there is movement going on and they can start lobbing shells in the direction of the smoke.

**LIKE A WHAT?** An enemy notebook on tactics had this advice for Japanese soldiers: "When you attempt to attack, keep cool and surprise your enemy either from the flank or rear. At first proceed as you would approach a virgin, but in the end get away like a jack-rabbit."

**MAIL CALL.** Occasionally, the Japanese get a little cute in their bragging. In a recent broadcast, they told how they "shot down" 23 of our bombers over Rabaul. "We call the attacking enemy planes our mail," the announcer said. "We go up and shoot down at once eight machines, confusing the rest of the enemy flight. We patiently await the arrival of the second wave, which comes and loses another fifteen planes to us. Thus we account for forty percent of the attacking forces. This is how we deal regularly with our mail."

The broadcast was in German.

**HOW'S THAT AGAIN?** People who study languages often have trouble with Japanese because it is vague and variable, words that seem to mean one thing one time mean another the next time. There is *Hakko Ichiu,* for instance, which in most cases is defined as "Universal Brotherhood." The Japs use the expression a lot in their dispatches, and what they do with it is enough to make any linguist nervous.

In a broadcast beamed to the world at large, for instance, one fellow mentioned "the eternally noble ideal of Hakko

Ichiu—independence and sovereign status for each nation."

A few days after this talk, a Domei editorial for home consumption went on, ". . . in the future, under the august virtue of His Imperial Majesty, 'Hakko Ichiu' will be realized; that is, the corners of the universe will be protected under the one roof of the Imperial Household."

**EGON MAYER.** The death of a very hot pilot, Egon Mayer, was announced by Germany a few weeks ago. Mayer, who probably was shot down during one of our raids over Germany, was a lieutenant colonel and commander of the Richthofen Jagdgeschwader. Hitler had just awarded him the Oak Leaves with Swords.

On a propaganda broadcast before his death, he was put on the radio by the Germans and described as the only officer still in the Richthofen unit who was a member when it first went into action after it was reconstituted for this war.

At the time of his death he had claims of 102 combat victories, including 28 heavy bombers.

**TRICKS FROM BELOW.** Landmines against low-flying Allied aircraft have been used recently with some success by the Japs. Two P-51s, operating with ground forces, were damaged by violent mine explosions when they came in to strafe Jap positions. In another area, a mine placed near a couple of unserviceable barges almost got a reconnaissance plane which was flying at 500 feet. The pilot reported that the mine threw rocks and water as high as his plane was travelling.

**PAPER BOMB . . .** A grenade tossed occasionally from Japanese Dinahs at attacking planes is a rather odd device. It consists of a spherical container made of compressed paper with an open neck of compressed cardboard. Inside is a black, granular powder charge held in a silk bag, surrounded by HE pellets.

The black powder charge, fired by a pull igniter in the neck, bursts the container and scatters the HE pellets, at the same time igniting the short fuses on each. The pellets are made up of small metal cases containing high explosive charges. Since there is little metal in the grenade, danger from fragmentation is negligible. The pellets could cause fire or blast damage if they make contact with a plane.

**NEW PLANE.** A weird-looking plane, but apparently a good one, is being produced by German aircraft manufacturers these days. Our reconnaissance personnel in England have confirmed the reports of two Mosquito pilots who said they had seen and shot down a Heinkel glider tug which had five engines and two tails.

The aircraft is built almost entirely of standard Heinkel 111 parts and looks like two 111's jointed together in a Siamese-twin operation. It consists of two HE-111 fuselages, one port and one starboard wing, joined together by a specially designed center-section on which are mounted three engines along the leading edge making a total of five engines in line. The wing span is approximately 115 feet and the fuselage length 55 feet, with 36 feet distance between the fuselages.

The plane could be used as a troop carrier with accommodations for from thirty to forty fully equipped troops, as a glider tug or as a bomber. It is a smart production job inasmuch as the Germans can make this new bomber with parts and designs already in full production.

**NICE FLAVOR.** The Japanese on Bougainville, running out of normal fuel, are burning their gas masks to cook their meals. One rubberized face piece and hose is enough to warm up two mess-kits of rice. Consequently, they have few gas masks and the air around there is something you wouldn't believe.

**ALWAYS THE HARD WAY.** Capt. William M. Waldman, a P-38 pilot recently returned from the Pacific, has this to say about Jap tactics:

"It is hard to find a Zero that is in a normal attitude of flight. When Zeros are sighted in the distance, they are either doing acrobatics or diving or zooming. I have seen a Zero on the tail of a P-38 doing a series of slow rolls while firing at the 38. Someone got the Zero.

"The Jap fighter pilot will attack other fighters from any and every angle. I have seen them climb straight up, hanging on their props, firing at a P-38. Others dive straight down on us or come in from the side or rear. They do not like head-on passes, especially if you are firing at them. . . .

"Most Jap fighter pilots, attacked alone, will go through what seems to be a set series of evasive maneuvers they were probably taught in flying school. They don't seem to have the initiative to act for themselves when they are hard pressed.

". . . The Nips, when bombing us, would come over with twenty to thirty dive bombers or medium bombers, with an equal or even greater number of fighters and try their damndest to get to their target. Then, though we would shoot down sixty percent or even more, they would come back in the next day or so with the same number and the same thing would happen again."

**THURSDAY FOLLOWS WEDNESDAY.** Two items from a Japanese diary found some weeks ago:

December 8, 1943: Our battalion commander gladly informed us that in an engagement northeast of Guadalcanal our Navy has sunk four enemy warships, seven cruisers, seventeen aircraft carriers and countless transports. The American Pacific Fleet Commander also was killed. At present the death rate of Australians is so high that they cannot afford to send any reinforcements in the future.

December 9, 1943: Again troubled by beri-beri.

**TACTICS.** Here are some of the typical methods used by the Nazi fighter planes in their attempts to break up our bomber formations over German cities.

Echelons of twin-engine fighters, in a javelin-up formation, attack from above and the rear of our bombers. The entire echelon slides past B-17s and B-24s, laying down a barrage type of fire. As many as five echelons may attack in waves.

