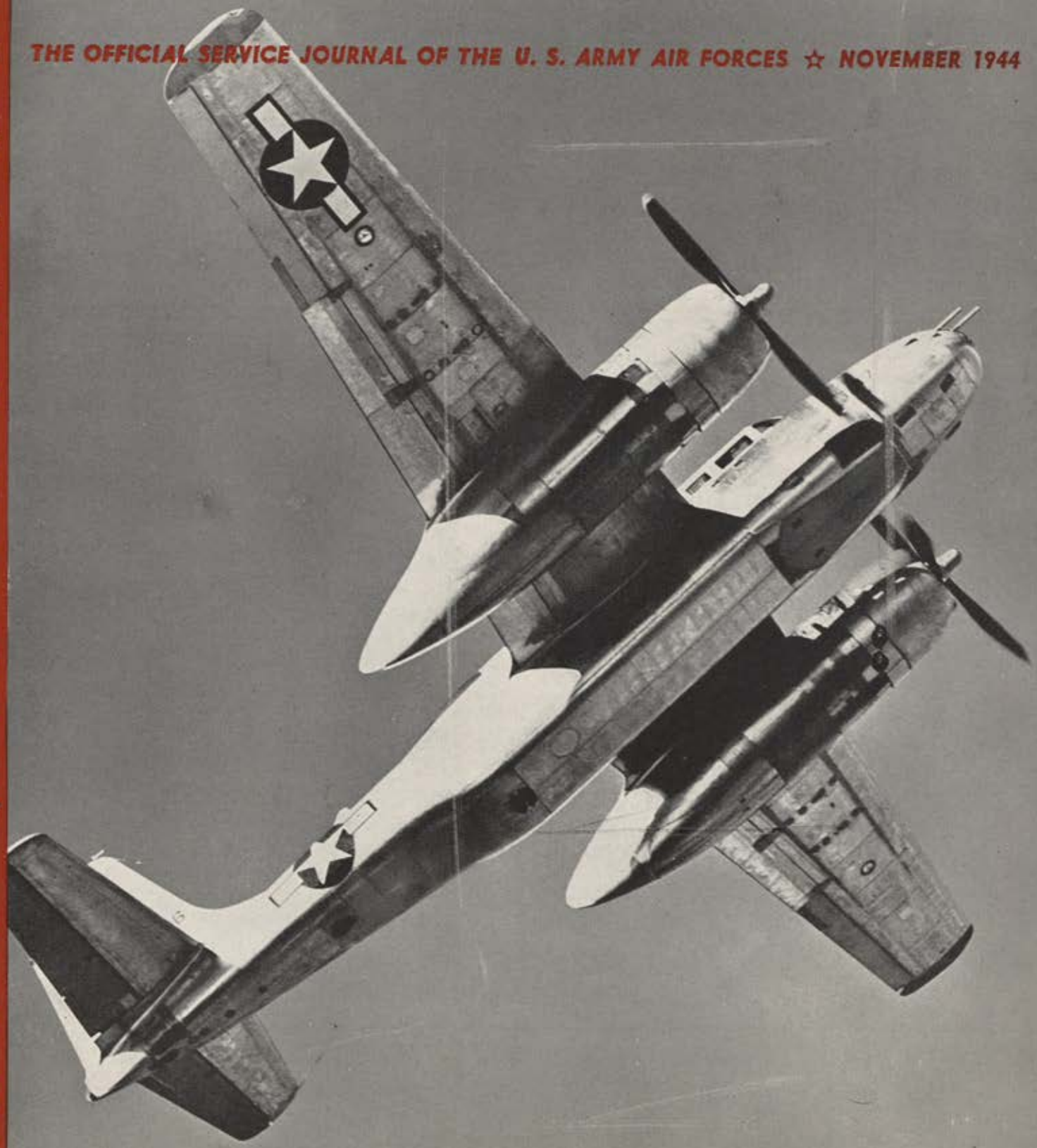
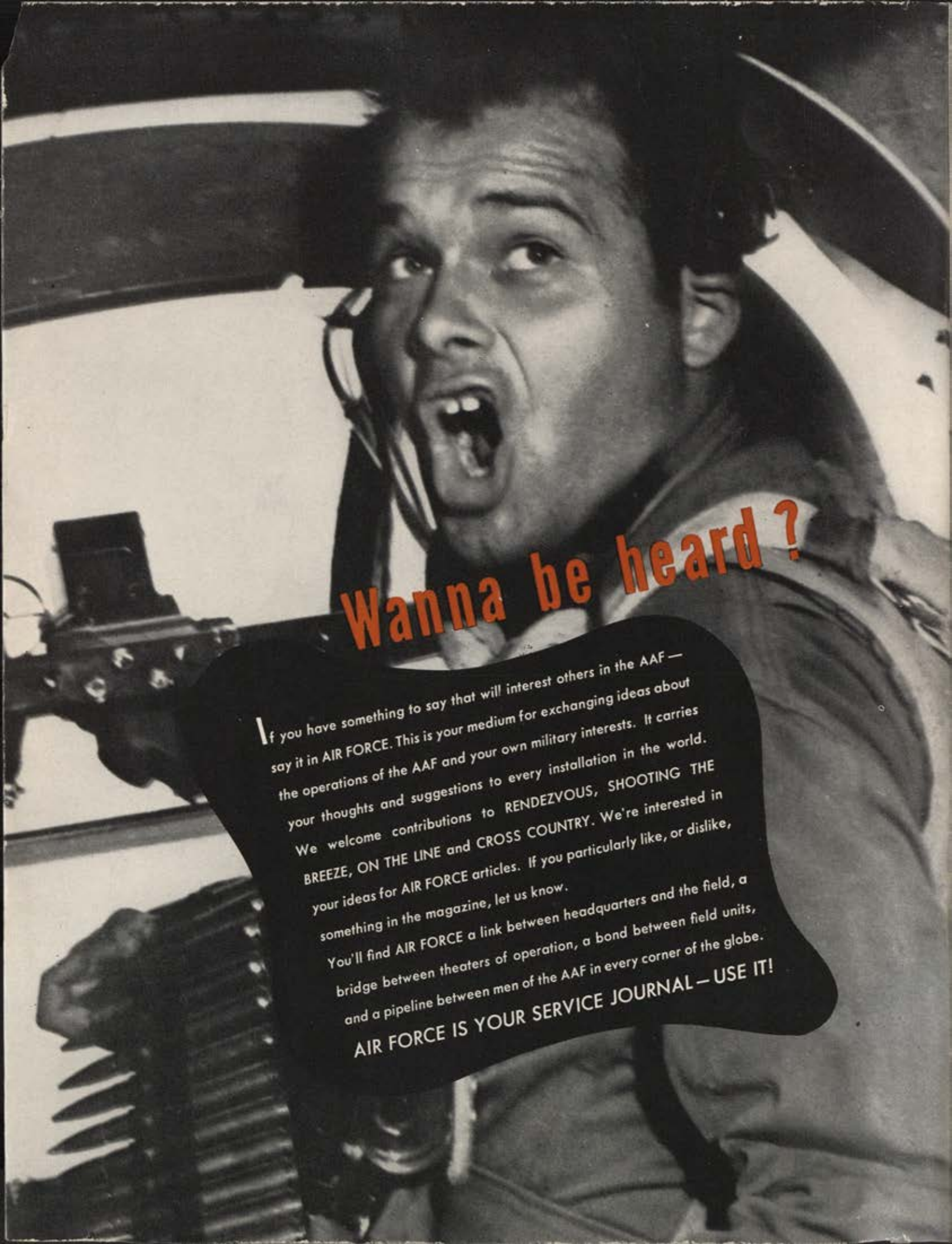
AIR FORCE

THE OFFICIAL SERVICE JOURNAL OF THE U. S. ARMY AIR FORCES ☆ NOVEMBER 1944



THE NEW A-26 — PAGE 39


Wanna be heard?
If you have something to say that will interest others in the AAF — say it in AIR FORCE. This is your medium for exchanging ideas about the operations of the AAF and your own military interests. It carries your thoughts and suggestions to every installation in the world. We welcome contributions to RENDEZVOUS, SHOOTING THE BREEZE, ON THE LINE and CROSS COUNTRY. We're interested in your ideas for AIR FORCE articles. If you particularly like, or dislike, something in the magazine, let us know.
You'll find AIR FORCE a link between headquarters and the field, a bridge between theaters of operation, a bond between field units, and a pipeline between men of the AAF in every corner of the globe.
AIR FORCE IS YOUR SERVICE JOURNAL — USE IT!

Rendezvous

For the Record

Dear Editor:

. . . I read in the September issue of AIR FORCE where one of the glorified B-17s flew the total of 29 consecutive missions without turning back. Good—but there are records better, far better than that. I flew B-26s through Sicily, Italy and France. My airplane the "Sweet Sue's Duke of Paducah (Ky.)" flew 53 missions without turning back. Later, after I left the group, she cracked up on her 97th mission—far more missions than any B-26 ever went on. . . .

Lt. J. M. Z., Orlando, Fla.

. . . In your last (October) issue . . . was the expressed probability that the B-17 "Bachelor's Delight" had set an AAF record by flying 124 combat missions. General Kenney has had under his command several 17s and 25s with 150 and 200 combat missions. I know specifically of a B-17 "Guinea Pig" with 212 missions and a B-25 "Dirty Dora" that was still flying when I left and had over 180 missions.

Speaking of records, I would like to put in a bid for one of my squadrons. . . . This organization picked up 15 B-25s on the East Coast, flew them across the States, across the Pacific to Australia, trained for a couple of weeks in Australia, flew them in New Guinea and flew approximately three months with an average of 25 missions per airplane with the same original airplanes. This calls for a large amount of maintenance, pilot proficiency and luck and the men concerned deserve a lot of credit. . . .

Col. C. U. True, Commanding, Turner Field, Ga.

Nice going. Can anyone top these? —*Ed.*

MISS WELCH

Disastrous Weakness

Dear Editor:

. . . If it is humanly possible, I would like some information about your lovely miss in this September issue of AIR FORCE. That is the lovely creature in the back portion of the magazine sitting with the lucky GI Joe, and on his left, another lovely. I would like her name and full statistics about that "gorgeous blonde" of a woman. You see I have been making it my hobby of collecting statistics about blondes—my mostly disastrous weakness. . . .

Pfc. Arthur G. Studley, Alexandria, Va.

Name: Miss Jean Welch: age, 19; height, 5' 7"; weight, 120 pounds; bust, 34"; hips, 34". Address: Try and get it. —*Ed.*

It's Done with Mirrors

Dear Editor:

Your article "Shooting Landings by Radio" in your October issue names the

(Continued on Page 46)

Vol. 27 No. 11 November 1944

AIR FORCE

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

BRIEFING

DEPARTMENTS

Notice: The AIR FORCE Editorial Office is now located at One Park Avenue, New York 16, N. Y.

AIR FORCE (formerly the Air Forces News Letter) is printed monthly by authority of AAF Reg. No. 5-6 (6 Sept. 1942), and with the approval of the Bureau of the Budget, Executive Office of the President. AIR FORCE is published by the U. S. Army Air Forces at the AIR FORCE Editorial Office, One Park Avenue, New York 16, N. Y., U. S. A., for use of personnel of the Army Air Forces and allied activities, and is not to be republished in whole or in part without written permission. Direct communication with the AIR FORCE Editorial Office has been authorized on matters of editorial content and distribution. Director: Lt. Col. James H. Straubel, A. C. Tel., MUrray Hill 5-1951; Teletype No. NY 1-2530; Liaison offices at Hq. AAF, Washington, D. C., (Tel., Republic 6700, Ext. 74362) and Wright Field, Dayton, Ohio, (Tel., Kenmore 7111, Ext. 29135). AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel, and the opinions expressed by individual contributors do not necessarily reflect the official attitude of the Army Air Forces or of the War Department.

☆ U. S. Govt. Printing Office—596128—Printed in U.S.A.

Operation: REUNION

By Capt. L. P. Bachmann

AIR FORCE Overseas Staff

Airmen just back from Romanian POW camps stripped off their vermin-ridden uniforms and took hot, soapy baths before receiving a fresh issue of clothing. While this was taking place their discarded uniforms were sprayed with a louse-killing disinfectant by a 15th Air Force sergeant. Lice were among the souvenirs they picked up after being shot down attacking Romanian oilfields.

The advance of the Allies into German-held territory means more than battles won or ground regained—it means freedom for our own captured airmen. Here is the story of the first great rescue mission carried out by air

ABOUT midnight a guy ran into a Romanian prison barracks yelling, "Chonka! Chonka! Where the hell's Chonka?"

And drowsily Chonka sat up in his bunk, rubbed his eyes, yawned, and inquired, "Huh? . . . Me?"

"Dammit, Chonka, wake up!" the guy yelled. "Something's happened. Come listen to the guards. Find out what they're talking about."

T/Sgt. John P. Chonka, 15th Air Force gunner, crawled out of bed, grumbling at his ability to speak Romanian. He walked through the barracks and stood for a moment listening to a group of excited guards.

As he came back to his bunk the other men crowded around him, demanding a report.

"Oh, they say the war's over," Chonka said sleepily. "Romania has surrendered."

"What else?" the other POWs yelled, pressing closer. "Give out! What about us?"

"Well," Chonka said, "they may turn us loose in the morning." With that, he crawled back into bed.

Sergeant Chonka, however, was the only man in the prison who hadn't been thrown into a fit of wild enthusiasm. The other Americans began singing at prospects of freedom and talking about the things they were going to eat.

"For months we had amused ourselves by making out menus," S/Sgt. William Mansfield, a ball-turret gunner from Tallahassee, said later. "Everytime a guy had nothing else to do he would make out a long list—porterhouse steak, creamed potatoes, thick gravy, lettuce and tomato salad, ice cream, and coffee—*United States* coffee!"

The party had reached its peak at 2 a.m. when a Romanian colonel came into the barracks.

"Men," he said, "at last Romania is on the right side. We knew all along that we should have been with the Allies, but what could we do? The Germans were around us, and the Allies were so far away."

When morning came the Romanians opened all exits to the prison and told the Americans they were free.

The 15th Air Force's great offensive against Ploesti oil fields, between August 5 and 20, had cost many men and planes. The accumulated losses since August 1, 1943, amounted to nearly 2300 United States airmen held as prisoners of war.

Some of these men had been prisoners of Romania for 13 months; some had been held but a few weeks. Among these late arrivals was Lt. Col. James A. Gunn III, commanding officer of a heavy bomb group.

On the morning the Americans were released, Colonel Gunn went to the Romanian Air Minister, and the Secretary of Foreign Affairs, and got their permission to establish communications with the 15th Air Force in Italy.

S/Sgt. Eddy Lavary of Lanchester, Ohio, served as POW postmaster in the camp where he and 1,000 others were imprisoned.

On the morning of August 26 he was taken to an airport in Bucharest and told that he could attempt the flight to Italy across Nazi-held Yugoslavia. They presented him with a tired old Savoia Marchetti, and, after a brief checkout on the strange instrument panel, he took off. Thirty minutes later he was back. The plane was too old and asthmatic.

He crawled out of the Savoia Marchetti and a group of Romanian flyers, sympathetic to his plan, tried to console him. Among these was Capt. Bazu Cantacuzino, commanding officer of a pursuit group outfitted with Me-109G's. The captain spoke English and was credited with 64 victories by the Romanian scoring system. He referred casually to shooting down Lightnings, Libs and Forts.

Captain Cantacuzino offered to take Colonel Gunn back to Italy, providing the American could fit into the radio compartment of a Messerschmitt.

Within a few minutes an adequate facsimile of the United States flag was painted on the German plane. The colonel was folded into the fuselage and the panel again screwed into place. As the Messerschmitt took off from Bucharest, Colonel Gunn hoped the Romanian ace was completely converted to the Allied cause, but there was nothing to do but sweat it out.

Two hours later, as the sun was setting behind the low hills of Italy, Colonel Gunn's home field was startled to see a Me-109G glide in to land. It taxied up, and AAF men surrounded it.

Captain Cantacuzino threw back the hood.

"I have somebody here you'll be glad to see," the Romanian dramatically announced. He then asked for a screwdriver and removed the panel.

A soldier cried, "Look at those GI shoes coming out!"

Colonel Gunn hurried to Brig. Gen. Charles Born, direc-

Lt. Col. James A. Gunn, III., who arranged the big rescue, drinks a toast with Captain Cantacuzino who did him a big favor.

A wounded American airman is loaded aboard an ambulance following his arrival in Italy. Sick and wounded were rescued first.

tor of operations, and they quickly worked out a plan to rescue the men from Romania.

The first phase of their plan was to insure that the airdrome outside Bucharest was still safe for evacuation and to start the prisoners toward their rendezvous point. If this went off successfully it was to mesh with the major field order. The first phase of this operation began when some P-51s took off to make sure things were still safe. Captain Cantacuzino flew one of these fighters—and flew it perfectly. They found the Bucharest airdrome safe and the signal was sent for the second phase of the operation to begin.

Immediately several B-17s, heavily escorted by P-51s, flew a rescue party into Bucharest. This party consisted of high officials who knew the Romanian political and military background, headed by Col. George Kraigher, of headquarters, MAAF. The Americans met with the necessary Romanian officials, and then the main operation began.

Back in Italy ground crews had worked day and night outfitting Fortresses with special racks for carrying passengers in the bomb bays. Several planes were equipped for litter cases since it was known that some of the prisoners of war were in hospitals around Bucharest.

By the time these planes were ready to leave Italy, the rescue party had rounded up hundreds of American airmen in Bucharest. They were transported to the airdrome and lined up around the perimeter of the field in groups of 20 at intervals of 150 feet. There they waited for the B-17s.

In general appearance the men ran the scale from ragamuffin to buffoon. Some wore German helmets and others wore Russian hats. They were bedecked with Nazi Iron Crosses and fully half of the men had Romanian air force insignia. Others had acquired the extra fancy Romanian paratrooper wings. They carried wine, swords and walking sticks, and although they had been out of prison but a few days, some had the photographs and addresses of Romanian girls.

Yet, with all this, there was a genuine American flavor. One prison barracks had received a shipment of GI trousers, but they were all size 40. This amused the men, since they had been living on prison fare. The oversize trousers especially pleased certain of the POWs, who folded the waist band into deep pleats which ran almost to the knees. Then they disconnected their dog tags and draped the chain in a long loop like the trappings of a zoot suit.

That was the way they awaited their liberation.

The first sight of American planes was a flight of P-51s which swept in and gave them a royal buzz. Then the fighters climbed up over the field and began circling for the Fortresses to come in.

The bombers arrived and taxied to the first group. Twenty Americans sprinted out and tumbled into the B-17. Another Fortress followed and picked up the next group. They came in three waves, at one-hour intervals, cutting their engines but ten minutes between landing and take-off.

In the first wave were two planes which carried medical supplies, and Lt. Col. William R. Lovelace and Major Raymond J. Beal, in charge of evacuating the wounded. These two officers spent a hectic three hours gathering up patients and transporting them back to the airdrome in time to make the last wave.

Things went well with the doctors until, faced with the problem of getting 12 miles across Bucharest to a hospital, they were given the services of a character who had served as Premier Antonescu's chauffeur. Whether or not this man was overjoyed at having new allies, or whether he was simply a wild man with an automobile, the two surgeons did not discover. He proved, however, to be the hottest chauffeur they had ever seen. Enroute to the hospital he swerved and whipped corners, blasted through traffic at such a rate the doctors felt destined to end their mission on the pavements of Bucharest. Fortunately, they reach their patients and with time growing short dispatched all but three litter cases to the airdrome. As a last resort Colonel Lovelace stopped a truck in the middle of a street and, for five dollars, persuaded the driver to take aboard two patients. He loaded the last man on a city bus.