A feinting approach may be used with two formations. The lower group will feint an attack, slide around the formation to gain altitude, while the upper group *really* attacks. The Germans accomplish this maneuver rapidly, often with planes painted silver or sky-blue, making perception difficult.

In coordinated approaches, formations fly parallel to the B-17s and 24s, and, while out of range, one element makes two 180-degree turns and then attacks from four to five or seven to eight o'clock, while the other element makes one 180-degree turn and attacks frontally, both hitting our bombers at the same time.

Twin-engine fighters, in line abreast above and to the rear, break into three elements, one sliding left, one sliding right and one firing straight ahead. ☆

PICTURE CREDITS

FOURTH COVER: AIR FORCE Staff Photographer. 26: Lockheed Aircraft Corp. 44-45-46: British Information Services. 50-52: Signal Corps. 57: U. S. Marine Corps. 62-63: AFTAD. All other illustrations secured through Army Air Forces sources.

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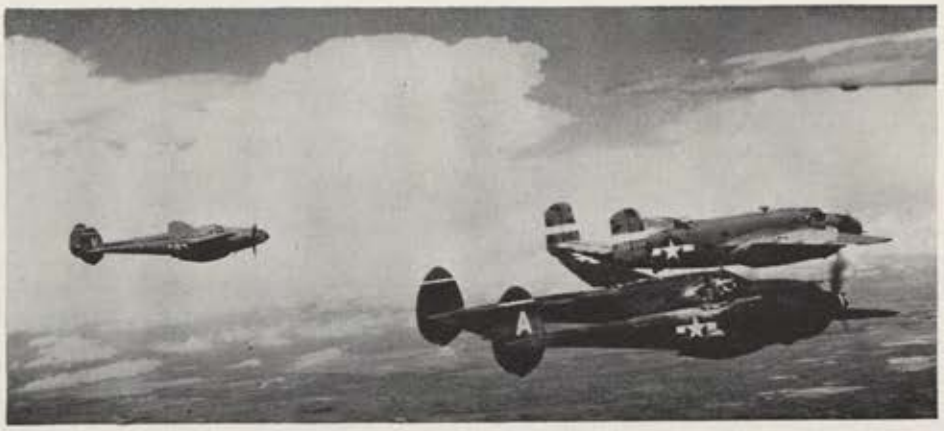
# AIR POWER IN THE SOUTHWEST PACIFIC

*(Continued from Page 10)*



Fighter cover is an important element in General Kenney's plan of attack. Here P-38s flank a B-25 on their way to join in the November 2 surprise attack on Rabaul when 114,000 tons of shipping were sunk or damaged and 81 Jap airplanes were destroyed in the air and on the ground.

Force had pulled the rear turret off the Liberator and stuck it in the nose. It was a fine idea. If we are not smart enough to figure something out first, we can still capitalize on someone else's good work and perhaps even improve a bit on it. At the time this modification was made the 7th Air Force was not as active as it is now and they set up a whole modification line for us in their great depot.

Before we stopped using the P-39s, we redesigned and rebuilt its wings in order to accommodate the new feed bags necessitated in our switching from .30 caliber guns to .50.

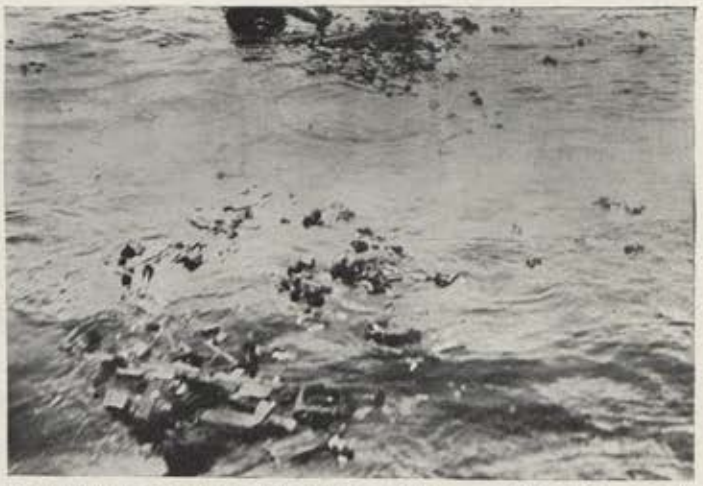
The P-47s presented a different problem. They did not have enough range for operations in this theatre where we go long distances to find the enemy and knock him out of the sky. The plane would serve its purpose admirably if we were defending our own airdromes. Fortunately we were not. We were carrying the fight to the Nip. That meant longer range for the plane, which in turn meant increased fuel capacity. Time was short. We had to shove the planes right in. The 5th Air Service Command was given only six weeks to fabricate belly tanks and an auxiliary feed system for a whole group of these planes. They ran into all manner of engineering problems but in the stated time they fabricated a perfect belly tank that increased the range of the P-47 two-thirds. They fitted every plane in the group with these handmade tanks and then turned the manufacture of additional ones over to Australian manufacturers just as they had done in the past. It was not long before we decided that we needed even more range in the P-47. We looked about for another place to put more gas. Our engineers did it, although the amount of juggling done with the CG (center of gravity) would turn the hair of the average aeronautical engineer grey and make him throw up his hands in horror.

The September 5 attack on the Nadzab strip marked the first extensive use of paratroops in the Pacific. Three hundred and two planes dropped 1,700 paratroops in seventy seconds behind a smokescreen laid by seven A-20s. C-47s are shown dropping men and supplies during the operations.

OUR only reply is that we would much rather not have to do any modifications. We have enough to do with planning and operations without adding engineering. But constantly changing conditions call for changes in tactics. Our modifications are to enable us to meet the changes in tactics. If the Nip moves his airfields out of range of our fighters, we either have to bomb him with unprotected bombers or increase the range of our fighters. Rather than lose our bombers we modify the fighters. That is why I encourage our personnel who have any ideas to go right ahead with them. It makes no difference what the man's rank or his previous experience. If he has an idea that sounds feasible he is told to go ahead and he is given every assistance in carrying it out. We have given ourselves lots of headaches, but we have also gotten some fine results, especially from the enlisted ground personnel.

One sergeant dropped me a note explaining that the gunners ran out of ammunition during a mission and were open to attack while reloading. He had an idea for a larger ammunition box and an improved feed. We built it and it is still being used. Another thought up a scheme that would permit a .50 caliber gun to fire at a rate of 1,500 rounds a minute. It sounded good to us. He was told to go ahead. Later we watched a

An A-20 puts the theory of masthead skip bombing in practice against a 3,000-ton Jap transport off the Muschu Islands, New Guinea. The



blast littered the ocean with debris and Japs, and the ship's register was found lodged in right engine of the A-20 as a result of the explosion.

demonstration. It worked. It burned out the gun barrel, but it worked. We didn't adopt his idea, but we learned a great deal from him, and from his work we got some other ideas that were most practical.

The next lesson we learned was how to help ground troops get the land on which we build airdromes and advance the bomber line, from which we help them go ahead to get some more land for more airdromes and keep the process going until we can lay some eggs in Tokyo.

The first step in this advancement of the bomber line is to gain and maintain air control as far into enemy territory as our longest range fighters can reach. Then we put an air blockade around the Jap positions or section of the coast which we want in order to stop him from getting supplies or reinforcements. The bombers then go to work and pulverize his defensive system, methodically taking out his artillery positions, stores, bivouac areas and so on. Finally comes the air cover escorting the amphibious expedition to the landing beach, a last-minute blasting and smoking of the enemy beach defenses and the maintenance of strafers and fighters overhead, on call from the surface forces until their beachhead is secured. If emergency supplies are needed we drop them by parachute.

The ground troops get a transport field ready as fast as possible so that we can supplement boat supply by cargo-carrying airplanes. When necessary, we evacuate the wounded and sick and bring reinforcements in a hurry. The transport field becomes a fighter field, the strafers and finally the heavies arrive and it is time to move forward again.

It is our ambition to put infantry ashore with rifles on their backs and to keep the rifles there as long as possible. Anything that will hinder our troops from landing is blasted until there is nothing left of it. To do that we throw everything we have at the objective. We use our heavy long range bombers as well as the short-legged airplanes at this time, even though the target may be less than 200 miles away. When we are after a piece of ground we will use everything that flies in order to get it.

On the day that the assault comes we forget about objectives that are at extreme range. We concentrate on the target. We act as direct air support. And there again, everything we have is thrown in to aid the ground forces. As soon as the objective is won, we put engineers in to build an airstrip for the fighters to convoy the bombers in their long range targets.

HOWEVER, all of our assaults are not carried out in this manner, nor are all of our airfields won this way. We have taken land and carved out airfields right in the heart of Jap-occupied territory, and we have done it solely with air power. Marilinan was taken and developed as an advanced fighter base all by air. The occupation of the Nadzab area, which sealed Lae, was another example. We shall do it again, using other means, for variations in our methods are continuous. The Nip, we have found, is a sucker for any type of attack for a short while. Then he figures it out and is ready for it. Before he can work it out we change. That is why we have not been able to settle down to any prescribed course of action or basic plan of attack, such as is found in most other theatres. Perhaps the major reason for that is that we have no industrial targets—yet.

There is constant planning for any full scale attack. It starts at least three months ahead of time. We work the plans over and over until we think we have it. Then we turn it over to the boys and let them poke holes in the plan of attack. After which we replan the operation, working it over and over until it jells. Then the rehearsals start.

We believe in rehearsal in this theatre. No major operation is carried out until it has had intensive rehearsal. In fact, every small strike is a rehearsal for something bigger. Our rehearsals have more than paid off. We have found that it is not enough that the flight leaders or the squadron commanders know what they have to do. It is not enough that every squadron and group knows the exact plan. It still can misfire. They must actually do it to make certain that the thousands of things which are generally classified under the one word "timing" come off exactly as they should. Therefore, all big operations are rehearsed in full scale. And they are not dry runs.

The battle of the Bismarck Sea was not something that just happened. We didn't just see the convoy coming and go out and hit it. It was planned and rehearsed. We prepared. We even picked the spot for the engagement. A location where all of our units could engage the Nips with the maximum efficiency. We calculated that 1000 would be the time he would be there and we would engage him. We miscalculated. It was 0955.

Three days before the battle we rehearsed at full scale. We selected a half-submerged wreck that was exactly the same distance, although in another direction from our bases than the forthcoming engagement would be. Our units took off from their various fields at the same time they would take off three days later. We rendezvoused over the exact spot and, flying with the identical gas and bomb load, we duplicated our flying problem in every possible manner even to the formation and compass headings into the attack.

The Lae operation of September 5, 1943, in which we dropped 1,700 men in one minute and ten seconds thirty miles west of Lae at Nadzab, forced the Nip to give up a base which he had been building for over seventeen months. It meant the abandonment of his major plan to control New Guinea. And it demonstrated that intensive preparation in every phase — bombing, strafing, combined operations, dispersed landings, infiltration and paratroops—pays big dividends.

That operation, too, was rehearsed in

full scale; a practice ground similar to Nadzab was selected. All the units designated for the real operation participated in the rehearsal. The strafers opened the attack with live ammunition and bombs. Smoke screens were laid down. And even some of the paratroopers jumped during this simulated attack. It was not necessary for all of them to bail out. They knew their job—as they subsequently proved. We only jumped enough to make certain our formations and positions were perfect.

Every possible contingency was accounted for, even to fitting up special supply bombers to drop to the paratroopers on the ground any type material they might want, from extra shoes to all types of ammunition. However, there was one thing we could not rehearse—the weather.

The weather men did a superb job of forecasting for the Nadzab operation. But we could afford to take no chances. The night before the attack we had five B-17s up, charting every thunderhead and bit of weather over the terrain we would fly over on our way to the target. This was vital information for in this theatre the thunderheads are so high that it is not possible to fly over them. Nor can they be flown through for the turbulence is great enough to tear the wings off a P-47. The next day, to make doubly certain, the weather men did more than brief the pilots. They were up in the lead planes like traffic cops showing the formations the way through the weather.

The rest of the Lae operation is history. Everything moved exactly as had been planned with the minimum of loss to us and the maximum to the enemy.