In all, 98 wounded airmen were among the 1,166 men taken out of Bucharest in the first two days of the rescue. On the third day the last remaining Americans, and those who had arranged for the evacuation, were flown out. In the three days of the operation, there was no man in Italy more pleased than Maj. Gen. Nathan F. Twining, commanding general of the 15th Air Force, and no one watched the returning men unload with greater satisfaction.

"Thank God you're back," he told them as they stepped out upon their airfield again. "We sweated you out a long time."

As for the men, some kissed the ground; others kept shaking hands with everybody, and grinning at their comrades in prison; while some were too overcome by emotion to say or do anything.

Revealing their morale, the men were outspoken in appreciation and loyalty to the 15th Air Force. Of all those

(Continued on Page 50)

Combat may make you Lazy

By Maj. Walker M. Mahurin

He was a good guy. I'd known him in England and I'd flown with him. I knew he was a fine pilot, a good flight leader and a reasonably eager lieutenant. But here he was in the States, assigned to the kind of job he used to gripe about not having—and he was miserable. Most of the time he was sore, sore inside, and the rest of the time he did a lousy job as assistant base operations officer. Somehow his reports, schedules, forms were always days behind; he never could be found when he was needed. After three months in this job he still didn't know all the personnel working directly under him.

What's more, the people he worked and lived with didn't like him. They resented his arrogance, his sloppiness, his I've-been-winning-the-war-and-risking-my-neck-while-you've-been-taking-it-easy-in-the-States attitude. Overseas, he had been a popular member of his group, always the center of a happy gang in the local pub. But in the States he was playing a lone-wolf role, acting as though nobody around was worth his time. I'd see him in the PX or the canteen, talking to no one and looking as though he'd snap off your head if you so much as said "hello" to him.

I wish I could say he was the only one of his kind, but after I had visited a few more bases I noticed quite a few like him. And I heard hints in conversations. A base CO once remarked in my presence, "One thing I don't want any more of is guys just back from combat. We have too much work to do to take time off to pamper them."

Well, I resented what he said, naturally. But I knew this CO was an honest hard worker who meant nothing spiteful. Not that I hold any brief for those in the States who are obviously in no hurry to fight, although they were trained for combat duty. There are guys like that and there are people who are just plain reluctant to give a combat man a chance to adapt himself—COs who don't want to disrupt their nice, neat little outfits for anybody.

However, most of the men who haven't been overseas are kept here because they have particular specialties that make them more valuable behind the lines than in them. The CO who made that remark was this kind of man—one of the best—and I thought about what he said. Then, when I got my new assignment and tried to settle down in a job, I found there were certain tendencies in me that I had to fight. I can't honestly swear that I've beaten them all yet, but at least I can tell you men still overseas what to be careful of, and I can give you my ideas on why we get that way.

First, in combat jobs, no matter how many hours they give us on the ground gadgets and no matter how many lectures S-2 arranges, most of us don't have enough to do when we're not flying. Particularly in theaters like the ETO where weather can keep you on the ground sometimes for days and days, a guy gets in the habit of lying flat on his back a good deal of the time. We become students of the horizontal. But we know it's all right. We rationalize it to ourselves by saying we risk our necks and deserve plenty of leisure when we're not operational.

Well, in a combat zone that attitude is all right. Fighting is what we're there for and if we do our fighting OK that attitude makes sense. But back in the States, where there isn't much dying tomorrow or even the next day, it gets a little silly. The habit of thinking of yourself as a kind of superman who deserves the best the world has to offer

(Continued on Page 50)

Men back from combat frequently have trouble adapting themselves to jobs in the States. Here a fighter pilot with 17 months in the ETO and 21 Nazi planes to his credit gives some reasons why

ILLUSTRATION BY T/SGT. D. BROCKELL

German aircraft engines, desperately needed by Luftwaffe, were abandoned after an attack on Nazi hangars outside Paris.

In April, 1943, Renault factory was producing 40 trucks daily for Nazis. Allied bombers stopped all production for a month.

BOMBPOWER

Four attacks by 8th Air Force heavies levelled the German rail shops at Rheims. Tracks, turnabouts, warehouses, shop buildings, and locomotives were smashed into rubble.

The results of two years' steady pounding by our British-based heavies are graphically revealed in this eyewitness report from precision target areas in France

By MAJ. CHARLES D. FRAZER
AIR FORCE *Overseas Staff*

LATHES, presses and drilling machines, most of them broken and dusty with disuse, stood in crowded ranks along both sides of the factory. Overhead the saw-tooth roof was a dangling skeleton of steel. But across the reaches of cement floor not a bomb crater could be seen.

The stocky Frenchman in black business suit and beret waved toward the wreckage.

"Your bombs were well fuzed," he said. "One hundred and thirty bombs struck this building. Five were duds. The rest went through one surface, the roof, then exploded before hitting the floor. Damage to our machines was enormous. It was work well done."

This was the story everywhere. Frenchmen who had seen 8th Air Force bombardment of targets in the Paris and Rheims areas made varying comments. An engineer spoke of bomb fuzing. A former French airman praised the "impeccable" formations. Other men admired the courage of those crews who had weathered the hottest flak in Europe.

But the sum of their statements came to one thing—work well done. Even German officers, standing not only in the ruins of airfields, rail yards, factories and oil plants but in the ruins of their own military ambition, had characterized American bombardment as an A-1 job.

A description of results achieved in 8th Air Force attacks upon industrial France—as found through ground inspection of targets and interviews with French businessmen shortly after the occupation—requires, first, a review of the problem involved. For nowhere in the world has precision bombing been put to a more severe test.

French factories operated by or for the Nazis generally were much smaller in area than those of the Reich itself, and the Germans had gone to extravagant lengths to fend off U. S. air power. Paris was so stoutly armored with antiaircraft and fleets of fighter planes that bombers were forced up to 25,000 feet or more. Key plants were protected by firewalls and other structures.

Moreover, these factories were situated in thickly populated sections among people who at heart were friendly to the Allied cause or secretly active in it. Always, this was a vital consideration. The 8th Air Force sent only picked crews and expert bombardiers on Paris missions, never used incendiaries on factories (which normally cause up to half the damage in a bombing attack), and rarely attacked through cloud cover.

Whatever the difficulties, however, destruction of French industry was essential, for it figured largely in the plans of the German war machine. The success of the mission may be seen in a few typical targets—for example, the CAM ball and roller bearing plant.

This concern—the Compagnie d'Application Mecaniques—was a subsidiary of the Swedish SKF organization. Its two plants at Bois Colombe and Ivry were capable in pre-war times of producing 40,000 bearings per day. The wartime production figure ranged from 15,000 to 25,000 daily. Two thousand workers were employed.

From a strategic standpoint this may have been the most important industrial target in France. Manufacture of bearings requires highly skilled labor and it is one industry the Germans could not decentralize. And, while Germany produced 75 percent of her own bearings at Schweinfurt, Erkner and elsewhere, CAM was counted on for 10 to 15 percent of the total requirements. CAM made tapered roller bearings, a product so urgent that the Germans, like a vagrant picking up butts in the street, were salvaging them from all crashed Allied aircraft.

Two attacks were made by the 8th Air Force upon CAM's Bois Colombe plant: on September 15, 1943, with 78 Forts dropping 229 tons of HE, and on December 31, 1943, with 57 Forts dropping 164 tons. On that New Year Eve other bombers paid a call on the Ivry plant, too. In all cases 500-pound bombs were used against single-story, steel and concrete buildings.

The first attack on Bois Colombe destroyed 30 percent of the surface structures and 20 percent of the machines. Practically all roofs fell in. Orvar Gustaffson, the Swedish manager who ran the plants under German supervision, called this a very good result. Since 30 operations are needed to make a bearing, this percentage of destruction put the plant out completely for two months. Even after work was resumed production never again got above 12,000 bearings per day.

After the second attack, Bois Colombe was down for another two months and the Ivry plant was down for nearly three. At Ivry bombs destroyed many four-spindle automatic machines which the Germans could neither repair nor replace.

These CAM factories were very small pinpoint targets. Apparently the Germans understood that if AAF bombers could hit the plants twice they could do it again, so in May of this year Nazi officials in charge of CAM made a spectacular move. They undertook to transfer all usable machines from Bois Colombe and Ivry into a vast grotto at Taverny, just outside Paris. Strenuous labor was involved and the work took weeks. Cold and damp, the grotto was wholly unsuited to the manufacture of bearings, and to overcome this obstacle the Germans installed heating equipment. They also ran electric power and oil lines into the caves and built tunnels for a railroad spur. Eventually this fantastic factory, occupying 250,000 square feet of cavern 40 to 80 yards below ground, was put into operation; but it was then too late—July, 1944. Production of a sort was maintained for one month, then ceased altogether on August 12.

Quite a different type of plant in the Bois Colombe vicinity was that of Hispano Suiza. Here German-controlled workers repaired airplane and marine engines, repaired ME-109 aircraft, and manufactured components for Daimler

BOMBPOWER . . . *continued*

Benz engines. Here, too, the Nazis were put out of business in late 1943.

Three attacks were sent against Hispano Suiza. On September 9, a shop for machining crankshafts was destroyed. On the morning of September 15, administration buildings were wrecked and a vital foundry was knocked out. It is still out. On December 31, a third visit demolished the Daimler unit, hit the foundry again and destroyed a toolshop. Work at Hispano Suiza was never resumed.

Europe's largest automotive factory is the Renault works at Billancourt, which before the war employed 25,000 men and women. Following the German conquest of France, this great industrial unit was turned to the production of materials for the Wehrmacht.

Actually, there are two Renault plants. The main plant, covering nearly 300 acres, produced tanks, aero and marine engines, trucks, axles and gears, among other items, and repaired many kinds of vehicles. The Caudron Renault plant made trainer aircraft, manufactured component parts for Messerschmitt planes, repaired aircraft and produced automobile chassis. Buildings at both centers, as in most French industry, were of single-story steel frame construction, although at Caudron Renault one large shop was built of light reinforced concrete shells.

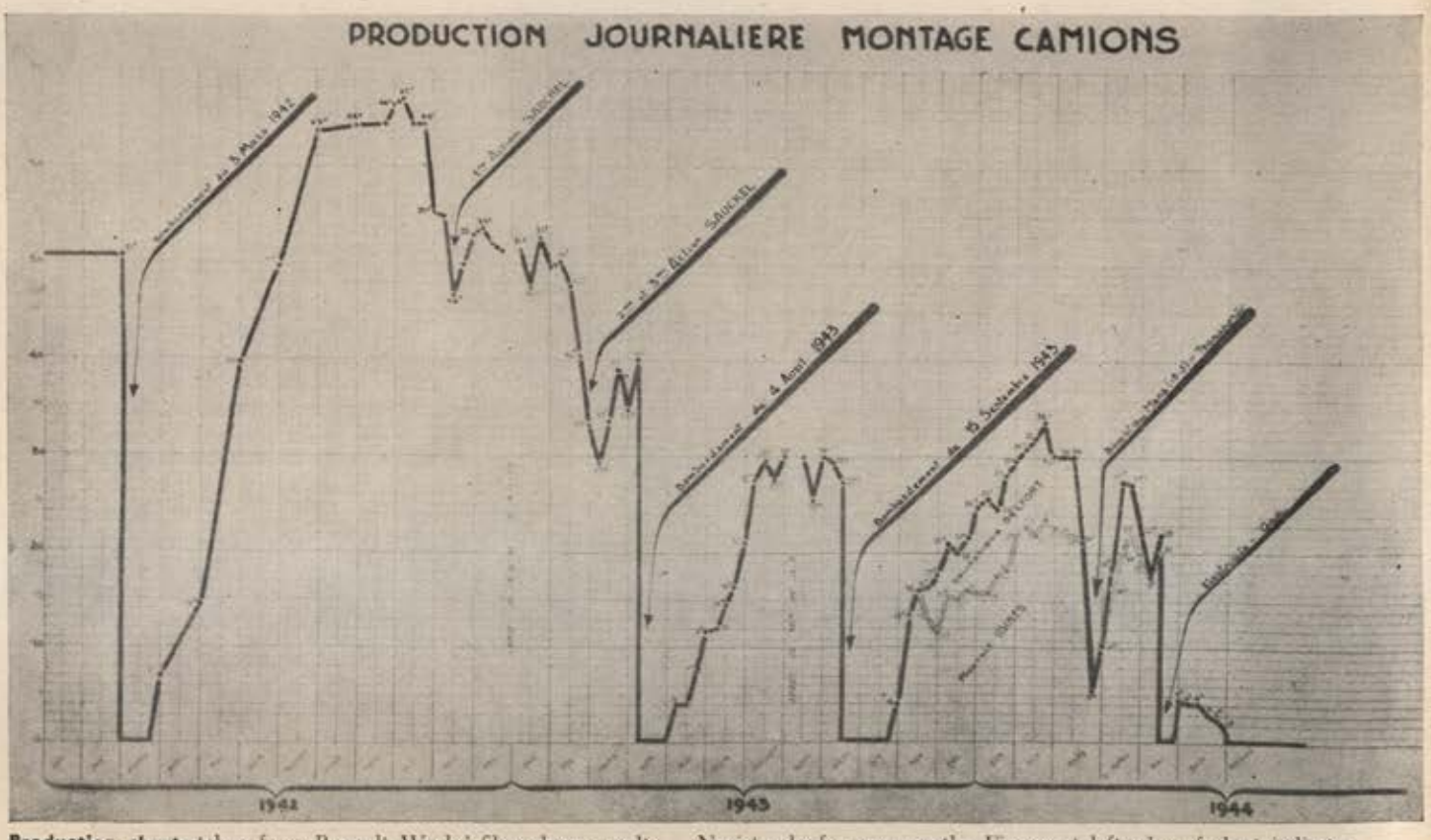
Renault was bombed first by the RAF. In March, 1942, a saturation attack by 222 British aircraft put the main Renault plant wholly out of production. Germans promptly ordered the factory rebuilt and gave the Renault management a high priority for necessary materials, as they continued to do through the war. Numerous improvements in building construction and machine methods were introduced.

Thirteen months later, in April, 1943, the 8th Air Force hit the remodeled plant. Eighty-five Forts dropped 251 tons of HE, using 1000-pound bombs fuzed at 1/40 second tail, designed to explode at about floor level assuming that the fuzes were initiated by the roofs. (Where roofs were flimsy this did not always occur, in which cases bombs penetrated the floor with relatively small areas of damage.)

Once again Renault had to be rebuilt. Jean Renault, son of the owner of this enterprise, describing that first AAF assault, stated that 80 percent of the plant's roofs were knocked down, 20 percent of the shops destroyed, 500 machines completely destroyed, 1,000 badly damaged and 2,000 slightly damaged.

In September this main Renault factory was again hit by 21 aircraft, but as a secondary target. Cloud over another part of Paris prevented one combat wing from dropping on the primary, so further destruction was wrought upon Renault as it was rebuilding. Reconstruction of this plant required several months of work by all employees. Among materials needed were 30 acres of glass.

During September, also, two attacks were leveled against the Caudron Renault factory—one on September 3, by 37 Forts, the second on September 15, by 40 Forts. In the latter mission, 119 tons of 500-pounders fuzed at 1/100 second tail were dropped and caused very great damage both to structures and machines. Four of these bombs hit the reinforced concrete shell building at Caudron and destroyed 43,600 square feet of it, better than the per ton average. The Caudron plant, including chassis shops, was put entirely out of production and is still out. The main works is nearly restored.



Production chart, taken from Renault Works' files, shows results of Allied bombings. Attacks in March 1942, April 1943, and September 1943, in each case completely knocked out production of Nazi trucks for one month. Figures at left edge of chart indicate total trucks produced. Germans moved part of assembly line to Belfort but later bombings cut production down to permanent zero.

Production charts show the disaster these bombings brought to Renault, and thus to Nazi operations. But even these charts are too lenient because, as M. Renault observed, they were made by Frenchmen for German consumption. All through the occupation, the Renault works was under the rigid control of an able German commissar who was supposedly a civilian but who was last seen in Paris, just before the evacuation, wearing an officer's uniform.

Airfields always stood high on the 8th Air Force priority list and among the most important in France were those at Villacoublay and Orly, near Paris, and the Rheims-Champagne airbase farther north.

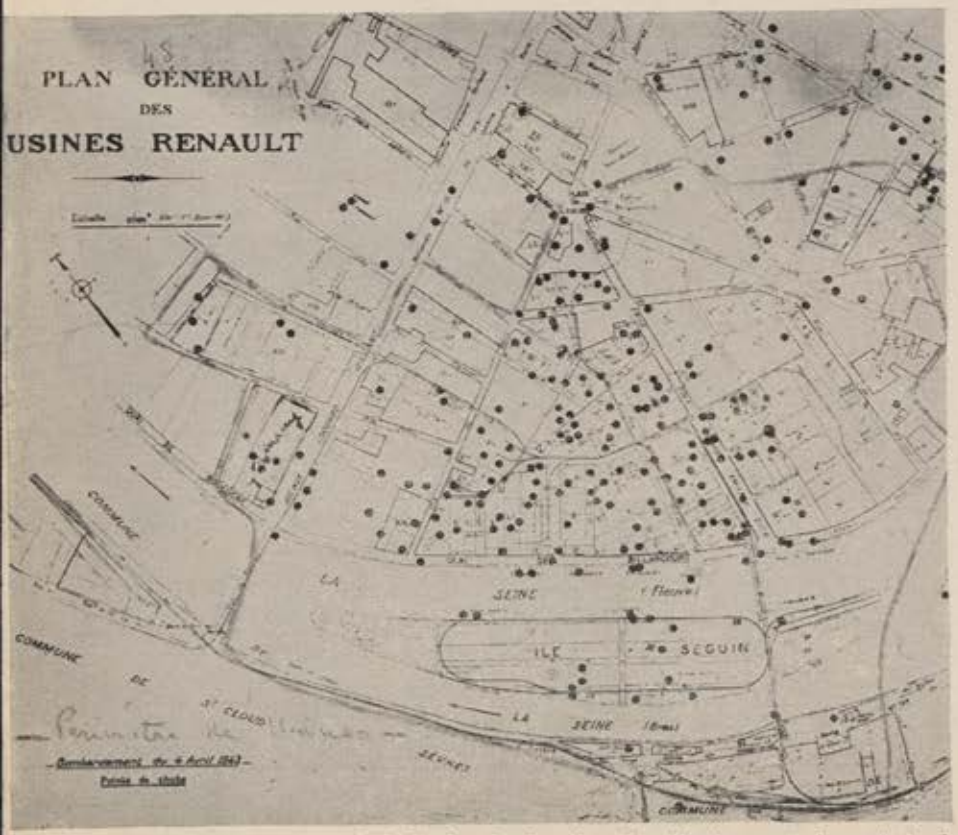
Villacoublay was once the largest of all Luftwaffe installations, the service base for all northwest France and a highly active interception field. Its complex facilities included hangars and repair shops for FW-190s, JU-88s and night fighters, plants for assembly and service of army cooperation aircraft, a shop for Heinkels, several others for Junkers transports, a training field, and acres of runways, aprons and dispersals. Eight hundred men worked on FW repair, nearly 1,800 on Junkers, plus many other employees.

This field was hit four times. In June, 1943, B-17s bombed from 27,000 feet through partial cloud to destroy much of the FW-190 section. Two months later, 133 Forts returned with aiming points all over the field and knocked Villacoublay out of effective action for nearly eight months. In July and August, 1944, the field was again attacked by the 8th Air Force, the last assault being made by B-24s to posthole the field and interfere with German efforts to withdraw aircraft. More than 800 tons of bombs were dropped in the four missions and no section of the base escaped damage. Some runways were rebuilt three or four times.

Orly, a field nearby, was not active until the beginning of this year and then mainly as a storage point for V-1 and V-2 materials. Liberators, carrying 500-pounders with some incendiaries, struck Orly in May and July, demolishing two giant dirigible hangars used for housing fly-bombs. Hangars and other installations burned well in both instances and no further attacks were necessary.