A variation in our manner of rehearsal was used before the attack against Cape Gloucester on December 26, 1943. This time we rehearsed against a secondary enemy target. Again we did it in full scale, using more force than was necessary for that particular target. It accomplished the dual purpose of blotting out the secondary target while getting our timing down perfectly. We had to have it perfect—we were rendezvousing at night.

THIS show out here keeps me busy. I have to be constantly roaming all over the theatre as I am concerned with the planning of the Allied Air Force which at the moment consists of the American 5th Air Force, the RAAF, augmented by NEIAF (the Netherlands East Indies Air Force) units under the command of RAAF Air Vice Marshal W. Bostock. My deputy commander, Maj. Gen. Ennis C. Whitehead runs ADVON (the Advanced Echelon) and puts the plans laid down against the Jap into operation.

This theatre at the moment, insofar as air is concerned, is divided into two sections under my command. The New Guinea sector is under General Whitehead and consists principally of the 5th Air Force augmented by Australian groups.

In the northwestern area, the RAAF air commander is my deputy. The majority of his planes and personnel are Australian with some 5th Air Force and Dutch units. Whereas this sector is quiet in comparison to New Guinea, it is of vital importance. The reconnaissance work is done not only for the defense of Australia but also for the future operations against the rich islands lying in that direction. This is witnessed by the bombing missions—probably the longest in the world—which our heavies are conducting against the Netherlands East Indies.

Up to April, 1943, we were operating on a fairly thin shoestring. About that time, however, production at home got going fast enough to give us some real help. It came just in time. Around the arc from Soerabaja, Java, to Rabaul the Nip had three times as many airplanes as we had. Why he didn't take us out I don't know. I remember telling General MacArthur that if the Jap didn't ruin me by that August, I would have enough strength to take air control away from him for keeps. But that if he were smart enough he would certainly keep us busy trying to survive.

During April, 1943, the Nip put on three raids of 75 to 100 planes each in four days. But he put them over three widely separated targets and didn't press them home. We lost half a dozen planes and a couple of boats. It cost the Jap over 100 fighters and bombers. He has never appeared again over Moresby in the daytime.

It is now too late and it is too late from now on, for since August 17, 1943, when we destroyed the Jap air power at Wewak, the tempo in this theatre has been stepping up. The capture of Lae and Salamaua in September was quickly followed by the seizure of the Markham-Ramu Valley as far as Dumpu and the capture of Finschhafen, Arawe, Gloucester and Saidor.

As the ground forces moved forward, so did our bombing line. Our air blockade broke the Nip at Rabaul on November 2, 1943, when in twelve minutes we hit 41 vessels in the harbor for a total of 114,000 tons of shipping, destroyed 68 airplanes in air combat and 13 more on the ground and set fire to the town itself, with its huge stores of supplies that the Jap had taken months to accumulate. In February of this year in three days we sank 25 ships which were trying to run supplies and troops into Kavieng and Rabaul. Toward the end of March, our bombs sent to the bottom every one of a seven-vessel convoy which was trying to run supplies and troops into Wewak.

The Nip is not eating so well these days along the north coast of New Guinea. We've got him down. We shall keep him down. Every time he lifts his head we will knock it down again. This is our air wherever we fly. And we are going to keep it that way. ☆

General Kenney is shown in conference with members of his staff. Seated with General Kenney is Brig. Gen. Donald Wilson, chief of staff. Standing (left to right) are Lieut. Col. R. T. Nichols, Jr., A-1; Lieut. Col. W. T. Hudnell, Jr., A-4; Col. R. E. Beebe, Jr., A-3; Col. B. B. Cain, A-2.


**A Report on Army Air Forces Training Devices**

### *Recognition Baseball*

The RCAF has devised a Recognition Baseball Game with no additional equipment or arrangements required.

Any number of "players" are divided into two teams and "batting orders" arranged. Each player calls for a single, two-base hit, triple or home run, and he is given a one-view test ranging in difficulty according to the hit he is attempting. Slides, models, photographs, shadowgraphs, flash cards or any other media may be used. Error in identification means a strike-out.

As in baseball, a hit will advance a man on base, a home run will bring in all men on base, and three strike-outs retire the side for that inning.

### *Shadowgraph*

Perforated name tags insure that students will associate the name with the aircraft in recognition Shadowgraph presentation. Regular name tags, each with an aircraft name punched out by a machine used for making stencils, can be hung from hooks inserted along the top of the Shadowgraph frame. Light shining through the perforated column makes the name of the aircraft visible immediately next to the silhouette appearing on the Shadowgraph screen. Names of the two aircraft being contrasted can be hung side by side by the respective slides.

### *Review Boards*

Recognition Review Boards of simple local construction fill a definite need in after-class activity. Cut a plywood board three by two feet and attach a coat hanger hook at top. One side is mounted with every available interesting picture of particular aircraft; the other side displays the three conventional silhouette views.

Following the lecture on a new aircraft type, the instructor hangs the appropriate review board in back of the classroom where it remains until replaced the following session. The flat, uniform construction and coat hanger feature makes for economical storage along a rod.

Chief advantages of the review boards are: display at a time when interest in the particular plane is at its height, permanent maintenance of good pictures safe from loss or damage through excessive handling, and instant availability of all views for review purposes.

### *Power and Octane Booklets*

Copies of the booklet "Power and Octane" have been distributed to training commands and air forces for use in connection with Training Film AF-179 "Power and Octane."

Initial distribution of film was completed 1 March 1944. Additional film prints are available on requisition to AFTAD.

### *E-14 Trainer Clarification*

In the interests of a standard nomenclature for training devices, attention of Training Aids officers is invited to the fact that the flexible gunnery trainer, type E-14, should not be confused with the Jam Handy (3-A-2) trainer. A 70 mm sight is to be used on the E-14 trainer. Replacement of the 70 mm sight by the 101 mm sight applies only to fixed gunnery devices.

### *Obsolete Film Disposal*

Directions for the disposal of obsolete training films, film bulletins and film strips are amended as follows at the request of Air Service Command:

"All film, film bulletins and film strips to be disposed of as obsolete subjects will be burned locally and the necessary certifications accomplished and forwarded to the Air Service Command Control Library, 1 Park Avenue, New York City. Reels and cans will be removed prior to burning the film, and will be shipped to the Depot Supply Officer, 802nd AAF Specialized Depot, Camden, N. J."

### *New Bombardier Trainer*

THE A-6 McKaba Bombing Trainer provides for simulated bombing missions with a wide variety of targets. The bombardier's position in this trainer is in a bomber-nose containing all rack controls, switches and instruments found in

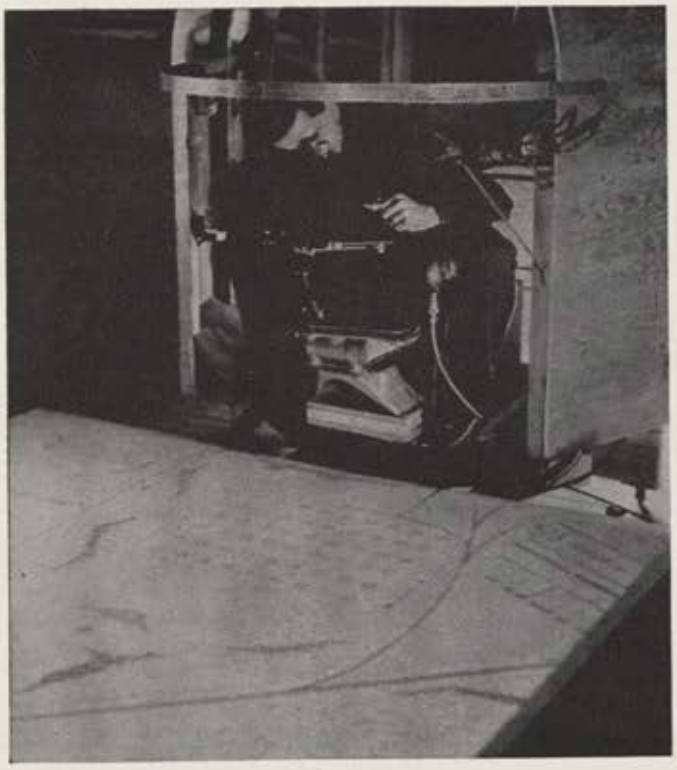
### AIR POSTER SERIES . . . *"Fighter Tips"*

Flying a fighter plane, even in friendly skies, calls for flawless health, perfect coordination and top skill. Switch the scene to enemy territory and you have a job that contains no margin for error.

The Air Poster series "Fighter Tips," with its 26 situations, demonstrates the more important DO's and DON'T's in a style that's not easily forgotten. The idea is to impress them upon the mind of the pilot in a way that will make the experiences of men who have had combat time an automatic part of his mental "ticking" when the "pinch" comes —when he's got to make the right move without taking time out for study.

In "Fighter Tips," the negative and positive situations are pictorialized, mistakes high-lighted, consequences indicated. Every DO and every DON'T is hammered home, before it occurs. The pilot must learn to recognize the danger potential before the danger itself develops. He must be able to say, on the outer rim of a perilous situation, "I've been in that spot before and THIS is what I do about it," automatically making the single, proper, physical response.

This air poster series is available in color in the standard AFTAD Binder, size 22 by 32 inches.



the type airplane simulated.

This trainer is stationary but pivoted so that course corrections from the bombsight directional gyro may be followed. A moving terrain area is projected onto a screen below the bomber and the direction of travel of this terrain image is coordinated with the position of the bomber.

The projection system is placed below the screen and the image is transmitted through a small aperture in the screen to a ceiling mirror which reflects it on the screen. This position for the projector is advantageous since it permits a simple linkage to the bomber nose and also removes the projector as a source of interest and distraction. The use of ceiling mirror doubles the projection distance permitting the use of a simple lens system to obtain the desired image size. The unit may be used in rooms of ordinary ceiling height.

The drift mechanism is so designed that the instructor may preset a drift-angle into the trainer and on the completion of an accurate bombing run this drift angle will be shown on the bombsight drift scale. This permits the instructor to set up any desired wind vector on an E6B computer and to set this problem into the trainer.

Training Aids Division has a project under way to obtain terrain projections simulating as closely as possible combat areas being bombed at the present time. A total of 24 projection plates will be furnished with each trainer.

The shipping dates for this device are as follows: June 1, 15; July, 40; August, 80; September, 100; October, 100; November, 10. This order is to be distributed only within the Training Command.

### ▸ *Useful References for Instructors*

*AFFS-1088:* Teaching With Slide Films—A film strip explaining the instructional importance of the film strip in Army training; explains and illustrates basic steps in successful teaching with film strips.

*AFFS-1089:* Vivid Visualization—Mechanics of Slide Film Projection—A film strip explaining correct procedures for preparing room and equipment for projection of film strips; gives hints for the operator and instructor and describes the operation and maintenance of the SVE Tri-purpose film strip projector (Air Corps Model C-2).

*FS 7-75:* Visual Aids to Training—A film strip illustrating problems which can be solved and simplified by blackboards, charts, models, sand tables, motion pictures, film strips, opaque projection, etc.

*FM 21-5:* Military Training—Field manual outlining basic steps in instruction of military units.

*TM 21-250:* Army Instruction—Technical manual outlining detailed procedures for instructors.

*TM 1-1000:* Vocational Teaching—Technical manual giving helpful advice to instructors.

*TM 11-401:* Training Film and Film Strip Projection—Technical manual for projectionists, describing care and operation of motion picture and film strip projectors.

*FB-73:* Use of Training Films—A short motion picture illustrating some of the basic techniques which the instructor should follow in order to make the most effective use of training films.

*How to Use Film Strips*—An illustrated booklet describing procedures for using film strips in the training program. ☆

**WHERE TO GO**

Information on the availability of training films and film strips, aircraft recognition materials, training devices and training publications may be obtained from the Chief, Training Aids Division, Army Air Forces, 1 Park Avenue, New York 16, N. Y., upon request through channels. AAF Regulation No. 50-19 explains fully the functions of the Training Aids Division.