Photo-intelligence officers learned from French workmen that neither at Villacoublay nor at Orly had the Germans set up dummy aircraft. Once they had created an entire dummy field a few miles away, complete with fake planes, but had lost interest in their little ruse when the British

Smashed hangars at Villacoublay were part of the score made by 8th Air Force while Germans held the field during battle of Paris. The enemy had no chance to salvage their damaged planes.



Renault officials compiled this bomb plot after 8th Air Force attack on 4 April 1943. Pencil line outlines factory area, dots denote hits. Rectangle at left, marked "Germany," shows where Germans adapted French tanks for use by Wehrmacht.

Thorough saturation of rocket installations like this one at Siracourt, France, effectively blasted Nazi hopes of hammering England into submission.

BOMBPOWER . . . *continued*

This mass of concrete near Paris was one of several flying bomb storage depots destroyed by bombers. Robot supplies were also stored in caves but accurate bombing wrecked entrances, rail lines.

American soldiers search through wreckage of German planes at Orly airdrome near Paris. In background are remains of two huge Zeppelin hangars which Germans used to store pilotless plane parts.

This mass of burned out tanks and pipes was once a busy section of a vital oil and gasoline storage depot in the outskirts of Paris. From it Germans moved about 750 tons each day to Normandy front.

bombed it with dummy wooden bombs. The field at Rheims had been the headquarters of the chief of the Luftwaffe in France. This base, extremely active both as an interception and service center for FWs and JU-88s, was frequently attacked by the 8th Air Force and finally rendered wholly useless by a June raid which left the field littered with scores of crumpled hangars and shops and enormous numbers of damaged aircraft. Many hangars had been newly constructed by the Nazis and were of the arched-roof, reinforced concrete type, supposedly bombproof. These roofs caved in just as other types.

In the spring and summer of 1944, the Nazi oil industry became a No. 1 priority with the AAF. Two typical targets were situated at Gennevilliers, on the bank of the Seine.

An important producer was the Standard Oil plant (Standard Francaise des Petroles), which had been turning out 2,000 tons of petroleum products per month, including a grease for tank treads. Between one-third and one-half of the plant's total production was being taken for German use.

On June 22, in the early evening, 72 heavies, loaded with 100- and 250-pound HE bombs with instantaneous and 1/100 second fuzes, carried out an assault against the Standard plant and it promptly became a ruin. Bombs landed at

all key points of the factory's 34,000 square yards of space, setting fires which flamed for two days. By some chance, the home of the director, George Auclair, who lived on one corner of the property, was neither hit nor damaged.

Almost adjoining Standard was a gasoline depot once owned by the Compagnie Industriale Maritime but later taken over by the Germans. This distribution depot, known as WIFO, handled 750 tons of gasoline a day for the Normandy front. Most of its 500-cubic meter tanks were arranged in clusters surrounded by heavy firewalls. Heavy bombers, attacking at the same time as the strike against Standard, destroyed approximately 20,000 of the depot's total 45,000 cubic meter capacity. Some of the firewalls, especially those girding diesel oil tanks, effectively prevented destruction, but others failed altogether and the bulk of WIFO's installations was a mass of burned and wrinkled wreckage.

Still a third target in Gennevilliers on that day was the old Ford plant, now operated by the Laffly concern. This plant had once equipped and maintained an entire Panzer division, repairing tanks, halftracks and other vehicles, and had assembled snowplows for the Russian front and Norway's roads. Here the chief immediate damage was destruc-

Allied bombings forced Nazis to convert Paris subways into aircraft factories. Porte de Lillas station (above) produced propellers.

Ground inspection parties reported that damage to enemy installations was even greater than had been reported by our photo-interpreters

Nazis lost 29 storage tanks with a total of 13,000 tons of oil when 8th Air Force bombs fired the huge Standard Oil plant at Gennevilliers. Intense heat of fire caused tanks in foreground to collapse.

BOMBPOWER . . . *continued*

tion of electric power. And while the Germans had already begun to curtail use of this plant before the attack, wrecking of more than 50 percent of its facilities ended all hope of continued or future use.

The strategic bombing of railroads, like all foregoing types of bomb damage, is a subject for exhaustive research. No definite conclusions can be drawn until the enemy is finally defeated and a thorough-going study is completed.

Still, even casual inspection of French railways is impressive, particularly in the Paris area. The French transportation system is so constructed that all troop and freight traffic from Germany to Normandy or southern France normally passed through Paris, and in May and June, 1944, a terrific joint assault on Paris marshalling yards was carried out by the RAF and AAF.

Marshalling yards run to a pattern. There are reception sidings, forwarding sidings and sorting sites where trains are made up. This maze of trackage always converges at one or two points in the yard.

Allied technique in blasting these targets was to combine an RAF saturation attack by Lancasters and Halifaxes with precision bombing by the 8th Air Force against choke points. RAF bombs demolished and burned rolling stock, shattered yard buildings and raised hell generally, while the AAF tore up tracks where it would do the most good and destroyed key repair shops, control stations and other works.

Robert Le Besnerais, general manager of the Societe Nationale de Chemins de Fers Francais—the government-controlled railway system—conceded that marshalling yard attacks had considerable cumulative effect in immobilizing the Germans in May. He believes, however, that precision bombing of bridges and important trackage was even more disastrous and represented a more economic use of aircraft. He cited especially the cutting of rail and highway bridges on the Seine, Loire, Oise and Yonne rivers.

Prior to the invasion, Seine River bridges had been cut by the 9th Air Force. Then, after D-day, the 8th was given the assignment of knocking out rail and highway bridges across the Loire and Yonne.

Along the former river, from Nantes on the coast to Nevers in central France, not a bridge was left standing. This havoc, said M. Le Besnerais, hurt the German effort incalculably. Some reinforcing divisions for Normandy were delayed eight to fifteen days—despite constant bridge-mending by those indefatigable rebuilders, the Germans—and many were completely stopped. Presumably, the Nazis had sufficient rolling stock, but everlasting detours made it impossible for them ever to get troops or equipment to the right place at the right time. The railroads of France were in a gigantic dislocation.

As has been indicated, the Germans went underground wherever possible to escape Allied air blows, and an interesting example of their frenzied frustration was found in the Paris subway.

Early in the war, there had existed a French turbo-mechanical factory at Epone-Mezieres, 40 kilometers west of Paris. This plant made compressors and other equipment for French aircraft and had obtained in 1939 a large amount of machinery from the United States for the purpose.

After France's collapse the factory owners refused to work for Germany. One man fled to Switzerland, another to New York; a third just stayed in Paris. Germans took over the plant and converted it to the manufacture of shafts for Ratier propellers. In June, 1944, an average of 300 prop shafts a month was being produced. Just about that time, however, AAF bombers destroyed a railway station adjacent to the factory at Epone-Mezieres and the Germans grew nervous. They were afraid that next time the plant would go up, too. Moreover, they were having 25 or more air raid alerts daily which, as in many other French plants, seriously disrupted production.

Consequently, they decided to move the factory into some mushroom caves near Poissy. Many such caves were being utilized for manufacture of aircraft parts, submarine torpedoes and the like. Before they could move, however, the 8th Air Force wrecked a bridge at Poissy. This complicated the transportation problem, so the Germans took a new tack and moved the plant into a branch line of the Paris subway.

To accomplish this, they shut off four kilometers of the Metro Paris subway on a deep branch line and, at no little trouble to themselves, moved scores of heavy machines onto the platforms at the Porte de Lillas station, 156 steps down from the street.

Apparently the original idea was to operate lathes, drills and cutters right on the Porte de Lillas platforms. But a fresh difficulty presented itself. So great was the vibration that the platforms couldn't stand the strain.

The Todt organization was called in. They tore up the subway tracks, laid a reinforced concrete floor on the roadbed and installed electric current. Additional plants had been moved in at other Metro stations and the plan called for installation of heating equipment, building of a railway connection and similar construction. While this mammoth job of work was begun on June 15 none of the plants ever did get into operation and the whole project was eventually abandoned in favor of a retreat from Paris. Incidentally, men who know Berlin say that refuge in that city's subways would be impractical because they are much too shallow.

This effort to go underground, involving titanic labors, is perhaps the most dramatic evidence of the damage wrought by precision bombing in France. The Nazis knew that there was no escape, even for small-size plants—and that what the 8th could see, it could hit.

This damage was done with a remarkably low loss of life among French civilians. In some attacks, no lives were lost. Of all attacks described, only one could be called inaccurate—an assault upon Villacoublay. During one of four raids on that target, some bombs, falling short, hit the nearby village, killing several persons. But the understanding with which the French accepted this unavoidable result of war revealed itself in a typical and touching incident.

A Fortress had been shot down in the attack. The bomber crashed in a field, killing the entire crew, and the French people of the village paid tribute to those men by covering the Fort with flowers. The Germans were enraged. They issued an order that the incident should not occur again, under threat of heavy penalties. Next morning the bomber bore twice as many flowers.

Ground inspection of French targets disclosed a wide variety of information. For one thing it showed that the Germans had consistently been hit where it hurt the most. For another it showed that selection of bombs and fuzes had been handled with skill, that the area and type of damage per ton of bombs had been highly effective and that the bombings themselves had been extremely precise.

Nobody who visits these targets, who sees the demolished airfields, railways, oil depots and factories, could possibly doubt that the Wehrmacht suffered inestimable blows from bombing in France. Nobody who has seen the Taverny grotto or the subway platform at Porte de Lillas could doubt that the Nazis were desperate and had great hopes and plans for underground production. But it was too late. As usual, their plans came to nothing in the end. ☆

Portrait of a Guy Thinking About an Island

2nd Lt. Bert Stiles
8th Air Force

THE Fortresses took off in the late afternoon, and flew by wings to the west of England and turned south. Out of sight to the northeast, there was fighting on the beaches, and many dead men lay in the surf. But the Forts were high above all that. Since the first day, the 6th of June, their job had been easy.

Today the target was an airfield on the Brest Peninsula, not so far from Lorient, where the Forts used to go in the old days. He flew it when it was his turn, and watched the sun slide down through the soft blue toward the sea. When it was time to bomb, the field was already a smoky mess from the wings up ahead.

The flak started just after bombs away. The first four puffs were just outside the window. He could see the dull flash as the shells burst. The formation leader banked steeply right. The flak tracked along easily.

There was an ugly clank underneath somewhere. He knew they were hit. Engines OK. Instruments reading true. Everything OK. The helpless fear of those soft black puffs tightened inside him. It was always the same. Nothing to do but sit there and pray the luck holds. And then they were out of it, turning toward home. "Ball-turret to pilot," came over interphone. "We got holes in the gut."

Once you're out of it, flak never seems quite real, till the next time. The formations churn through the quiet sky, and the earth is a million miles low.

The formations let down into the darkening east. He leaned forward, waiting for England.

England. He said it in his mind, and then slow in his mouth, without moving his lips.

When he was eight years old he read Robin Hood the first time. After that he must have read it twenty more. Sherwood Forest and Nottingham town in the days of Richard of the Lion Heart. He'd dreamed of it then, waiting for the day when he would stand at the rail of a ship waiting for England to come out of the sea, out of the haze. Almost like now.

But it wasn't the same. Because now, for a little while, England was home, more home than Colorado. More home than the house on York street could ever be.

After the ride to Munich he thought that the island had sunk into the sea, and France had someway stretched and spread on north to the pole.

After Kiel, letting down over the North Sea, he had said a funny knocked-out prayer. *Be there, island. Please be there. Be there soon.* After Berlin, after the soft acres of death above that shattered town, nothing had ever looked so good as the dim line of surf a half-hour ahead.

It slipped in gently, as always, clean and friendly and far off. That would be Lands End, Cornwall and Devon. The names ring. He could sit with a map and say the names out loud, and never get tired of the sound of them . . . Torquay, Nutt Corner, Conventry and Charing Cross.

The Forts hit the coast at 8,000 feet. A flight of Spitfires was playing in the clouds at three o'clock low.

A guy named Mitchell lay on a cliff above the sea and watched the gulls, and dreamed the Spitfire. And a guy named Leslie Howard, who was Mitchell for a couple of hours worth of movie, crashed back there somewhere coming back from Lisbon, probably leaning forward waiting for England to show through the dusk.

Strange, how any land could be so many shades of green, with the lazy netting of the lanes that wandered everywhere to nowhere. Looking down there, War was just a word, without meaning. It looked so peacefully lovely, yet the people who lived there had fought since the beginning of time, since long before the Romans. And they were still fighting.

He flew his turn, for a while, taking it easy, not trying to squeeze the lead ship any. He was glad when the pilot took over again. It was better just to look.

Airfields and towns and churches and hedges, more airfields and ponds and brooks, and cows. More airfields and roads and train tracks and radio towers.

He tried to imagine it as it must have been once, long before William the Conqueror, when King Lear was wandering mad on the heath. He couldn't bring it through. He couldn't believe it had ever been wild. Everything looked permanent, steady till the end of time.

He was so tired of sitting, he wanted to bail out. Yet he would have liked to fly on for hours, up to the lands of the Scotsmen. Stornaway, Inverness, and the Isle of Skye.

Two Lancasters were landing on the east-west runway. A flight of P-51s came over the top from nine o'clock. Night was slipping over the world from the east, but there was still day back at six o'clock.

Though it was not his land, and although he had only lived there a little while, he thought he knew why these quiet Englishmen raised so much hell with anyone who tried to take over.

He was tired, saggy tired, starting at the knees on up to the eyes. But he felt good, just glad to be there, just so God damn good to be there, there were no words to tell it.

It was almost dark then, and the stars were coming through. ☆

MORE POWER TO YOU

By S/Sgt. Douglas J. Ingells
AIR FORCE Staff

Wright 3350 engine is cradled on a torque stand in a Power Plant Laboratory for a periodic check-up after 150-hour endurance test.

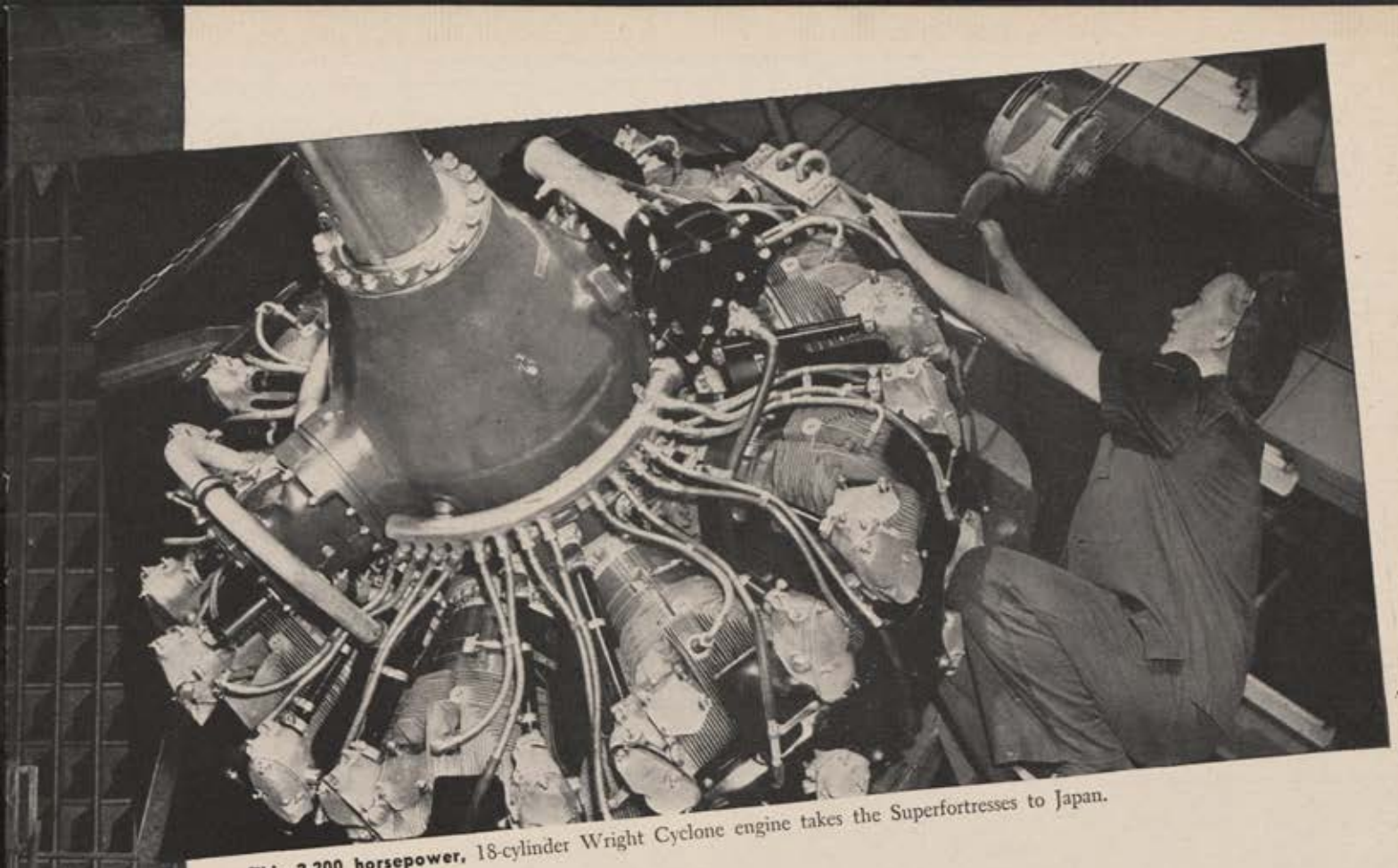
EXTRA horsepower—the stuff that counts when our planes are up and the chips are down—has contributed as much as any other single development to the margin of superiority our fighting aircraft have attained over the enemy.

Our fighters and bombers now are flying 1,000 more horsepower than they had at the start of the war, thanks to super fuels, tougher metals, design changes, improved water and fuel injection systems and new supercharger installations. And the 3,000-horsepower engine for AAF planes is now a reality.

Giving engines an extra bonus in horsepower has not been easy for our engineers. One horsepower is the force required to lift 550 pounds one foot in one second. Now apply this yardstick to an aircraft engine, bearing in mind that, unlike any other power plant, a plane's engine seldom remains on an even keel. It must operate efficiently during steep climbs, dives, pull-outs, banks and sharp turns, and it frequently must fly on its back. Within a few minutes, it may be hurtled through space from desert temperatures of 130 degrees above zero to altitudes with temperatures as low as 67 below, from sea level air into the thin air of the stratosphere. Add to this the combat necessity of keeping out of the enemy's gunsights and you have a thumbnail sketch of the horsepower problem.

The race for more horsepower began during the last war when AAF engineers helped design and produce the Liberty engine which introduced the turbo-supercharger, lifted De-Havilands to record ceilings and powered the Douglas "World Cruisers." Never capable of producing better than 425 horsepower in flight, however, the Liberty finally had to give way to 500-plus-horsepower designs.

Not until 1936 were the first 1,000-horsepower engines developed—a radial, aircooled design in the P-36 pursuit and an inline engine for use in the XP-40 and XP-39 air-



This 2,200 horsepower, 18-cylinder Wright Cyclone engine takes the Superfortresses to Japan.

AAF engineers are giving our airmen a victory bonus in horsepower

planes. Progressive development, spurred by the war, has given us today's super horsepower engines.

Chiefly responsible for upping aircraft engine dependability and horsepower are the experts of the Air Technical Service Command's Power Plant Laboratory and the "Four Horsemen"—Pratt & Whitney, Wright Aeronautical, Allison and Packard-Rolls Royce—who manufacture the engines that power every type of combat plane in use by the AAF.

Their problem has been to supply a maximum of dependable horsepower at a minimum cost in fuel in the smallest, lightest package possible, so that an engine can be fitted into the trim lines of a fighter or lend itself to nacelle streamlining in a cargo plane or bomber.

What the engineers strive for is a pound per horsepower equation. In the P-38, for example, each engine weighs only 1,395 pounds without turbo-supercharger and produces 1,500-horsepower at take-off.