# Roll of Honor

A MONTHLY RECORD OF DECORATIONS AWARDED TO PERSONNEL OF THE ARMY AIR FORCES

(Continued from Page 48)

Robison, Robert A., Lt.
Rochez, Louis A., III, Lt.
Rodenberg, Elmer R., Lt.
Roddy, Vincent J., Lt.
Rodgen, Eugene L., Lt.
Rogers, Arthur L., T/Sgt.
Romano, Albert A., Lt.
Roodman, Harold, Lt.
Rose, Joseph G., T/Sgt.
Rosenthal, David L., T/Sgt. (& OLC)
Ross, George L., Lt.
Ross, Norman A., Lt.
Ross, Willys Wayne, Sgt.
Rothkrug, Edward, Lt. (& OLC)
Rotundo, Joseph T., Lt.
Ruark, Charles R., S/Sgt.
Rueter, Chris H. W., Maj.
Runyan, Alfred J., S/Sgt.
Runyon, Theodore H., Capt.
Rurak, Philip A., S/Sgt.
Rusie, Robert K., T/Sgt.
Russell, Cal., T/Sgt.
Russell, David A., S/Sgt.
Russell, John F., S/Sgt.
Russell, Raymond J., S/Sgt. (& OLC)
Rutledge, William H., Lt.
Ryan, George, Jr., Sgt.
Ryan, Lyme T., Lt. (& OLC)
Ryden, Donald A., Lt.
Ryerson, Gordon L., Lt.
Sachs, Morton L., Lt.
Salisbury, Richard G., S/Sgt.
Salm, Ernst, Lt.
Salmon, Walter J., Jr., S/Sgt.
Saltzman, Donald H., Sgt.
Salyer, Charles A., F/O
Samoski, Stanley J., Lt. (& OLC)
Sampeck, Adrian J., Lt.
Samson, Jack, Sgt. (& OLC)
Sand, Edward A., S/Sgt.
Sanders, Richard L., Sgt.
Sane, David E., Cpl.
Sanford, William L., Capt.
Sargeant, Everett E., Jr., Lt.
Sargent, Ignatius, Capt.
Sartin, Luin W., S/Sgt.
Satterfield, Channing N., S/Sgt.
Satterlund, Carl S., F/O
Sauer, Robert R., Lt. (& OLC)
Savage, Harry R., Lt.
Savaria, Jerome D., Lt.
Savoini, Charles S., S/Sgt.
Scarborough, Theodore F., Lt.
Schaufele, Howard A., Lt. (& OLC)
Schauland, Martin F., Lt.
Scherr, Jerome A., T/Sgt.
Schierholz, Charles C., T/Sgt.
Schiwetz, Max H., Lt.
Schlenker, Leroy F., Lt.
Schoenfeldt, Verl B., Lt.
Schoer, Walter B., S/Sgt.
Scholl, Lawrence L., T/Sgt. (& OLC)
Scott, George W., S/Sgt.
Scott, Harold W., S/Sgt. (& OLC)
Scott, Henry W., Lt.
Scott, Leslie E., T/Sgt. (& OLC)
Scott, William, Lt. (& OLC)
Scriven, Dale R., Lt.
Scrivner, Thomas E., Lt. (& OLC)
Seamon, Walter E., Jr., Lt. (& OLC)
Sears, Frank L., Jr., T/Sgt.
Sears, Meldrum L., Lt. (& OLC)
Secor, Leonard M., Cpl.
Sedlack, James J., T/Sgt.
Seibert, Gordon D., Lt.
Seldon, Franklin F., T/Sgt.
Semple, David, M/Sgt.
Sgroi, Anthony, Lt.
Shahan, Elza E., Lt.
Shanley, Edward M., T/Sgt.
Shannon, Robert H., Lt.
Shattles, David C., S/Sgt.
Shaw, Charles M., Lt.
Shaw, Edgar L., Jr., T/Sgt.
Shaw, John H., Capt.
Sheggrud, Earl, Capt.
Shelton, Jack A., T/Sgt.
Shepherd, Lloyd E., S/Sgt.
*Sherburne, Darol M., S/Sgt.
Sheridan, William P., S/Sgt. (& OLC)
Sherman, John H., S/Sgt. (& OLC)
Shipman, Mark K., Lt. (& 2 OLC)
Shirley, Edwin C., S/Sgt.
Shouse, Allen V., Lt.
Shreve, Leo E., Cpl.
Shriver, Philip K., Lt.
Shuler, Quentine E., Lt.
Shuler, Thomas H., Lt.
Shultz, Harry, T/Sgt. (& OLC)
Siegal, Gilbert, Lt.
Sigle, Michael P., S/Sgt. (& OLC)
Silverman, Joel M., Lt.
Simmons, Charles U., S/Sgt.
Simmons, Mabry, Capt.
Singleton, John W., Lt. (& OLC)
Skowronski, Eugene E., S/Sgt.
Skradski, Joseph F., S/Sgt.
Skrovig, Sylvannus O., S/Sgt.
Slattery, Dennis E., T/Sgt.
Sliman, Aldo J., Sgt.
Slodki, Casimir J., S/Sgt.
Sloulin, Wesley C., Lt.
Smith, Charles E., F/O
Smith, Delmar E., T/Sgt. (& OLC)
Smith, Francis H., Capt.
Smith, Harlan R., Lt.
Smith, Kenneth B., Sgt.
Smith, Louis, S/Sgt.
Smith, Richard B., Lt.
Smith, Robert D., Lt.
Smith, Thomas W., S/Sgt.
Smith, Walter D., T/Sgt.
Smith, Walter W., S/Sgt.
Snetting, Leverne H., Lt.
Snider, Harold E., Lt.
Snitkin, Emanuel, Lt.
Snodgrass, Duane F., T/Sgt.
Snow, Lorenzo H., S/Sgt.
Solberg, Frederic, S/Sgt.
Soloff, Israel, Lt.
Solomon, Herbert, Lt.
Sorensen, Wallace A., Lt. (& 2 OLC)
Soukop, Reynold A., Capt.
Souza, Joseph L., Lt. (& OLC)
Sowers, Wayne A., T/Sgt.
Sparger, Henry M., Lt.
Sparks, Gerald A., S/Sgt.
Sparks, Robert O., S/Sgt.
Spaulding, Perley W., S/Sgt.
Spears, Milford L., S/Sgt.
Speer, Robert E., Maj.
Speiser, Martin A., Lt.
Spellman, John F., Jt., Sgt.
Spindler, Frank L., S/Sgt.
Sponable, Edson J., Jr., Capt.
Spurrier, Chester E., Lt.
Stachow, Benny S., S/Sgt.
Stahl, Albert W., Lt.
Stampolis, Nicholas, Lt.
Stanley, Sylvester, Jr., S/Sgt. (& OLC)
Stansbury, Jay W., Lt.
Stepg, James R., Lt.
Stein, William F., Lt.
Steinbinder, John J., Lt.
Steiner, Harold R., T/Sgt. (& OLC)
Steller, Rudolph, T/Sgt.
Stemen, Roger F., Lt.
Stenborn, Harry W., Lt.
Stephens, Robert C., Lt.
Schottelkerb, William P., Lt. (& OLC)
Schrampf, William M., Lt. (& OLC)
Schuerman, Donald S., Lt.
Schwaller, Joseph F., S/Sgt.
Schweigert, Delmer M., S/Sgt.
Scollin, Victor E., S/Sgt.
Sternfels, Robert W., Lt.
Stewart, George A., Lt.
Stewart, Roderick M., Jr., Lt.