To put more horsepower in small packages, engineers must take a standard engine apart piece-by-piece and improve upon each part individually by re-designing, strengthening and using better metals, materials and fuels. The only alternative is to build a bigger engine.

This we did for such planes as the B-29, P-61, P-63 and the A-26, which have completely new engines producing 25 percent more horsepower than any engine available 18 months ago.

Performance-wise advancements have meant longer range, better rate of climb, faster speeds, higher altitudes and safer operation for our aircraft.

To understand various horsepower ratings, it is necessary to define the four general categories which the AAF uses today for rating engines: *Take-off rating*—power output necessary to get the airplane into the air and up to a safe flying altitude. *Normal rating*—horsepower which the engine can deliver continuously without undue stress. *Military rating*—maximum power available in flight within safety limitations, usually equal to take-off rating. *War emergency rating*—highest power that it is possible to take from the engine within limits of structural safety.

War emergency ratings give fighters or bombers a surplus of power when they get in tight spots. Permissible only for a short period—five minutes—this added power affords highest possible performance during actual contact with the enemy. Its use may shorten the life of an engine by many hours but it may bring the airplane back to fight again.

The B-29's engine originally was a combination of two nine-cylinder Wright R-1820s. By the time the engine was first installed in the XB-19, then in the Navy's Mars and later in the B-29, it was a completely new development—the R-3350. To get more power and performance, the designers had built a bigger engine. Actually, in cubic inch displacement it was smaller—3350 cubic inches compared with 3640 cubic inches for the initial twin-row design. But the R-3350 had more power because of increased cylinder size and two-speed integral superchargers.

When first tested at Wright Field in 1937-38, the R-3350 developed a take-off horsepower rating of 1,800. Today the engine turns out 2,200 horsepower at take-off because reduction gears were changed, a new impeller drive was installed and cylinder head shapes were made thicker with increased fin area. (Thicker cylinder heads permit a more uniform heat flow and strengthened construction; increased fin area

allows more air to circulate through the engine for cooling.) The two-speed integral supercharger was replaced by a single-stage internal supercharger and turbo-superchargers for high altitude performance. The induction system and exhaust valve assembly were changed; vibration dampers were added to counteract crankshaft whirl and ward off roughness at high speeds. Although engine displacement was not increased, horsepower output was upped.

The P & W R-2800 engine, used on the P-47 and P-61, was developed from two nine-cylinder R-985 engines mounted in a twin-row arrangement. By increasing the size of cylinders from 5-3/16 inches in diameter to 5-3/4 inches, and the piston stroke by 13/16 of an inch, engineers later obtained a 450 percent increase in take-off power rating over the original R-985 engine.

New elliptical cooling fins that eliminate some production problems and supply a greater amount of airflow through the 2800's cylinders also have helped boost power. To solve the cooling problem of pusher-engines, a large auxiliary fan is being installed and may also be adapted to tractor engines.

Hydraulically operated platform rises from test chamber floor so this rugged 3350 Wright engine may be overhauled more easily.

Additional horsepower and better altitude performance for inline engines have been attained through use of integral superchargers and turbos, and improved coolants.

Basically, we are using three types of inline engines, the Allison V-1710 and V-3420 and the Packard-Rolls Royce V-1650, which power such airplanes as the P-39, P-38, P-51 and, experimentally, the XB-19, world's largest aircraft.

One of the first installations of an Allison engine was in the XP-39 with a take-off rating of 1,090 horsepower. The same engine in latest P-39s has a take-off rating of 1,200 hp. A new supercharger gear ratio boosted altitude ratings; carburetor redesign provided new fuel metering requirements; changed reduction gear ratio brought more propeller efficiency; mechanical manifold changes eliminated backfire screens; aluminum replaced magnesium in manifold parts to permit higher temperatures and more power, and a material change in distributors from a phenolic material to a soybean plastic improved electrical characteristics. New pistons, bigger jets for more fuel and latest design cylinder heads also were incorporated. By comparison, the new engine—with all its improvements and accessories—weighs only 150 pounds more than the original. Allison's new V-1710 engine, which powers the P-63, initially developed 1,325 horsepower at take-off. With new injection systems, better coolants, a redesigned crankshaft, it develops well over 1,500 horsepower, war emergency rating. Biggest improvement over earlier 1710-series engines is the addition of a two-stage supercharger that permits operation at higher altitudes.

The V-1710 series engine, however, underwent its greatest design change when it was fitted for the P-38, which requires a right-hand and a left-hand engine. The change included a completely redesigned crankshaft and the addition of a small alternate rotation gear mechanism. At the same time engineers upped the horsepower rating to 1,450 for take-off, giving the P-38 2,900 hp, which makes it possible for this aircraft to carry two 2,000-pound bombs.

The Packard-Rolls Royce V-1650 engine, which initially developed 1,300 hp at take-off, has been hopped-up considerably by water injection, improved methods of after-cooling and a two-stage, two-speed geared supercharger which permit higher altitude performance. Development of a variable speed supercharger to supply the correct amount of supercharging at critical altitudes may eliminate power waste which now tends to occur.

Addition of a turbo supercharger as well as the integral supercharger has permitted further increases in horsepower and made higher ceilings possible with inline engines.

The turbo supercharger, or the geared supercharger used in the Rolls Royce, compresses outside thin air of high altitudes so that it will burn in the engine. Integral superchargers are used to cram air into the cylinders to produce added charge forces and pumping capacity.

Although the supercharger does increase the pumping capacity of an engine resulting in more power, the engine is still subject to the same effects of altitude as an unsupercharged engine. The higher the altitude, the greater will be the volume of air required.

This is accomplished by turbo or mechanically driven high-altitude superchargers, which allow the engines to draw a maximum horsepower at high altitudes. They do the same thing for the engine as oxygen masks and pressurized cabins accomplish for humans.

Yet, for all the improvements made in the engines themselves and the superchargers, a new method of water injection has been responsible for increasing horsepower ratings in some engines as much as 50 percent.

Water injection systems, which in principle have the same beneficial effect on the aircraft engine as wet weather has on your car engine, shoot a fine spray of water into cylinders which suppresses detonation and permits more economical fuel usage. In the engineer's language, it eleminates "ping" —the vibrating sound which occurs when fuel burns in one part of the cylinder more rapidly than in another part.

The water is injected into the fuel induction system between the intake manifold and the carburetor. It enters the cylinder as a liquid and passes out as a vapor, taking off undesirable heat which previously caused fuels to burn too quickly. The water also saves fuel by getting the same power from a leaner mixture. For instance, the P-47 at take-off rating used a fuel-air ratio of .108 without water injection. Using the new method, the ratio was reduced to .080—a 28 percent saving in fuel.

New superfuels also have contributed to better engine performance and have dictated many engine changes. Operating on 100 octane fuel, for example, one engine developed only 1,000-horsepower at take-off. Now, with new 130-Performance Number fuel, it attains a 1,300 hp rating.

Engine development is meeting the demand. The engines with which we started the war have become super engines, developing the greatest horsepower output of any engines in the world. There is much truth in Lt. Gen. Brehon Somervell's statement: "When the Axis hitched its chariot to an internal combustion engine, they ran it straight down our alley." ☆

Interception Begins on the Ground

By CHARLOTTE KNIGHT

AIR FORCE Staff

ILLUSTRATED BY CPL. LOUIS GLANZMAN

Fighter control positions our planes for the kill—at the right place, time, and altitude

THE report from the radio detection station announced the approach of four unidentified aircraft. Nothing to get excited about. Or was it?

"Get moving, boys," said Capt. David Harbour, 5th Air Force fighter pilot then on duty as controller in the Dobadura fighter sector, "here comes the whole Jap air force!"

Nor was he being facetious—as the next half hour proved. Without a moment's hesitation he scrambled every fighter squadron in his area, and even then feared it wouldn't be sufficient opposition to throw against the raid that was coming. Using his prerogative as controller, Captain Harbour grounded a flight of transports due to take off at that same time and used their fighter escort to reinforce his designated air defense fighters for the interception.

All because of "four unidentified aircraft."

Actually, 48 Jap planes raided Allied shipping in Ora Bay that day. And 46 of them were shot down as definites, the other two as probables. Not one ship of ours was sunk or damaged, not one of our men was killed. We lost one P-38.

By all counts this was one of the most successful interceptions in that theater. Eight days later it was followed by another, equally spectacular, this time during the Finchhafen landings on October 22, 1943, when all the controlling was done from a destroyer acting as "control" ship. The box score speaks for itself: Our fighters not only prevented the Japs from sinking a single ship but managed to shoot down 84 enemy planes in the bargain.

This was a year ago, but these actions set a pattern for interceptions which proved to be the rule rather than the exception in the months since then. On June 18 large-scale interceptions reached a climax in the Marianas; on that day, Navy aircraft intercepted and shot down 335 Jap planes.

There are sound reasons for this success: Added up, they all mean air superiority. Our planes may be better, our tactics may be better, and our pilots may be able to out-fly and out-shoot the Jap. But it doesn't end there. Fighters have got to be in position to meet the enemy at the right spot, the right altitude, the right time, and in sufficient numbers to destroy him.

This is where the controller comes in. He is the man who puts 'em there. The secrecy which has surrounded our whole warning and control system has had its customary effect on the operation's personnel: either they are never heard about —or if they are, they are generally taken for a couple of other guys. We are speaking here of a *fighter* controller and not the controller who does an equally important job directing traffic from an airdrome control tower. The fighter controller, by contrast, rarely sees the aircraft he is directing and often may be located miles from the nearest airfield.

The system under which he operates is known variously as fighter control, flight control, and tactical control. The term "flight control" when used in connection with these operations means the system of vectoring aircraft in a purely *tactical* situation to a specific point. Likewise it is not to be confused with the Flight Control system which provides pilots of all types of aircraft with weather, landing, and other flying safety data. The Navy, which frequently uses AAF personnel for controlling amphibious operations when land-based aircraft is involved, calls the system "fighter-directing."

Whatever the nomenclature, the principle is the same: it means *ground* control. And it is based on one of the strange paradoxes of aerial warfare that permits a man sitting in a concealed room, sometimes below ground, nine times out of ten to know more about the aerial situation miles above and away from him than a pilot himself in a CAVU sky. Flyers who doubted that at first have come to have a healthy respect for the electronic "seeing" devices which are not limited by the range of 20/20 vision, clouds or blinding sun.

"Drumstick leader from Dogface . . . Heads up . . . Jerries up-sun ready to bounce you . . . one two zero . . ."

Pilots flying into the sun on a fighter sweep over France in pre-invasion days needed only one such warning from a controller many miles back in an English coast fighter-control station to develop a genuine awe of the operation.

Now that it's had a five-year combat workout, the role of this complex aircraft warning and control system in the success of Allied fighter operations throughout the world is beginning to assume its proper perspective.

The role certainly hasn't been a walk-on either. It is common knowledge by now that it was this system which made it possible in England's darkest hour for 50 flyable Spitfires and a handful of Hurricanes to prove more than a match for the Luftwaffe's best. Developed by the RAF for the air defense of the British isles, it was designed to do just what it *had* to do in the Battle of Britain: (1) furnish enough advance warning, by means of radars and ground observers, of the approach of enemy aircraft to permit the fighters to be in the air ready to meet the raiders, (2) provide a means of tracking accurately both friendly and enemy aircraft and (3) be able to lead the fighters to an exact interception with a frequently unseen foe.

It is a tribute to the effectiveness of the British warning and control set-up to acknowledge that the AAF's system has been patterned after it. So has Germany's for that matter. For a long time Jerry couldn't figure out how the British fighters were always up to meet his bombers. He chalked it up to information leaks. When he did find out he tried hard to catch up—and he's been racing us ever since.

Aircraft warning and control is a complex operation demanding the highest degree of teamwork, split-second coordination, and specialized performance on the part of its radio and radar personnel, ground observers, plotters, filterers, tellers, liaison officers and controllers. The system works so fast that often fighters are ordered to scramble within 60 to 90 seconds after hostile aircraft has been detected.

Heart of its far flung network is the Information Center, known as the "IC" or "control center," where the controller is boss man. He sits on a gallery—or catwalk—overlooking the "Ops" board on which are plotted filtered reports from radar and ground observer stations showing altitude, number, and position of aircraft within a given area. Before him are status boards listing weather information, condition of squadrons airborne or on the ground, and—in certain cases—the exact minute-by-minute picture of ground action in that sector. At his side are liaison officers for Navy, antiaircraft, ground forces, etc.

The controller has many jobs, of which one—directing

Bandits are picked up by electronic devices long before they reach target. Exact minute-by-minute position is phoned to "Ops" room.

interceptions—is mentioned in these pages. In Italy and in Western Europe, where the control centers direct air cooperation missions, the controller's major responsibility is to lead fighters, fighter-bombers, and reconnaissance planes to specific targets and bring them home again. Elsewhere his duties might be chiefly to rendezvous fighter escort or to control air-sea rescues, or "home" lost aircraft. Surprisingly often, the controller gets saddled with all these things at once.

The moment hostile aircraft is reported, the controller instantly and automatically becomes in effect a field general whose duty it is to protect not only the lives of all men in his area but all installations, ships, and friendly aircraft in a given sector. From here on the air show is his.

It's a hot seat and nobody knows this better than the controller. No matter how good the system, no matter how foolproof the equipment, it is no better than the "operational brain" behind it. The controller must make decisions with lightning speed and each decision has to be the right one. If he waits too long to scramble his fighters, disaster may descend on his very vulnerable neck. If he scrambles them too soon, he takes a chance of their going after a decoy raid while the main strike comes a little later from a differ-

ent direction. If he does not interpret his warning reports accurately, he'll lead his fighters to the wrong spot, or he may send up one squadron to intercept 100 bombers. If he fails completely to act on the warning information at hand, there might be another Pearl Harbor somewhere.

Whatever the situation, if he does any of these things he had better start looking for a good ditch-digging spot, for his days as a controller will be over. More important naturally is the fact that he cannot afford to make any of these mistakes. Where lives and materiel are at stake, he can't indulge in any trial and error tactics with an enemy raid coming in to wipe him out. Generally, he'll get but one good crack at the enemy as he tries to intercept him. The controller has to make it a first round knockout.

The controller's problems are many and complex. One of his greatest is the "commitment of forces." In this respect controlling is very much like a bridge game. You've got so much; your opponent has so much. You know—or should know—what's in his hand by your own aircraft warning and intelligence reports. How you play the game depends entirely on your knowledge of his tactics. This is where the controller's skill comes in.

How, for instance, was it possible for Captain Harbour, sitting in a New Guinea Ops room with only a report of four unidentified aircraft to go on, to call the turn accurately on a large sized raid?

"First of all," Captain Harbour explained, "I can't say the raid was *entirely* unexpected. We had just raided his base of Rabaul and I felt he would probably hit back to save face. I knew he would strike around noon because he had always hit this well-defended sector around noon before. From intelligence reports we knew he had a considerable number of dive bombers and fighters available, and since it was easily assumed the target would be our concentration of shipping at Ora Bay and Buna, I figured he would send all the dive bombers he could get off.

"I could make a stab at the altitude because we knew his dive bombers always came in between 15,000 and 17,000 feet on the last leg into the target. His track was similarly figured because all raids from Rabaul to this target generally came the same way. So, when the teller reported the first plot, even though it said only four aircraft at that stage, I knew it was the larger number of dive bombers and fighters coming at us, and I also had a good idea of all the other factors needed to make an interception. I got our fighters together over Ora Bay, orbited them until the enemy force was about 30 miles out and vectored them into the kill."

There might have been hell to pay if the controller had been wrong in this quick deduction of the enemy situation. But months of flying and controlling against the Jap had given him a working knowledge of Japanese tactics which paid off when it counted most.

Wherever he is, a controller must know his enemy's tactics, for frequently he can read more information from a knowledge of his methods than he can from his detectors—as witness the Ora Bay raid. Particularly is this true in those zones where mountainous terrain reduces effective radar coverage to a minimum.

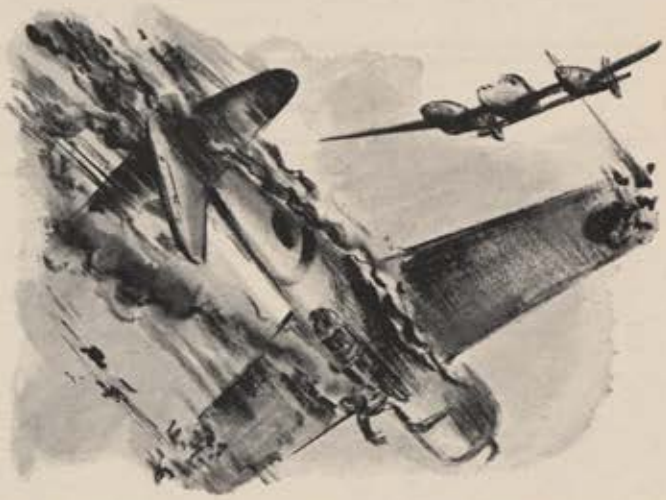
In the Southwest Pacific, as in some other theaters, the controller was a fighter pilot chosen at random in those days before the AAFSAT-trained controllers arrived on the scene. The pilot would fly one day, control the next. Flyers cast in this dual role found one as exciting as the other. "After spending fifteen months in New Guinea as a fighter pilot and controller," Captain Harbour said, "I can honestly say I believe I got a bigger thrill out of making a good interception with my squadrons than downing a Jap plane myself."

Although pilot-controller teamwork has reached a highly-developed state of almost perfect dovetailing, still there are times when the relationship is a delicate one. "Half the pilots love you, the other half of 'em hate you," as one controller put it. It's up to the controller to stack his fighters to provide the best tactical advantage. As a result, certain squadrons will always rate the gravy in such a deal.

"Even if your warning reports are accurate enough to indicate the enemy coming in at high altitude, you're taking a chance if you don't provide low cover in case the main strike comes in a little later on the deck," another controller explained. "So you have to stack your planes to cope with any enemy eventuality.

"Days may go by and your low-cover planes may not get a single crack at the bandits, while the boys upstairs are chalking up record-breaking scores. Naturally your low-cover pilots will gripe like hell and blame you for putting them there. Or it works the other way around if the raid is a low one. Whichever it is, the controller is the fall guy. But the pilot who drew a blank today may be top-scorer tomorrow, and our pilots have been flying long enough to know they'd a whole lot rather work *with* the control system than without it. The days of the free-lance fighter pilot are over. Our interceptions today are systematic, scientific—and sure. And that's the only thing that counts." ☆

Plots of friendly and enemy planes appear on grid table. Controller or intercept officer accurately vectors fighters to a "Tally-Ho!"



Pilots take over from this point on, as one "Splash!" after another is scored. Fighter control eliminates guesswork in interceptions.

Pulling in His Neck. Recent developments in the Jap's equipment, tactics and technique bear out the conclusion that the air fighting will be bitter as we strike deeper and deeper into Nippon home quarters.

Here are some developments:

Strong fighter opposition encountered by Superfortresses over Kyushu Island during a recent attack is indicative of how the Japanese have bolstered the inner zone air defense at the expense of the perimeter.

The enemy is developing his antiaircraft defenses close to home. Reports indicate that AA has been improved, both in volume and in accuracy.

Jap fighters are being equipped with better armament and better armor. The 20 mm and the 12.7 mm guns are being substituted for the 7.7 mm, which was one of the principal Jap aerial weapons at the beginning of the war. Moreover, the Japs are developing more powerful 20 mm guns, and single-shot 37 mm tank guns have been mounted in some fighters.

More and more, the Jap is equipping his fighters for air-to-air bombing, hoping thus to destroy our bomber formations by this defense. With somewhat better than usual accuracy, Zekes dropped 125 phosphorous bombs on our formations over Yap.

Current production emphasis is on twin-engine fighters.

Merchant ships are being armed more heavily than ever before. Double- and triple-barreled 25 mm automatic antiaircraft guns, production of which has been stepped up sharply, are being installed on many merchantmen.