Stewart, William S., Lt.
Stiles, Ralph J., M/Sgt.
Stinson, Walter Dale, Sgt.
Stoddard, Robert T., S/Sgt.
Stoddart, Percy, Jr., Maj.
Storms, Leon M., Lt.
Story, Daniel A., Lt.
Storz, Robert H., Lt. (& OLC)
Strand, Bernard C., T/Sgt.
Strandberg, Clarence W., T/Sgt.
Strasemeier, William R., S/Sgt.
Stratton, Hubert M., T/Sgt.
Strickbine, Edward, Lt.
Stricker, Thomas A., Lt.
Stubbs, James Woodrow, Lt.
Sullivan, Francis A., T/Sgt.
Sullivan, Gerard E., S/Sgt.
Sullivan, John A., Lt.
Sullivan, Joseph P., Lt.
Sullivan, Michael L., Sgt.
Surles, Donald C., Capt.
Sweedar, George, Sgt. (& OLC)
Sweet, Adolphus J., Lt.
Sweet, Robert G., S/Sgt.
Swmenlw, John N., T/Sgt.
Sylvester, Robert B., Lt.
Tabacoff, Harold, Lt.
Tabb, Clarence E., Jr., Lt.
Tainsh, Alexander S., Capt.
Tamueirez, Joseph E., S/Sgt.
Tarter, Jerome, Capt.
Tate, Faustyn W., S/Sgt.
Tate, Joseph S., Jr., Maj. (& OLC)
Tate, Moses F., S/Sgt.
Taylor, Carl E., Capt.
Taylor, James G., Lt. (& OLC)
Taylor, Vance, S/Sgt.
Taylor, Walter E., T/Sgt.
Tegnazian, Albert, Lt.
Teltser, Milton, Lt. (& OLC)
Temple, George W., Lt.
Terry, Derwin D., S/Sgt.
Terry, Edmond T., T/Sgt.
Terry, Hal J., S/Sgt.
Terry, Harvey, N., Jr., T/Sgt.
Terwey, Alphonse J., S/Sgt. (& OLC)
Thacker, Robert E., Capt.
Thomas, Coy H., T/Sgt.
Thomas, John B., Lt.
Thompson, Augustus B., T/Sgt.
Thompson, Douglas W., F/O
Thompson, Jack P., Capt.
Thompson, Lesley E., T/Sgt.
Thompson, William E., S/Sgt.
Thrasher, Carl M., M/Sgt.
Thunell, Fred J., S/Sgt.
Tibbets, Paul W., Jr., Lt. Col.
Timberlake, Edward J., Col. (& OLC)
Timmer, Robert, Lt.
Timpo, Peter A., Lt.
Tipton, Roger J., T/Sgt.
Titkemeyer, Charles W., Lt.
Todd, Robert E., Lt.
Toles, William, Lt.
Tortora, Bernardino O., T/Sgt.
Totten, Gerald J., Lt.
Town, Harold F., T/Sgt.
Townsend, Franklyn, Sgt.
Travis, Euel A., Lt.
Travis, Leo G., Lt.
Treace, Harvey L., S/Sgt.
Treadway, Lloyd L., S/Sgt.
Triantafellu, Rockley, Lt.
Trouve, Louis V., Lt.
Troxell, Clifton H., Lt.
Tucholski, John P., T/Sgt.
Tucker, Loyd E., T/Sgt.
Turgeon, Alfred F., T/Sgt. (& OLC)
Turner, Edwin L., T/Sgt. (& OLC)
Turner, James E., S/Sgt. (& OLC)
Turner, Kenneth L., S/Sgt.
Tushla, Harold R., Lt.
Tylka, Adolph A., S/Sgt.
Underwood, James C., Sgt.
Unger, Glenn R., S/Sgt.
Utley, James A., S/Sgt.
Utter, Blaine B., T/Sgt.
Van Every, Edward, S/Sgt.
Vangilder, Taylor H., T/Sgt.
Van Kleeck, Arthur B., Sgt. (& OLC)
*Vann, William M., Jr., Sgt.
Van Son, George, S/Sgt.
Varner, Lee A., S/Sgt.
Vaughn, Lawrence M., T/Sgt.
Verberg, Merlin H., Lt.
Vickary, Eugene P., Lt.
Victor, Jerome S., Lt. (& OLC)
Viers, John W., Lt.
Vinson, Arnold E., Capt. (& OLC)
Wade, Horace M., Lt. Col.
Wagner, Earl L., Sgt.
Wagner, John C., Capt.
Waldman, William M., Lt.
Walker, Albert J., F/O
Wall, James T., Jr., Lt.
Wallen, Phil J., Lt.
Wallen, Wade C., Jr., Capt. & OLC)
Walls, Daniel H., Lt.
Walsh, Martin R., Jr., Capt.
Walters, Wiley C., S/Sgt.
Walthers, George A., Lt.
Waples, Pershing W., S/Sgt.
Ward, Arthur D., T/Sgt. (& OLC)
Warner, Raymond P., Lt.
Warren, Charles K., Lt. (& OLC)
Wateski, Joseph C., Sgt.
Watkins, Alton O., Capt.
Watson, William H., Lt.
Waugh, Arthur T., T/Sgt.
Weber, Mark B., T/Sgt.
Weekly, Pharis F., Lt.
Weer, Harold F., T/Sgt. (& OLC)
Weljanes, Oeva O., Lt.
Weil, Burton L., Lt.
Weinberg, Charles W., Lt.
Weinfurther, Regis D., Sgt.
Welch, James W., Jr., Lt.
Welch, Darrell G., Capt.
Wells, Harold G., Jr., Capt.
Wertz, Wayne E., S/Sgt.
West, Ernest E., S/Sgt.
Westcott, Earl C., S/Sgt.
*Westcott, Elvin P., S/Sgt.
Weston, John T., S/Sgt. (& OLC)
White, Arthur W., T/Sgt.
White, L. H., T/Sgt.
Whitener, Cecil J., Lt.
Whitesides, William W., S/Sgt.
Whitker, Frederic E., Lt.
Whitman, Edward N., S/Sgt.
Wierciszewski, Raymond C., M/Sgt.
Wiese, Edward B., S/Sgt.
Wight, Lee D., Lt.
Wilhite, Roy J., M/Sgt.
Wilkinson, Richard L., Lt.
William, Leo, Sgt. (& OLC)
Williams, Edd P., Sgt.
Williams, Lee M., Lt.
Williams, Llewelyn, Jr., Sgt.
Williams, Richard H., T/Sgt.
Wiliamson, Richard C., Lt.
Wilmarth, Clarence M., Lt.
Wilmes, Albert H., T/Sgt.
Wilson, Floyd D., S/Sgt.
Wilson, Herbert F., Sgt.
Wilson, Robert F., Lt.
Wilson, Stanley, T/Sgt.
Winchester, John K., Lt. (& OLC)
Wisniewski, James, Sgt.
Witt, Thomas E., Lt.
Wolff, Joseph E., Lt.
Wood, Richard A., Lt.
Wood, William O., S/Sgt.
Woodring, Dugan V., Lt.
Woodruff, Jasper W., Capt. (& OLC)
Woodward, James O., S/Sgt.
Work, Byron R., Lt. (& OLC)
Working, William H., Lt.
Workman, Matthew, Sgt. (& OLC)
Wright, Donald G., S/Sgt.
Wright, Gottrell H., T/Sgt.
Wright, Lonnie D., Cpl.
Wright, Wilbur J., Sgt.
Wright, William M., Lt. ☆