Civilian defense activities, such as building shelters and training the populace for blackouts and air raids, have been intensified greatly. Among other recent instruction, the Air Defense General Headquarters has told the people to prepare breakfast and lunch each night for the following day, since gas mains are cut off as soon as the alarm sounds.

Ramming Department. A roundabout source gives us a story on the so-called Sturm or Ramm Staffel of German fighters, whose job is to ram American heavy bombers if they fail to shoot them down. Twenty German pilots, most of them being punished for flying offenses, were assigned to this job. These pilots, flying FW-190s with cockpit tops and sides

THIS IS

heavily armored, were under orders to attack our formations in the usual way, from head-on, and then to turn and ram individual bombers from behind. The Nazi pilot, if still alive, is supposed to bail out at this point.

Devil's Due. Whatever our pilots generally think of Jap fighter pilots, they recognize skill when they see it. Take the case of the Jap who was chased all over the sky by four P-51s. He circled and came in for more. They couldn't get a bead on him. Finally, as if tired of it, he broke away and went home.

The P-51 boys, admitting they had been outmaneuvered, came to know the Jap respectfully as "the coach."

Limit: One Squawk. Evidently civilians are expected to do a lot of squawking during our air raids over Korea. Lt. Gen. Sonada of the Korean Defense General Headquarters issued by radio this stern warning: "In any war, whenever a person thinks, 'Things are looking bad' or 'This is the end' he is already inviting a losing war. When we are bombed there will be cases where one may yell loud, but what we don't want you to do is continue yelling."

Propaganda. One of the current stories of the ingenious Jap propaganda bureau is that war prisoners taken by the Americans are run down and squashed by tanks.

Seaplane Tactics. With the Jap seaplane increasing in importance as a factor in the Pacific war, the instructions given to pilots of these planes are interesting and revealing.

Discussing the seaplane fighter, the Jap instructions to student pilots say, "These planes possess the characteristics of good observation, good turning power and the firepower of flexible and machine guns. They fight mutually supported and maintain constant and close liaison among themselves. Therefore, they should refrain from becoming dispersed in the battle area, and, as they possess a good field of fire . . ., they should feint the enemy into an opposite course action and draw him into a dog fight."

It is pointed out that the seaplane fighter is frequently only a decoy and "though they must endure this, they should try to reverse the situation by luring the enemy to a position below a friendly plane." Then the instructions add: "Upon catching on to the ruse, the friendly plane will dive to the attack without giving the enemy a chance to escape. However, in these cases it is not easy to lure away an enemy who is wise to the game. On the contrary, since this will redound to our disadvantage, spontaneous action may be most necessary."

The pilot is told that in undertaking an attack from a favorable position against a superior airplane, repeated steep dives and steep climbing attacks should be made. In other cases, the instructions add, it is advisable, immediately following one attack, to feign pursuit and attack.

The pilot is advised to use his fixed guns mainly, holding the flexible guns in position to use at a favorable moment.

YOUR ENEMY

"On the occasion of engaging an enemy plane in combat, use your turning ability to the utmost. You should make it impossible for other enemy planes to enter combat. In case the enemy comes in to attack from an opposite course, it is usually disadvantageous for one to plan to fight on the opposite course. In this case, it is best to lower the nose of the plane and pass the enemy at full speed. Then, without letting him get away, counterattack by executing a chandelle."

Annoyed. Japanese air commanders are greatly exercised about the increasing numbers of Jap aircraft destroyed on the ground. A recent order to all commanders, describing these on-the-ground losses as "most regrettable," declared that in cases where shelter installations are not complete, all flyable aircraft must be withdrawn before the raid starts.

As for those airplanes which remain on the ground, these measures were ordered:

1. Drain out the fuel.
2. Unload and disperse the equipment carried in the airplanes, especially pyrotechnics.
3. Disperse the planes, concealing them away from the field.

Oil defenses. Prior to its occupation by the Soviets, Ploesti was one of Hitler's great prizes. From its installations the Germans got much of the oil that kept the Nazi war machine running. No wonder it was a favorite target for Allied strategic bombing. And no wonder the Germans protected it with an elaborate system of air defenses.

Because the Ploesti defenses represented one of the Germans' best efforts, an examination of the measures used is interesting.

Active defense was built around fighter aircraft, antiaircraft batteries and searchlights. Balloon barrages, used to hinder dive bombers, were disposed in two concentric circles, one having a radius of 2,700 yards and the other about 1,100 yards. Smoke screens were employed effectively both day and night. Usually, they were extended to an area much larger than that to be defended and were placed with limited intensity so that fighter defense, fire-fighting and first aid would not be handicapped. Ordinarily the screen was raised by fixed installations but mobile equipment made it possible to change the area of the screen.

Passive defense included protection walls of reinforced concrete, some of them designed to make false shadows. Storage tanks were camouflaged, sometimes with light planking propped in the form of roofs. Among other things, this camouflage was designed to give the impression of barracks of various forms and dimensions. The camouflage color for protection walls was usually green or some very dark tone. Nearby roads and canals which might constitute points of reference for enemy attack were camouflaged to alter their width and directions.

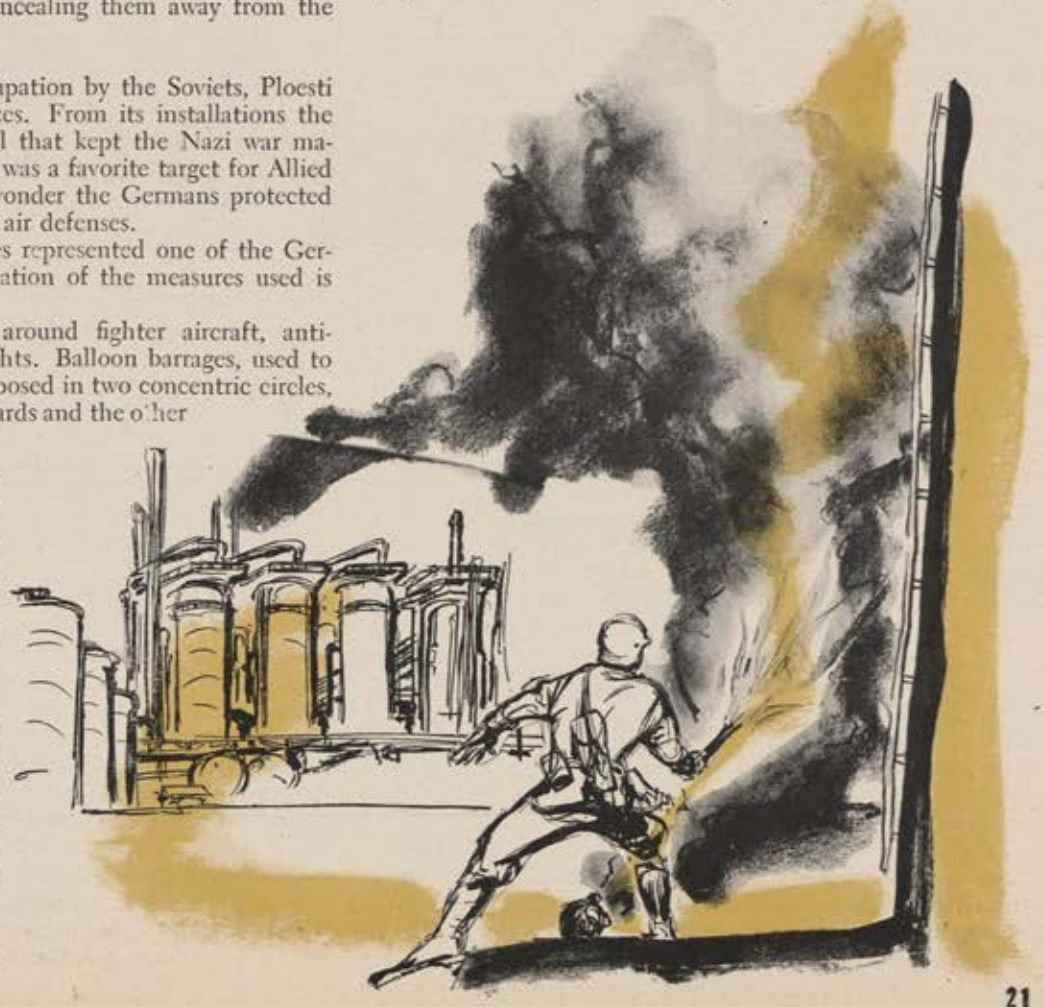
Another interesting camouflage measure was a system of dummy installations, built three to six miles from the real installations. The dummies were equipped to make false smoke and fires.

Jets. Here, briefly, are descriptions of the Luftwaffe's jet-propelled fighters.

ME-163: Single-engine, single-seat midwing monoplane. Resembles an arrowhead. Wings sharply swept back, short tear-drop fuselage. Tall single fin and rudder. Span 30 feet, length 20 feet. Speed, over 500 miles per hour. The 163 is rocket type, employing a single liquid rocket-propulsion unit. The endurance at full power is reported to be only a few minutes, but the jet may be used only intermittently.

ME-262: Single-seat, twin-engine, low-wing monoplane. Wings are tapered with squarish tips. Slim fuselage has a long nose, with cockpit placed over the wing. Span 41 feet, length 35 feet 5 inches. Speed, over 550 miles per hour. In contrast to the rocket-type 163, the 262 is a true jet-propelled fighter with two jet units.

First claim for a destroyed ME-262 was made recently by two 8th Air Force P-47 pilots. Flying at 11,000 feet near Brussels, they saw the ME-262 at 500 feet and at once went into a 45-degree dive. The German attempted to make a belly-landing. The Thunderbolts came in strafing, and the jet plane was destroyed on the ground. ☆



When a radio operator makes a mistake, it can easily be fatal

KEY MEN

THE B-24s were about half an hour from their targets in Italy. The flight had been long and uneventful, so the radio operator in the lead plane took off his headset and relaxed. While he was watching the scenery, the ground station called with instructions not to go over the target. Reports had been received of unusually strong fighter opposition, and orders were issued to call back the flight. But the radio operator never got the message. The formation continued over the target and got the hell shot out of it. All because a radio operator was not paying attention to his job.

It is axiomatic that a radio operator keeps his headset on at all times. Otherwise, he is useless to the flight. But radio operators, like anyone else, are apt to make mistakes. They agree, however, that there is no reason why the same error should be committed twice. The incidents reported here—as told to an AIR FORCE staff writer—come straight from the radio operators who offer them with the thought that even once is too much.

Take the case of the radio operator who was returning from a mission with a seriously wounded gunner aboard. Following the correct procedure, he called his base with a request to get an ambulance ready and have medical assistance on hand. But he called on the fixed wire antenna and he had his antenna switch on the trailing wire position. Naturally, there was no transmission. Every radio operator in the air force knows that the antenna switch should have been on the fixed wire position. But this man was excited and he did not take time to check his equipment. As a result of this simple error, no one was waiting to treat the wounded gunner. He might have died from the loss of blood before he got the necessary attention.

Then there was the radio operator in the lead plane of a flight of B-17s attacking targets in France. Halfway between his base and the target, he called the ground station for a message check. He might just as well have sent a personally engraved message to the *Hauptmann* at the nearest Luftwaffe base, presented his compliments, informed him that some American planes were on their way, and requested the Nazi to please send up some intercepters. It amounted to the same thing. Thirty-five FW 190s attacked, shot down two planes, forced four to turn back and damaged several others. It is the opinion of the men on the mission that the Germans would never have been alerted so quickly, or been in a position to attack so effectively, if the radio operator had not broken radio silence.

The lesson of maintaining radio silence, except in emergencies, is one of the first things taught to radiomen. From the time they get into school, until their tour of duty is completed, the importance of keeping off the air unless absolutely necessary is repeatedly hammered home. Yet on this flight, and many others like it, men were killed, planes were lost, and the success of the mission seriously diminished because a radio operator did not remember the first rule of his trade: Maintain radio silence at all times unless the situation is critical.

Combat-wise radio operators report that some men have had the extremely bad habit of calling for frequency checks shortly after leaving their base. Such action is completely unnecessary and serves chiefly to warn the enemy. The radio operator should know if his radio transmitter is on the exact frequency before the take-off. If he has any doubt about it, he should check by tuning the radio receiver to the exact frequency to be monitored and then zero beat the transmitter against the receiver. This will put him on the frequency of the ground station.

Another serious error reported from the ETO is the inability of radio operators to change frequencies quickly. If it is necessary to ditch a plane, the Air-Sea Rescue must be radioed information as to the distressed aircraft's position. To do this, the radio operator must switch frequencies—and fast. The few seconds spent making the proper adjustments may mean the difference between being immediately rescued or floating aimlessly around on a raft.

The same situation applies when weather or other obstacles make it impossible to establish contact with the base ground station. To call the alternative station, a quick frequency change must be made. Men who have sweated out this operation say that it is essential that the radio operator know how to do it with maximum efficiency and a minimum loss of time.

Some of the mistakes made fall into the category of plain damn fool tricks. Such was the situation with the B-26s which were returning to their base during the battle of Sicily. The lead operator called for a QDM, got one, but never bothered to authenticate it. The entire flight went into a German field. Some smart Nazi had tricked the radio operator into believing that it was his home station which sent out the signal. The Germans are very obliging in that regard. Asking for authentication is a simple matter—it would seem such action should be practically automatic—but reports indicate that this mistake has been made with serious consequences in every combat theater. In the early days in England, a B-17 flight was cancelled by a German radio

(Continued on Page 56)

Wear That Armor!

LIVING today on borrowed time are many AAF bomber crewmen whose names on flak and cannon shell fragments were erased by their body armor. The good sense which led them to wear flak suits and helmets in combat and thus live to fly another day will likely bring them home intact.

But there's a touch of that "fools rush in" business about wearing body armor. While seasoned veterans swear by their issued protection and wouldn't fly without it, some of the greener airmen are foolish enough to go into action unshielded.

It shouldn't be difficult to persuade a man to guard himself against death or a wound which may cripple him for the rest of his life. But some people have to learn the hard way, and the principal objection to that kind of education is that graduation usually comes too late.

The usual complaint of the objector to flak suits and helmets is that they are too cumbersome, that their weight and bulk hampers his movements too greatly. Maybe they are a bit inconvenient. It's inconvenient to die, too.

The flak suit currently in use by the AAF is composed of overlapping plates of manganese steel contained in vests and aprons of canvas. Designed and developed by Brig. Gen. Malcolm C. Grow, surgeon of the US Strategic Air Forces in Europe, it is intended to provide protection particularly against head, neck, chest and abdominal wounds from spent bullets and low velocity flak and 20 mm shell fragments, which formerly were responsible for 85 percent of all casualties in air combat.

The body armor comes in several fashionable styles—fashionable for those who want to see the States again. The garments are worn singly or combined, according to the flyer's combat post.

The M1 vest, armored front and back, weighs 18 pounds, 2 ounces. The M2 vest is armored only in front and is worn by crewmembers who occupy armor-plated seats. The M3 tapered apron, for crew members who are in an otherwise unprotected sitting position in flight, weighs 4 pounds, 12 ounces. The M4 full apron, worn by gunners, weighs 7 pounds, 8 ounces.

Approximately 40 percent of combat wounds received by men flying in bombers are caused by flak, 40 percent by 20 mm cannon shells, 10 percent by free fragments of plane structure, and the remaining 10 percent by machine gun projectiles. The flak suit will protect the wearer against long-range flak and 20 mm shell fragments but not against flak which bursts near the plane.

USSTAF records on 133 airmen struck by flying flak or enemy missiles of other sorts while wearing body armor reveal that two-thirds escaped injury. The complete percentage breakdown:

No injuries	65.5
Slightly wounded	24.0
Seriously wounded	2.3
Killed	8.2

Detailed experiences of the 91.8 percent who lived to tell their stories, are on file. A few of them are quoted here to give you the general idea:

Second Lt. Thomas D. Sellers, copilot, 381st Bomb Group: "Your flak suits and helmets are your best form of life assurance. . . . My wounds outlined the flak suit as if an artist had been at work. . . . To those of you, who may object to the weight, I can truthfully say that you'll never notice it in the heat of battle. It gets lighter with each mile you go inside enemy territory until finally you wonder if it is heavy enough to do the job. . . . If you love yourself or anyone back home, then it's your duty to wear body armor, just as much as it is your duty to have ammunition in your guns."

S/Sgt. Calvin W. Hopkins, waist gunner, 401st Bomb Group: "A piece of flak penetrated the left waist gun window, just missing the left waist gunner and hitting the back of my flak suit, which was the only thing that saved me. If anyone figures the suit is too heavy to wear, he'll take my advice and banish that thought." Capt. H. G. Overly, squadron surgeon, examined Hopkins and his flak suit when the gunner returned to his base. The medic also gave the suit credit for saving the man's life.

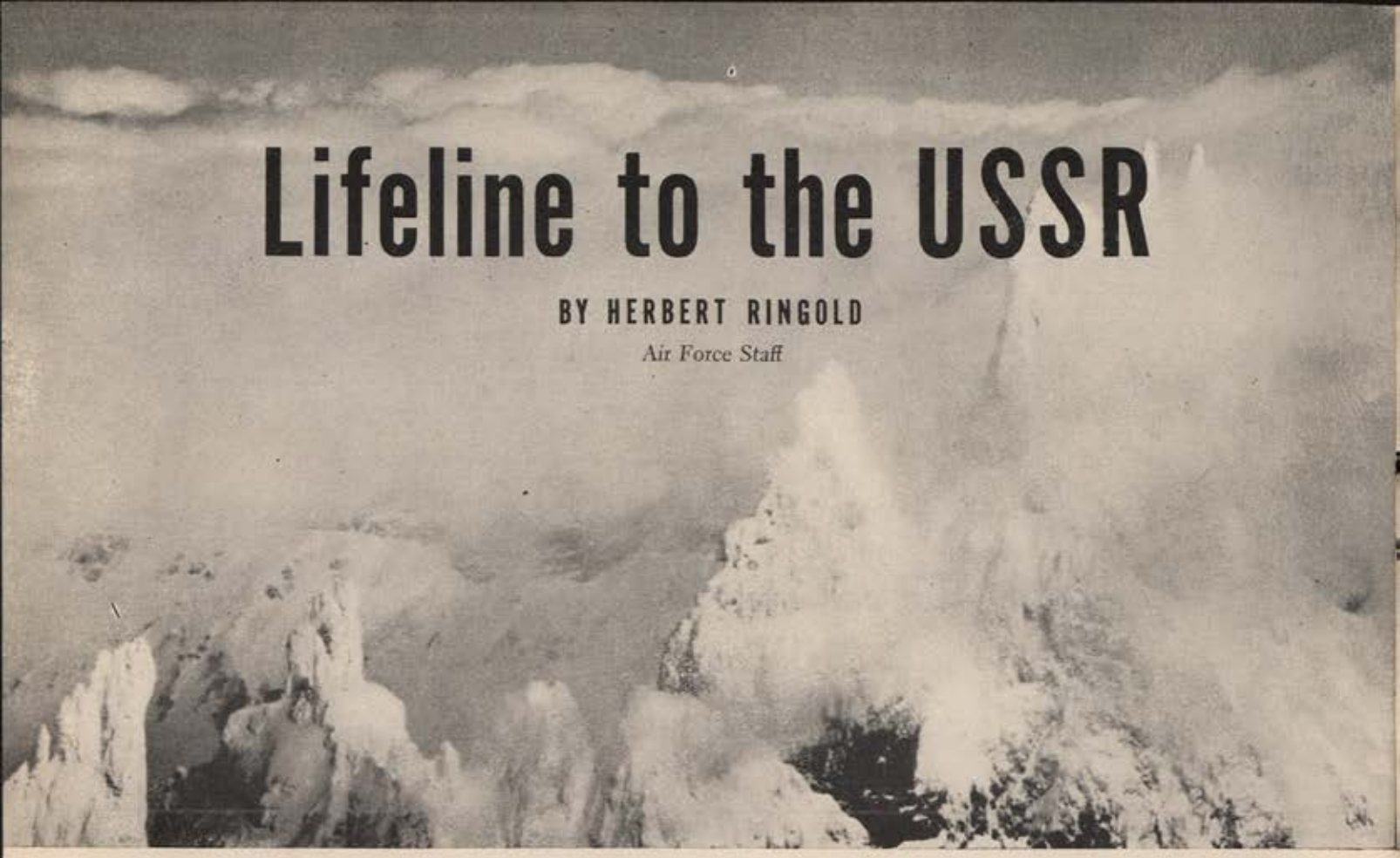
S/Sgt. Albert J. Riley, waist gunner, 392nd Bomb Group: "I was hit by two large pieces of flak directly over the heart. Although the force of the blow knocked me down, I received no injuries except mild bruises. I advise everyone to wear a flak suit. I'd be in pretty bad shape if I hadn't worn mine."

Second Lt. Vernon H. Powell, bombardier, 416th Bomb Group: "A piece of flak came through the left side of the nose of the plane, striking the left side of my head about 2½ inches above my left eye. I sincerely believe the flak helmet saved my life."

S/Sgt. Edwin J. Miller, top turret gunner, 391st Bomb Group: "I was struck by flak on my helmet. The fabric was torn and the steel plating dented. My head was forced against the gun mount with sufficient force to break by goggles. I believe the helmet saved me from serious injury." Capt. Richard L. Rapport, Miller's squadron surgeon, said: "In my opinion, the helmet saved this man from injury which conceivably could have been serious enough to result in his death." ☆

Saved by body armor when flak struck him in abdomen, 2d Lt. C. R. Cole, 305th Bomb Group bombardier, later chalked his sentiments on suit. Tear in covering is circled.

When 20 mm shell exploded against M1 vest of T/Sgt. J. W. Bothwell, 94th Bomb Group radioman, no fragments penetrated. He was cut slightly by bent armor plates.



Lifeline to the USSR

BY HERBERT RINGOLD

Air Force Staff

THE P-40 was blown into a blizzard by a 60 mile an hour wind. The pilot climbed to 14,000 feet without oxygen—his plane had no oxygen. He couldn't contact his base—he had no radio. He couldn't see—the snow froze to his windshield. He couldn't land—the terrain was covered by giant trees and jagged mountain peaks. He couldn't bail out—at the briefing he had been told that even if they knew where he went down it would take three months to rescue him. Turning back was an academic question—he didn't know where he was. There was nothing he could do but stay there and fly his airplane. Finally, after battling conditions as bad as any ever faced by American airmen, he brought his plane into Ladd Field, Alaska. He had completed a flight over the treacherous Northwest Route from Great Falls, Mont., to Fairbanks, Alaska, where a Russian pilot was waiting to move his plane across Siberia and into battle.

This was 1942. The war was not going according to plan. In June, the Japs bombed Dutch Harbor. Our small defense forces could not prevent them from making three successful landings in the Aleutians. In Africa, Rommel had captured Tobruk and was pushing toward Alexandria. Only a hastily reorganized British army stood between his Afrika Korps and German control of the Suez Canal. The USSR had lost Rostov and Sevastopol. Nazi General Von Bock was grinding up in force for the critical battle of Stalingrad. Both the Alaskan Air Forces and the Russians needed airplanes—and in one hell of a hurry.

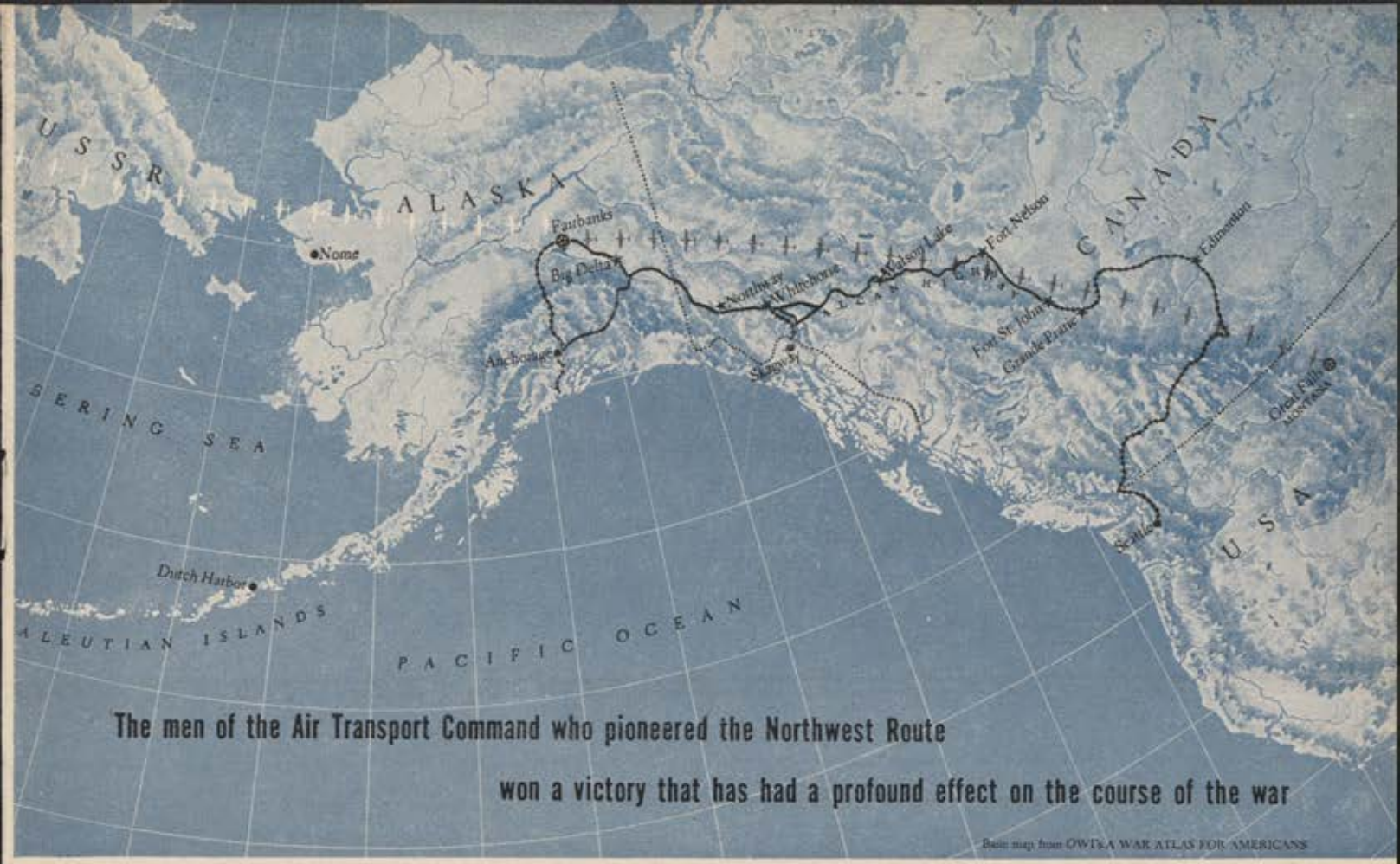
Some few planes were going to the Soviet Union the hard way—around Africa and up the Persian Gulf by boat and then overland across Iran—13,000 tortuous miles. Others were shipped via the Murmansk route, but a murderous percentage of the ships was being lost to U-boats and Norway-based Dorniers. It was obvious that a more efficient ferry route would have to be opened to Russia.

It was opened. By mid-1944, more than 5,000 planes had been delivered to the Russians over the Northwest Route. Fifty-nine percent were P-39s, but A-20s, P-63s and B-25s were moved up the run as fast as the Russians could take them into Siberia. Today, deliveries are being made at the rate of one every half hour. It's an achievement of which Americans can well be proud. It has played an important part in the winning of this war.

In the beginning, however, it was a rough deal. Back in November, 1940, the United States-Canadian Permanent Joint Board of Defense had recommended the development of an air route from the United States to Fairbanks. Early in 1942, Brig. Gen. O. A. Anderson suggested to the Air Staff that planes be ferried to Alaska. On June 26, 1942, a memorandum from Headquarters, Washington, to the 7th Ferrying Group, Ferrying Division, Air Transport Command at Great Falls stated: "You will take necessary action to organize and operate a ferry route between Great Falls, Montana and Fairbanks, Alaska."

It wasn't enough that we didn't know all of the answers; we didn't even know all of the questions that would arise when you build an airway from scratch along a route where few Americans had ever flown before, over vast expanses of snowbound territory that had never been mapped for aerial flight, in temperatures that got down to the minus sixties.

The first problem was to select the route. Great Falls, Montana was picked as the jumping-off base. It was desirable to by-pass the dangerous coastal run from Spokane into Fairbanks and necessary to establish Headquarters away from the West Coast Defense Area yet close enough to the aircraft factories. This was, remember, 1942 and combat-ready fighters were not pouring out of California's production lines. The P-39s, which the Russians used as anti-tank weapons, were coming from the East. Furthermore, Great Falls was close to a series of bush pilot flight strips which



The men of the Air Transport Command who pioneered the Northwest Route won a victory that has had a profound effect on the course of the war

Basic map from OWI's A WAR ATLAS FOR AMERICANS

then could not honestly be called flight strips but which could be turned into a series of bases linking the United States to Alaska.

In June, 1942, a group of officers, Maj. Lloyd Earle flight commander, made the first survey run for the 7th Ferrying Group and the route was opened with major stops at Great Falls, Edmonton, Fort St. John, Fort Nelson, Watson Lake, Whitehorse, and Fairbanks.

When the route was first opened, deliveries were few and far between. Men were killed, aircraft cracked up with alarming regularity. For a while it appeared that the promised delivery schedule would not be met. Moreover, the winter of 1942-43 was the coldest in all the recorded history of Fairbanks. The temperature dropped to 67 degrees below zero. At some way stations, men lived in tents in that kind of weather—and the latrines were outside. Engine oil froze to solid ice. Weather changed from CAVU to zero-zero in seven minutes. At Ladd Field, it was not physically possible to work outdoors for long periods in temperatures that turned breath into icicles, froze eyelids together, and caused severe cases of frostbite, sometimes necessitating amputation. Mechanics took turns running in and out of heated hangars to service the planes. If any part of the body touched a piece of metal, flesh and metal could not be separated without cutting. If a single drop of 100 octane gas fell on the skin, it would raise a blister about an inch high. The fingers of some mechanics were eaten away like the hands of lepers.

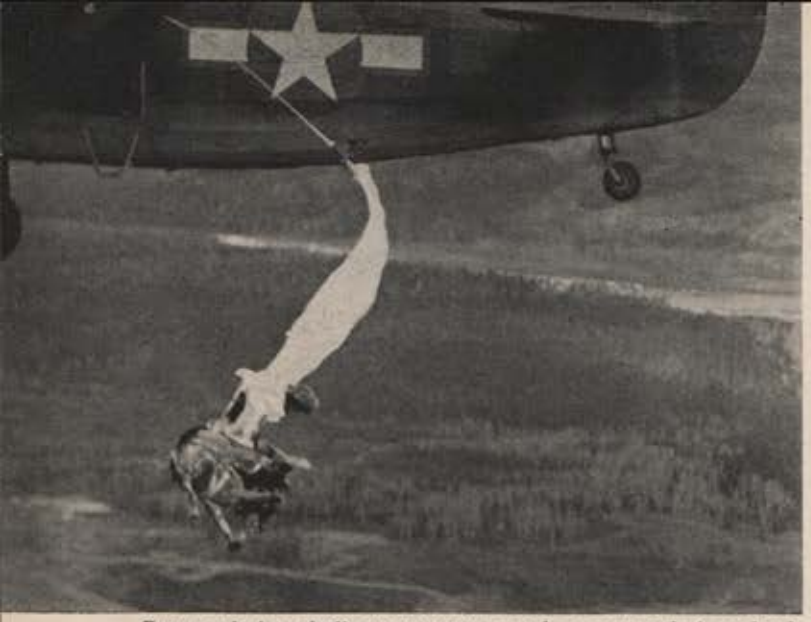
An indication of the weather is seen in the case of Capt. Thomas Hardy. He was B-26 Project Officer at Fairbanks and he had two brand new Marauders, in tip-top shape, serviced by some of the best mechanics in the business. Only four hours of flying time a month is necessary to qualify for flying pay. During January, 1943, the weather was so bad that Capt. Hardy did not get flying pay.

Gradually, with the help of the untiring work carried on by Brig. Gen. Dale V. Gaffney's (now CG of ATC's Alaskan Division) Cold Weather Testing Unit at Ladd Field and the pioneering of Col. Ponton De Arce, first commanding officer at Great Falls, the principal difficulties were licked.

Flying the route in the early days presented the kind of hazards that grandchildren will never believe. Along the 1,900 mile run, there were only four radio ranges. They were on the air only half of the time—and then they were completely unreliable. Pilots said that the best way to run into a mountainside was to stay on the beam. Landing conditions were dangerous because most fields had only soft dirt runways. Maj. Frank Lardent said, "I taxied a B-24 over a culvert at Edmonton and the damn thing collapsed underneath me. When I parked on the landing mats, they sank into the mud."

There was no weather information of any kind in an area where the only thing that could be forecast was that the weather would be unpredictable. "I had only one weather report for 24 hours of flying," said Capt. Edmund Averman. Pilots took off under perfect flying conditions and ran into a snowstorm five minutes out. They just stuck their ships into the weather and flew until it got too tough. Then the trick was to find out where they were and how to get back.

There is a valley between Watson Lake and Whitehorse which became known as Million Dollar Valley because we lost more than a million dollars worth of airplanes up there in a short time. It was easy for experienced pilots to guess what had happened. The planes ran into weather—blizzards, thunderstorms, fog, severe icing, and ceiling zero in the mountains. In that area, there were absolutely no navigational methods to determine approximate position. Every hundred miles of frozen terrain looked just like every other hundred miles. Every mountain range presented the same ugly picture. Radios were useless—distances were too great to establish contact. The pilots just flew around blindly until



Two pack dogs bail out paratrooper style, a new technique developed by ATC Alaskan Division to save flyers downed in the wilds.

A sharpshooting Soviet airman draws a bead on the 8-ball during a competition held at the officers' club of Alaskan Division in Nome.

Ten o'clock of a December morning at Ladd Field, Alaska. There may be a midnight sun in summer, but winter is a long, dark season.

they found this likely looking valley which seemed to offer an evenue of escape. Then they crashed. Despite all the hazards of the trip, one man made it in a Piper Cub. In December, 1942, Capt. Malcolm Pruitt looked over his insurance records and took off from Great Falls in a Cub that had a range of only three hours. He knew that he could not make the 242 mile jump from Edmonton to the flight strip at Grand Prairie without adding extra hours to his flying time. So he went into a hardware store and purchased a funnel. Then he scraped up 22 one-gallon gasoline cans and cut a hole in the gas tank which extends into the Piper cockpit. He kept one eye on his course and one eye on the gas. Every time the gas supply dropped, he heaved another gallon into the tank.

After flying out of Edmonton for four hours and fifteen minutes, he was still nowhere near his first stop. The outside temperature was a smart 20 degrees below zero, and Pruitt had no heater. He finally went down into nine inches of snow in the middle of a farmer's field. He figured that he could telephone for help—but the farmer had no phone.

When he got out to his plane, he found that the motor had frozen. Pruitt had already had too many troubles to let that bother him. He found a washtub, built a fire in it, and shoved the tub under the motor, heating it up sufficiently for the take-off. After an hour of night flying without instruments, he landed again at a little railroad town in the Peace River country. Finally, he got into Grand Prairie and eventually delivered his plane to Fort St. John, 796 miles from Great Falls.

Getting through in those days was often a matter of luck. Some of the most experienced pilots in the Air Forces went down more than two years ago—and they and their airplanes haven't been found yet. Because of the lack of radio ranges, it was impossible to notify the base as to the approximate crash position. A wrecked plane was nothing more than a fly speck against a background of snow and ice that extended for thousands of miles.

There were no roads, no people, no shelter, and very little chance of finding food. It was the kind of territory that even Renfrew of the Royal Canadian Mounted has never visited. Many crewmen who crashed were found frozen to death. There have been exceptions; Lt. Leon Crane got back after 84 days in the wilderness. On the other hand, a crew bailed out within sight of an airfield—and their plane is still undiscovered.

The man with one of the most unusual rescue stories is Capt. Thomas Dichiara. He was coming back from Fairbanks as a passenger in a C-60. The plane went into a spin and Dichiara bailed out. While he was floating down into that frozen barren country, the pilot righted the ship and flew on. Dichiara was very much alone.

He had no idea where he was, so he just picked a direction and headed off. In 30 minutes, he came across the only railroad track in that part of the world. Fifteen minutes later, a train which runs only once a week came along and picked him up.

Today, conditions in that area have been changed. Where there were only four radio ranges, now there is a range station every 150 to 200 miles. With one exception, all legs are interlocking. Instead of hundreds of miles without a possible landing site, there are now 13 regular landing fields and eight flight strips, a hundred miles apart. The Alcan Highway provides a perfect checkpoint with a station every 40 miles.

An Arctic Rescue System has been organized which has effectively combatted one of the most serious of all problems faced along the Northwest Route—the question of the mental hazard faced by airmen who knew that in case of

trouble their chances of survival and rescue would be exceedingly slim. A radio network is maintained and five stations have aircraft assigned for the specific purpose of helping in the search and dropping supplies. A survival kit has been perfected complete down to frying pans. There is a standing reward of $100 awaiting any trapper who furnishes information resulting in the rescue of grounded airmen.

But the men who were given the job of setting up a rescue system were faced with a problem that ordinary rescue methods could not overcome. Crews were forced down in locations inaccessible even to a man dropped by parachute. Planes cracked up in the middle of heavily wooded forests or on the top of mountain peaks. It was often necessary to land a rescue party miles away from the stricken airmen. But the rescuers could not carry the heavy sleds and equipment needed for the evacuation work. The problem had no answer until Lt. David Irwin came up with the idea of using parapups.

Lieutenant Irwin lived in the North country for years before the war. He said that he could train his dogs so that they could be parachuted out of an airplane. Then the sleds could be dropped to the rescue party and the dogs hitched up.

A test flight was made and Lieutenant Irwin merely pushed the dogs out of a C-47. The chutes opened automatically and the dogs landed without injury. Now the use of parapups is a routine method of operation. Everything has worked without difficulty except that Lieutenant Irwin has been unable to teach his dogs to yell "Geronimo" as they jump.

Every time one problem was solved another arose which demanded immediate attention. The toughest of all was the problem of winterizing the airplanes. Hydraulic fluid wouldn't flow at minus 30 and 40. Even at less cold temperatures, the fluid became so stiff that airmen had to sit with their feet braced against the landing gear operating valve in order to lower and raise the gear. A lighter fluid was developed that would pour in zero temperatures.

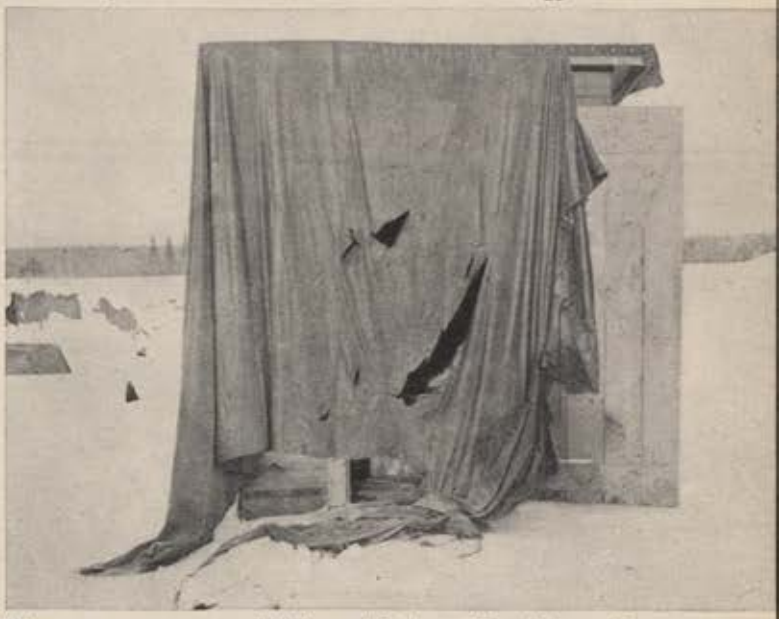
The sparkplugs wouldn't heat. As one pilot put it, "By the time I got out to the end of the runway, my engine sounded like an asthmatic outboard motor boat." A new sparkplug was invented with a longer electrode protruding into the combustion chambers of the cylinders.