## Mistakes in 'On the Line' Picture on Page 55

**1.** The airplane is wet, dripping wet. Errors will be introduced if it is covered with moisture in any form. Cleanliness of aeronautical equipment as directed in TO 01-1-1 is imperative in weighing.

**2.** You're weighing the airplane outdoors, men. "The airplane must be weighed in a closed hangar," says AN 01-1-40.

**3.** The miscellaneous equipment left carelessly about will affect the weight of the airplane. The towing bar should not remain attached, for example, and for all we can tell, the mechanic at the nosewheel is going to put his foot into the weight. Correct loading depends on accurate determination of MAC and center of gravity limits.

**4.** Looks as if the mech directly beneath the cockpit is entering figures on the airplane weighing form. Wrong! This is done *after* weight is computed and is entered by the weight and balance officer.

**5.** The man in the cockpit chose a convenient spot for his boner. The level should be used inside the airplane in conjunction with regular leveling lugs. And it's obvious that this soldier's poundage is superfluous to the true basic airplane weight.

**6.** The reference datum line is going to be haywire. The mech at the nosewheel should hold his steel tape to the center of the wheel disc, and the man under the fuselage should hold it at the same level from the ground.

**7.** Someone is going to have an unexpected fall by tripping over that handle lying on the ground in front of the man reading the scales. Men, safety in maintenance *must* be observed.

## Answers to Quiz on Page 40

1. (d) On a weather map
2. (a) 27 feet per second
3. (c) Bay of Bengal
4. (b) 9,750
5. (d) Brigadier General
6. (b) England
7. (d) 1,500
8. (d) Dauntless
9. (c) Twin-engine bomber
10. (a) True (AR 600-45 C-1 9 Mar. 44)
11. (a) 3,280 feet
12. (b) C-54. The C-54 is a four-engine aircraft; the other three transports are twin-engine planes.
13. (b) April 18, 1942. August 7, 1942 was the date of the first landings on Guadalcanal; June 7, 1942 marked the first Jap attack on Kiska, and on February 15, 1942, our forces on Corregidor surrendered to the enemy.
14. (b) On the Malay Peninsula
15. (b) One of the stars in the Dipper
16. (d) 2,600
17. (b) Meridian, Miss.
18. (d) Four-engine bomber
19. (c) Air Chief Marshal Sir Arthur Tedder
20. Phosphorus bomb.



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## SQUEEZE PLAY IN THE FAR EAST

Jap-controlled locomotive shops at Vinh in French-Indo China are blasted by B-24s of the 14th Air Force in an attack which caused extensive damage in this important target area. Workers' quarters, shown in the background, were untouched by the falling bombs. Targets in Indo-China, Formosa, Thailand and Burma have been added to Maj. Gen. Claire L. Chennault's original China coverage. This ever-increasing sweep has enabled the 14th to put the squeeze on Jap shipping, as well as rail communications and airdrome operations. The big dent made in Japanese shipping tonnage by bombers of the 14th has had telling effect on the enemy's defense against steady Allied advances among the islands of the Pacific.

# Proper VOICE PROCEDURE is vital to the mission!

**Complete knowledge and correct use of your communications equipment will help achieve maximum operational results.**

- ✓ **KNOW YOUR EQUIPMENT**
- ✓ **REMEMBER YOUR PRE-FLIGHT CHECK**
- ✓ **BE SURE YOUR EQUIPMENT IS ALWAYS PROPERLY ADJUSTED**
- ✓ **SPEAK SLOWLY—ENUNCIATE CLEARLY**
- ✓ **KNOW AND USE CORRECT CALL PROCEDURES AT ALL TIMES**

Read FM 24-9 for detailed information