The oil supply to the engines was cut off because moisture ran down into the oil tank sump and promptly froze. Hundreds of feet of control cable were useless because the grease in the system froze as solid as concrete. A mechanic who helped lick the problem said, "For a while there, we were going crazy. We'd put the correct tension on the control cables to allow for a temperature of minus 15 degrees, and a drop to minus 40 caused the cables to tighten and pull something loose. Then when we fixed them for minus 40, the thermometer went up to minus 10 and expansion set in. We finally arranged a complicated system that solved the problem."

One of the problems that still hasn't been completely licked is the undramatic question of making allowances for the differential in the expansion and contraction ratio of the various metals. Aluminum does not expand at the same rate as copper. Copper has a different contraction ratio from steel. When one metal contracted, the connecting rods had to be tightened to allow for the change. Then the other metal would contract and the work had to be done all over again. When the temperature changed, one metal would expand, requiring a loosening up process all around. But the second metal had not yet expanded and the proper allowances had to be made. After this was worked out for minus

(Continued on Page 46)

Palm Beach was never like this. ATC men in these tents at Watson Lake during the winter of '43 learned what the word "rugged" means.



When you gotta go, at 60 below. A latrine at Fort Nelson, Canada, was probably the world's coldest place during the winter of 1943.

Digging fuel drums out of snow in 60 below zero temperatures was a routine chore for ATC men at bases along the ferry route.

THE MAN WITH THE PRIVATE BREEZE

By Maj. Luther Davis
AIR FORCE Staff

In England, when you're scared stiff, they say you've 'got the wind up.' Major Davis swears this is a true story. Major Davis frequently lies in h:s teeth

"It's like this," said Pfc. George Opfel of 1258 Bloom Street, Pittsburgh, Penn. "I was waist gunner and minding my own business. After we cross the coast I see a speck in the sun and I says into the intercom, 'ME-109 in the sun.' Not that I know it's an ME-109, but it sounds good.

"Well, everything's quiet for a few minutes and then I see this speck coming closer like a bat out of hell. So I calls into the intercom, 'Here he comes!' And right then is when it happened."

The captain doing the interrogating looked interested. "It was right then the wind starts. At first I figure maybe flak blew a hole in the fuselage. Not that I seen any flak. Turns out later there wasn't any hole. But the wind was terrific. It blows out some magazines I've been saving. Also a Spam sandwich which was pretty heavy. It's a hell of a wind. It almost blows the oxygen mask off my face. But me, I'm busy trying to track this ME-109 which turns out to be more like a Heinkel something or other. Only he doesn't make a pass but pulls off about two thousand yards to the side and just looks at us.

"I turn around and I see That Jerk—S/Sgt. Marion C. MacKensie is his name. Staff sergeant no less. Fresh out of the States and he's a staff sergeant. Flying his first mission and he's a staff sergeant."

"Go on with the story."

"Oh. Well, I turn around and see The Jerk hanging onto his gun for dear life, the wind whipping his winter flying suit practically off his back. And I think it's funny he's getting more wind than I am. Then I notice another thing. The wind comes from the wrong direction. From the tail toward the nose. Well, I tap The Jerk on the shoulder and he looks at me with such scared eyes I'm sorry for him. 'Relax,' I tell him. 'That Jerry ain't going to attack. He's just a snooper.' As soon as I say that The Jerk looks less frightened—and the wind dies down."

"I see," said the captain. "And the same thing happened later when you were attacked after leaving the target?"

"That's right."

"Have you any theories, Opfel?"

"I think," said Opfel darkly, "you better talk to MacKensie himself. You wouldn't believe me if I said it."

A few minutes later MacKensie came in. He was a very thin specimen with a concave chest. His eyes were enormous and kind of rabbitty looking. "Yes sir?" he said, leaning heavily on the "sir."

"About that wind," said the captain. "Know what caused it?"

"Yessir. I did."

"How?"

"I just couldn't help it. Honest it isn't my fault. You believe me don't you?" As he said this his voice quavered. A sudden burst of wind whipped through the office and blew everything out of the captain's "in" basket.

"It always happens," said MacKensie mournfully. "I get my wind up too easily."

The captain gave up trying to save his papers and just let them blow. "Say that again, sergeant. Say that again."

"I guess I just get my wind up too easily."

"You mean—do you mean when you get a wind up, you really get a wind up?"

MacKensie's eyes got bigger. "Sure," he said. "Doesn't everybody?"

And that is the true story of why S/Sgt. Marion C. MacKensie, 622 East 40th Street, New York City, was removed from flying status as "unfit for combat." You'll find the whole thing in his service record which bears the cryptic comment, "This man has his own breeze. Should be kept out-of-doors." ☆

Night Marauders

The Marauders took off for their first night mission in a cold, gusty rain. Some pessimists predicted that a third of them would not return.

Drawings By Capt. Raymond Creekmore

AIR FORCE Staff

THE Marauders, once condemned as too hot to handle, were the first American bombers to make successful night-bombing missions in force from Great Britain, striking first on May 22, and the fifth time on July 7 when nine were lost. News of these operations was withheld for a time since the first four were made without a loss. All Marauder night missions were led by 9th Air Force Pathfinders which made possible bombing through solid cloud cover. The months of night training paid off generously at dawn on June 6 when the first Normandy landings were preceded by B-26 attacks, the planes taking off in the dark.

Pathfinders, turning back over the area, could see bombs bursting.

German searchlights caught a Marauder called "Homesick," and a gunner was wounded by shell fragments. Bombardier gave first aid.

THE AIR WAR IN THE SOUTHWEST PACIFIC

By Col. B. B. Cain

Far East Air Forces

"We will come back and make the Japs pay a hundredfold in death and destruction."

That was the grim pledge made by a handful of survivors of the puny U. S. Far Eastern Air Force that was all but wiped out in the Philippines.

Today one embodiment of that pledge is the mighty Far East Air Forces, comprising the U. S. 5th and 13th Air Forces in the Southwest Pacific, which, under command of Lt. Gen. George C. Kenney, paid the first installment on that debt on the night of August 5 when a B-24 on a reconnaissance mission bombed Sassa airdrome north of Davao.

The present contraction of the Japanese air force into their Philippines stronghold is the action of a beast that knows it is hurt and about to die, cornered but dangerous.

Recapture of the Philippines to the American mind is almost an end in itself, a matter of national honor. When the day comes that our planes once more take off from Nichols and Clark fields, this time with bombs for Tokyo, we will be compensated for the long and bitter struggle along the road back to the Philippines across the Southwest Pacific from Australia.

At the beginning of the war the Japanese military machine was an almost perfect offensive unit. For years the Jap had been trained in offense. His whole movement was based on advance or die, and inasmuch as he had been convinced by these teachings that death meant a beautiful after life, he was quite ready to die, and apparently still is.

The speed of his advance after Pearl Harbor becomes almost breathless when one realizes that Manila fell on January 2, 1942, and that 18 days later he was softening up Rabaul, in New Britain. Rabaul fell three days later and became the Jap's principal forward supply depot. During the next month the Japanese steamroller over-ran Borneo, Timor in the Dutch East Indies, and Singapore; the rest of New Britain came into Jap possession, and from bases captured at Lae and Salamaua along the east coast of New Guinea the Jap was bombing Port Moresby and threatening Australia itself.

Early in March the Japs rocketed into Java on one side and occupied Bougainville in the Solomons on the other. Their tactics and strategy were superb: bold leaps, terrific shock. Meeting more opposition than anticipated at any one spot, they would by-pass it and take another, finally surround the point of stubborn resistance and strangle it into submission. A large, first-class merchant marine easily supplied, garrisoned and assisted in consolidating newly captured territory.

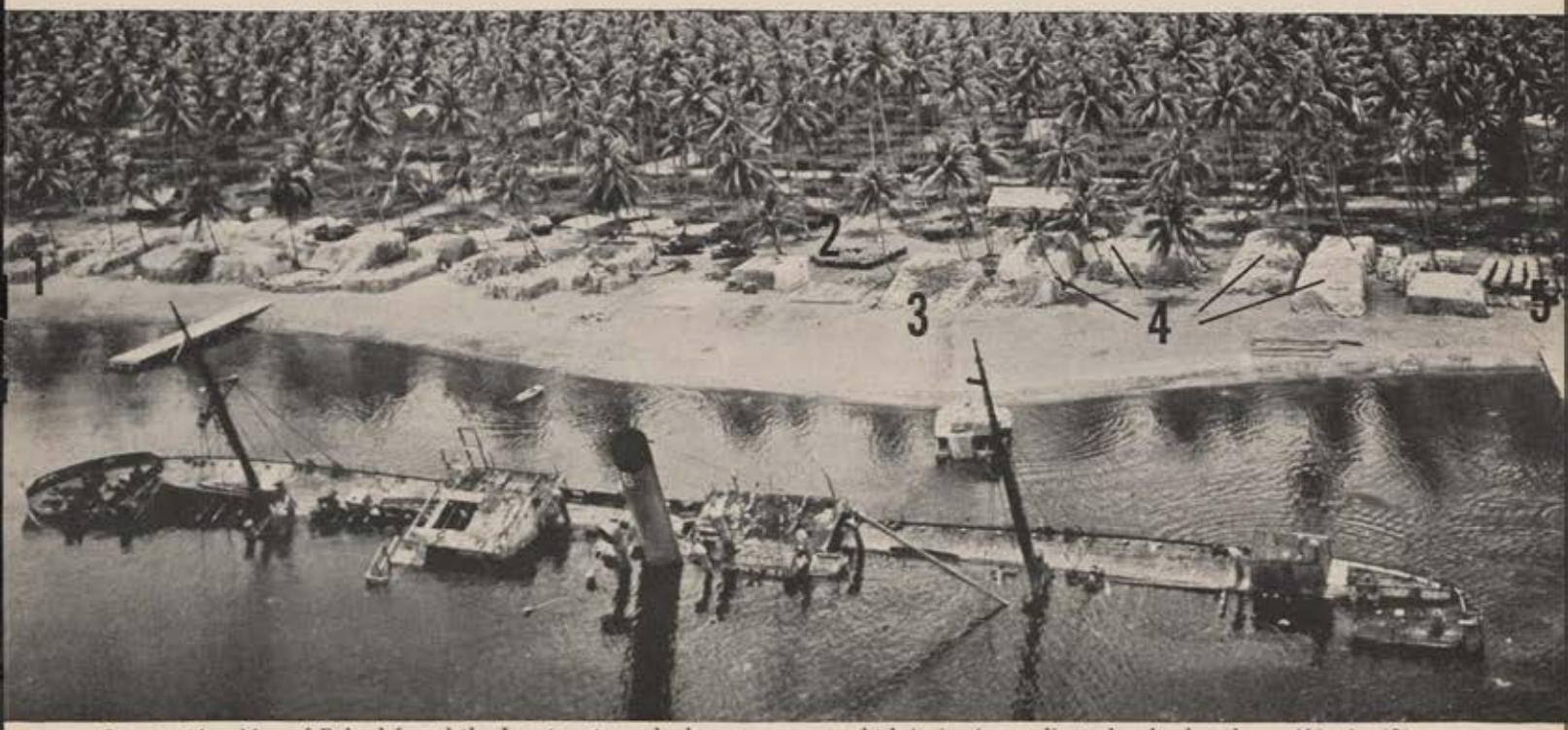
The ease with which the Japanese merchant marine plied protected shipping lanes, entirely covered by land-based aircraft, has backfired, however, as it made unnecessary the development of an air transport system. Instead the entire Japanese aircraft industry was devoted to combat airplane production. With such a rapid advance, anything but light maintenance was impossible, but the resulting wastage was offset by a continuous flow of new aircraft.

In the spring of 1942, with the Australian continent as an objective, the Jap met a stubborn point of resistance that he could not afford to by-pass—Port Moresby. Typical Japanese "Plan A," which had worked like magic up to this point, was put into effect for its capture. An air-covered, amphibious action supported by strong naval forces set out with the intention of sailing through China Strait around the southeast coast of New Guinea and taking Port Moresby by surprise.

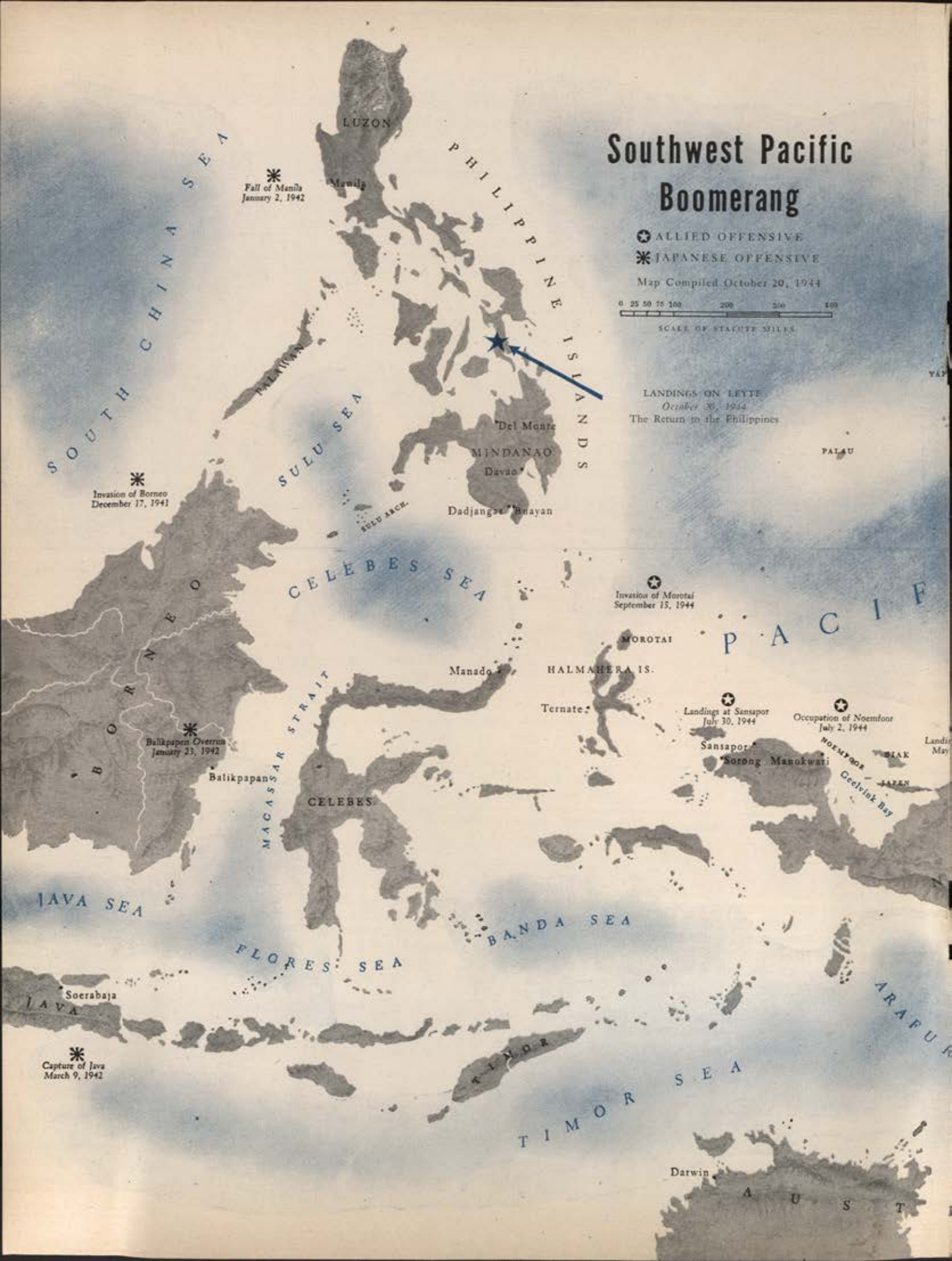
For the first time, however, the formula failed to work. Instead of a smooth victory the Jap met a serious defeat in the Battle of the Coral Sea which was fought May 4-8, 1942. The score: 11 Japanese vessels sunk to one

A brilliant summary of operations to date by an officer who has been in the theater since April, 1942

Softening up the Marshalls for the February 1 invasion, this 7th Air Force B-25 has just blasted Jap installations on one of the islands.



Constant bombing of Rabaul forced the Japs to set supply dumps in adjacent areas, like this one at Vunapope. Freighter in foreground was caught bringing in supplies to beach where boxes (1), rice (2), perishable stores (3), oil drums (4), machine parts (5) were stored.

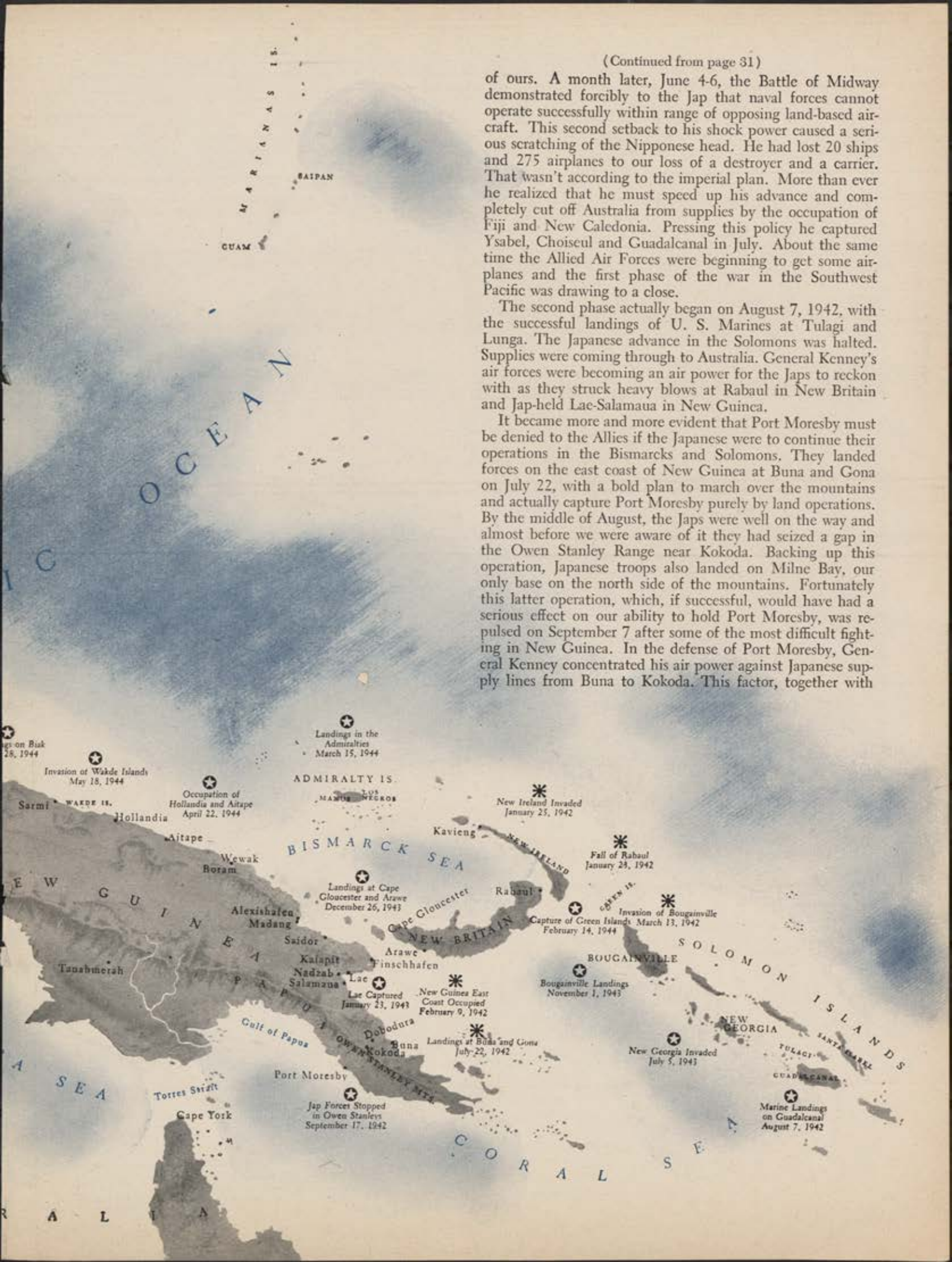

Southwest Pacific Boomerang
ALLIED OFFENSIVE
JAPANESE OFFENSIVE
Map Compiled October 20, 1944
0 25 50 75 100 200 300 400
SCALE OF STATUTE MILES
LANDINGS ON LEYTE
October 20, 1944
The Return to the Philippines
LUZON
Manila
Fall of Manila
January 2, 1942
PHILIPPINE ISLANDS
SOUTH CHINA SEA
PALAWAN
SULU SEA
Del Monte
MINDANAO
Davao
Invasion of Borneo
December 17, 1941
SULU ARCH.
Dadjangas
Buayan
CELEBES SEA
Invasion of Morotai
September 15, 1944
MOROTAI
PACIFIC
Manado
HALMAHERA IS.
Ternate
Landings at Sansapor
July 30, 1944
Occupation of Noemfoor
July 2, 1944
Sansapor
Sorong
Manokwari
NOEMFOOR
BIAK
JAPEN
Geelvink Bay
BORNEO
Balikpapan Overrun
January 23, 1942
Balikpapan
MACASSAR STRAIT
CELEBES
JAVA SEA
BANDA SEA
FLORES SEA
Soerabaja
JAVA
Capture of Java
March 9, 1942
TIMOR
TIMOR SEA
ARAFURA
Darwin
AUST

(Continued from page 31)

of ours. A month later, June 4-6, the Battle of Midway demonstrated forcibly to the Jap that naval forces cannot operate successfully within range of opposing land-based aircraft. This second setback to his shock power caused a serious scratching of the Nipponese head. He had lost 20 ships and 275 airplanes to our loss of a destroyer and a carrier. That wasn't according to the imperial plan. More than ever he realized that he must speed up his advance and completely cut off Australia from supplies by the occupation of Fiji and New Caledonia. Pressing this policy he captured Ysabel, Choiseul and Guadalcanal in July. About the same time the Allied Air Forces were beginning to get some airplanes and the first phase of the war in the Southwest Pacific was drawing to a close.

The second phase actually began on August 7, 1942, with the successful landings of U. S. Marines at Tulagi and Lunga. The Japanese advance in the Solomons was halted. Supplies were coming through to Australia. General Kenney's air forces were becoming an air power for the Japs to reckon with as they struck heavy blows at Rabaul in New Britain and Jap-held Lae-Salamaua in New Guinea.

It became more and more evident that Port Moresby must be denied to the Allies if the Japanese were to continue their operations in the Bismarcks and Solomons. They landed forces on the east coast of New Guinea at Buna and Gona on July 22, with a bold plan to march over the mountains and actually capture Port Moresby purely by land operations. By the middle of August, the Japs were well on the way and almost before we were aware of it they had seized a gap in the Owen Stanley Range near Kokoda. Backing up this operation, Japanese troops also landed on Milne Bay, our only base on the north side of the mountains. Fortunately this latter operation, which, if successful, would have had a serious effect on our ability to hold Port Moresby, was repulsed on September 7 after some of the most difficult fighting in New Guinea. In the defense of Port Moresby, General Kenney concentrated his air power against Japanese supply lines from Buna to Kokoda. This factor, together with



the new idea of Army Support Aviation, namely giving the Army the whole Air Force if it needed help, and backed by the magnificent fighting of Australian troops in the Owen Stanleys, stopped the Japanese advance on September 17. In fact, the enemy was turned back at a point so close to Moresby that the noise of our airplanes warming up on the strip disturbed the sleep of Japanese soldiers.

In adapting themselves to this second phase of the war, which threw them from offensive to defensive warfare, the confusion of the Japanese was evident. No provision had been made in the Jap code, his plan or his command for defense. The best possible outcome of the war for him appeared to be the construction of airbases protected by strong defenses behind which he could hold out long enough to exhaust the patience of the Allies. Japanese engineers were impressed to work like beavers building these bases. Japanese logistics followed the German pattern, except that after devising a plan which carried full proof of success on paper, it was never revised no matter how utterly it failed to work in practice. This failing proved to be an impetus to Allied recovery.

Deficiencies in Japanese supply began to tell, and to further those deficiencies, General Kenney concentrated on shipping targets. Skip bombing was developed and rehearsals began for the big air show that he knew was coming when a large enemy convoy or concentration of shipping could be attacked with our full available strength. Rabaul was at that time of great importance, since General Kenney was using it as a trap. Its harbor and airfields could always be depended upon to furnish lucrative targets of enemy shipping and aircraft.

Air facilities had been our number one priority target from the beginning, since the process of gaining and holding air superiority demanded constant attack on enemy air installations and aircraft. During the second half of 1942, however, our position was such that General Kenney was able to devote considerable attention to the second priority target, Japanese shipping, which was appreciably depleted by the middle of November.

Food, medicine and supplies were becoming critically short for the enemy through these constant attacks on his shipping. The Japanese had occupied Alexishafen, Madang and Wewak and made desperate attempts to strengthen their line across the north of New Guinea. One such attempt to reinforce the Lae area resulted in the Battle of the Bismarck Sea, on March 1-4, 1943, and the complete destruction of an entire Japanese convoy.

The Battle of the Bismarck Sea was the first real test of the much practiced low-level attacks against shipping, and was unquestioned proof of the effectiveness and economy of this type of attack. Again in April, 1943, a heavy bombardment attack against Kavieng resulted in two enemy warships being sunk, three damaged, and three merchantmen badly damaged.

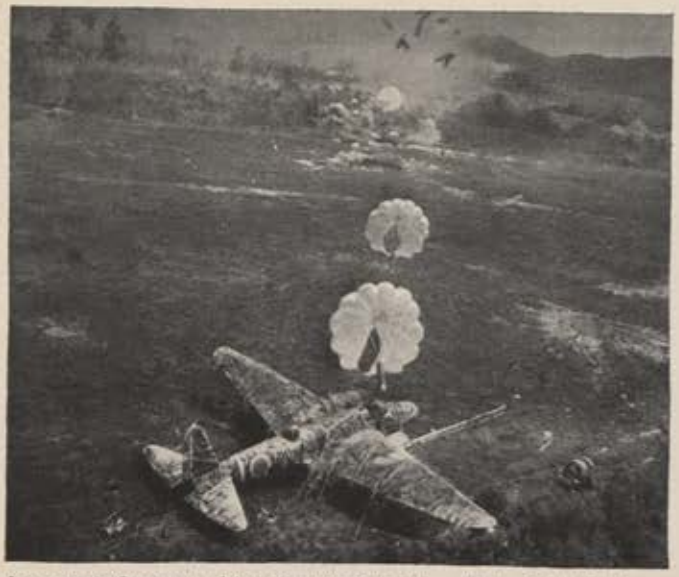
Our own shipping lanes to the east coast of New Guinea were far from safe, but General Kenney took the bull by the horns and, using his troop carrier command, started flying everything in from food to fully equipped troops. In order to get a base in the Buna area, he flew the airdrome, air force, bombs, garrison, gasoline and food across the mountains to Dobadura.

We were now getting the upper hand, but the Japanese still had some will to fight in the air. In the middle of April, 1943, the enemy raided Port Moresby with 100 airplanes, but the pressure was beginning to tell on the quality of his air force. An air attack on Guadalcanal in June cost the Japanese 94 out of 120 raiders; 22 out of 48 were destroyed at Darwin on the 21st, and 23 out of 36 were shot down over Lae on the 22nd. June also saw our forces move into Kiriwina and Woodlark, south of New Britain.

Formation of 5th Air Force Mitchells on patrol in the Southwest Pacific discovered this Japanese corvette hauling supplies. The corvette zig-zagged frantically to escape the depth bombs spilled on it by one of the Mitchells, but photograph at right tells its own story.

We were now on the advance and it became obvious to the Japanese that they would have to duplicate the now practically useless Rabaul elsewhere as a receiving and distributing point for supplies. Wewak was the logical alternative and construction was begun to convert it into a major installation; heavy concentrations of aircraft were being accumulated and maintained in the area. It was only natural that we, in turn, should look about for a desirable location on which to build a base from which we could bomb the Wewak area. Our choice was Marilinan, west by south of Lae and right in the enemy backyard. Here our engineers, after a perilous overland trek, constructed a C-47 landing strip under the noses of the Japs; again an airdrome and an air force were flown in to a forward base. The move paid off on August 17 and 18 when we destroyed 200 Jap planes at Wewak. This attack marked a turning point that brought us into the third phase of the Pacific war.

This third phase was the reduction of the Japanese from a position of defensive holding to positive retreat. It began on the 4th and 5th of September, 1943, with the amphibious



Jap camouflage on this Sally didn't fool low flying 5th Air Force bombers during their attack on Old Namlea airdrome, Boeroe Island.

landing east of Lae and the paratroop operation at Nadzab. After that, strike followed strike in rapid succession. Salamaua was captured, and battered Lae became ours on September 16. The Kenney air thrust secured us an advance airdrome up the Markham Valley at Kaiapit on the 20th, followed shortly afterward by the capture of Gusap and Tumpu. An amphibious landing at Finschhafen on the 22nd completed the rout of the Japs on the Huon Peninsula.

During October Rabaul was being squeezed dry of air and shipping targets. A perfectly planned and executed bombing attack on October 12 netted three enemy destroyers, three large cargo vessels, 43 small cargo vessels, 70 harbor craft and 126 airplanes destroyed. Another attack, on November 2, permanently put Rabaul out of the running as a base of any importance to the Japs.

This bleeding white of the enemy air forces and shipping in the Southwest Pacific resulted in his inability to maintain sufficiently strong air power at any one of his far flung mandate bases to jeopardize operations of our surface forces against him. Makin and Tarawa were occupied by us on November 21. The Australian 9th Division had pushed the

Alternate oil dump goes up in smoke after B-25 attack on Halmahera Islands, last Jap bastion between New Guinea and Philippines.

Japanese up to Satelberg, and 1943 was closed with a successful landing at Cape Gloucester and the capture of a PT base at Arawe. New Year 1944 was celebrated one day late with a landing at Saidor, New Guinea.

Whereas the Allied Air Forces under General Kenney were functioning with deadly efficiency, the enemy's organization had become disrupted to the point of rendering his order of battle useless for tactical planning. A Japanese striking force of 100 planes had become comparable to the power of 25. The enemy was definitely in retreat.

Although Rabaul had been neutralized, it was still too strong for us to chance a frontal attack. As an alternative we captured Green Island to the east and cut off a possible avenue of escape. This move also cut off any chance of the Japanese forces escaping from Bougainville or other parts of the Solomons. Our next need was an airbase from which we could strike at the enemy's New Guinea flank and completely bottle the Rabaul-Kavieng area. The Admiralty Islands were ideal for this purpose and would also give us a valuable base for deep reconnaissance to the north.

Our objectives, Manus and Los Negros in the Admiralties, were garrisoned by some 4,000 Japanese troops. On March 15 a reconnaissance party in force, consisting of a few hundred rifles of the 1st Cavalry Division, landed at Los Negros. General MacArthur was unexpectedly on the scene and went ashore with the troops. He surveyed the situation and ordered the troops to remain in occupation. Thus Momote airdrome was captured and our perimeter was reinforced just ahead of Japanese reinforcements. This was perhaps the most important operation ever conducted in this theater.

With air coverage available from Momote we were in a favorable position to begin leap-frogging operations in New Guinea. It was no longer necessary to attempt a landing east of the Japanese stronghold at Wewak. Instead a bold stroke was planned to by-pass this heavily defended section and land at Hollandia, to the west. On March 29 and 30, heavy bombers covered Hollandia with a perfectly planned attack, destroying a considerable part of the Japanese army air force in New Guinea. On the following day, fighter-covered strafers followed up and completely wrecked enemy air facilities in the area, burnt out Hollandia and destroyed fuel, maintenance and supply dumps. During these attacks more than 400 enemy airplanes were accounted for, and there is evidence that the Japanese air command in the area was relieved in disgrace.

Hollandia, and Aitape to the east, were occupied without substantial resistance on April 22, cutting off the Japanese 18th Army concentrated mainly at Wewak and the Hansa Bay area and giving us airfields which increased our heavy bombing range to a sweeping arc that included Soerabaja, Balikpapan, Davao and Saipan. The Halmaheras were open to attack and airdromes of the Vogelkop and Geelvink Bay areas came within range of our mediums.

The aerial blitz against the enemy's bases in the Wakde Islands began on May 6, and nearly 1,000 tons of bombs were dropped on the area from then until May 17 when Allied forces landed in the Toem sector on the Dutch New Guinea mainland opposite the islands. One island of the group was occupied, followed by others. With our seizure of air facilities in the Wakdes, the whole elaborate system of Jap airdromes in western Dutch New Guinea was in jeopardy. The most distant airfield at Jefman was only 490 miles away, easily within fighter range.

Meanwhile, although some enemy resistance still was being encountered at Wakde, General Kenney would not halt his schedule of aerial advance. Progressively heavy air attacks were being directed against Biak in a repeat performance of the death blow dealt at Hollandia.

(Continued on Page 49)

1 Airspeed Indicator
2 Turn Indicator
3 Flight Indicator
4 Altimeter
5 Turn and Bank Indicator
6 Rate of Climb Indicator
7 Clock
8 Air Temp. Gauge
9 Carburetor Temp. Gauge
10 Radio Compass
11 Suction Gauge
12 Volt Meter
13 Ammeter
14 Localizer Indicator
15 Oil Temp. Gauge
16 Cylinder Head Temp. Gauge
17 Magnetic Compass
18 RPM Meter
19 Manifold Pressure Gauge
20 Fuel Mixture Gauge

STANDARD FLIGHT INSTRUMENT PANEL

By Col. Thomas J. DuBose

Deputy, Asst. Chief of Air Staff, Training

EARLY this year, the Army Air Forces adopted one standard arrangement for the grouping of the six basic flight instruments on the instrument panels of AAF aircraft. The new arrangement, known as the Standard Flight Instrument Panel, was made official by Technical Order No. 01-1-160 dated March 11, 1944.

The Standard Flight Instrument Panel has the six basic flight instruments arranged in two horizontal rows, one above the other, with three instruments in each row. In the upper row, reading from left to right as viewed by the pilot, are the airspeed indicator, the turn indicator (directional gyro), and the flight indicator (gyro horizon or artificial horizon). In the lower row, again reading from left to right, are the altimeter, the turn and bank indicator, and the rate of climb indicator. If, in addition to the six basic flight instruments, the cross pointer and the radio compass are installed in the airplane, they are placed one above the other to the left of the two rows with the cross pointer in the upper position.

Now why was it necessary to adopt a standard arrangement for the grouping of these instruments? And, if there was such a requirement, why was this particular arrangement finally adopted?

As regards the first question, up until this new panel arrangement was officially adopted there were, in the various aircraft of the Army Air Forces, some 43 different official or quasi-official arrangements of the flight instruments. At one base it was found that there were *four different arrangements in four airplanes of the same model operating from the base.* Obviously, such a condition was extremely undesirable.

The Army Air Forces considers it essential that its pilots be able to fly on instruments. Almost every combat mission, transport, or domestic cross-country flight demands skill in instrument flying.

Flying on instruments in modern high performance airplanes demands much of the pilot. Before he can become an instrument pilot he must successfully complete a stiff training course. Before he can become a truly capable instrument pilot he must continue to practice instrument flying if he is to retain his skill. For safety, efficiency, and economy, everything possible must be done to simplify his task, not only during the training period, but throughout his instrument flying career.

From the training angle alone, the efficient mass production of pilots, able to fly on instruments, demands standardization in all phases of instruction. Such standardization is impossible without a standard arrangement of the flight instruments.

Finally, the lack of uniformity in instrument panels means just one more unnecessary complication in the already complex problem of mass production of aircraft.

As regards the second question—why the particular arrangement finally adopted?—the Army Air Forces started working on the development of the Standard Flight Instrument Panel nearly two years ago.

To the office of the Assistant Chief of Air Staff, Training, was given the responsibility of determining just what was the most acceptable lay-out for a standard panel and of monitoring the project through to completion.

The modern concept of instrument flying is based on teaching the student to visualize the attitude of his airplane from the instrument readings. By learning to do this, the student makes the necessary corrections from his visualization of his airplane's attitude, rather than mechanically moving the controls so that the pointers of the instrument dials assume the proper positions for the attitude desired. To do this properly, the student must learn to utilize all six of the basic flight instruments. The skilled instrument pilot, trained in accordance with this concept, can instantaneously and automatically create from the instrument readings a mental picture of his airplane's attitude. This, then, was the basis on which the Standard Flight Instrument Panel was developed.

For nearly 18 months, the officers of the Materiel Command and Training Command charged with developing the panel conducted studies and experiments, including exhaustive tests under actual instrument conditions, of various groupings of the flight instruments. In carrying on these studies and tests, the advice and assistance of operating units in the field were solicited and obtained. Both training and operational considerations were carefully weighed. Finally, there was evolved an instrument arrangement which seemed to fill the bill. Medical research by the office of the Air Surgeon in connection with the tests on this proposed lay-out substantiated its desirability from the standpoint of minimizing flight fatigue. This arrangement was adopted as the Standard Flight Instrument Panel.

The major advantages of the standard panel are:

1. The arrangement meets training requirements in that all six basic flight instruments are grouped together.
2. The airspeed indicator is directly over the altimeter which is necessary for accuracy in bombing operations.
3. The turn indicator (directional gyro) is directly over the turn and bank indicator which allows for vertical sighting by the pilot and his immediate perception of failure of either instrument.
4. The airspeed indicator, the altimeter,

(Continued on Page 44)

ON THE LINE

A MAINTENANCE ROUNDUP PREPARED IN COLLABORATION WITH AIR SERVICE COMMAND AND TECHNICAL INSPECTION DIVISION, AIR INSPECTOR'S OFFICE

A crystal gazing sergeant at an ASC depot in England foresaw the possibility of salvaging the highly sensitive quartz elements in 20,000 inactive radio crystals storaged for shipment back to the U. S. He is the proud prognosticator of a cathode ray machine which visually tells the precise frequency of a crystal and at the same time indicates its ability to withstand the tremendous vibration of a plane in flight.

The clearheaded clairvoyant is T/Sgt. James T. Johnson of Weatherford, Texas, on duty in the research department of the depot's Signal Maintenance Section, who without benefit of ouija board or astrological aids, alleviated a critical shortage in these vital radio components and solved a ticklish problem in test equipment.

It seems that there was real danger of many American planes being grounded for lack of signal equipment, and the demands from fighter and bomber units in England rose to a four-motored pitch. The Air Service Command immediately began an investigation to determine the possibility of injecting new life into "Class 26" radio crystals that were awaiting debarkation and honorable discharge.

Acting along these lines, Army technicians succeeded in saving many veteran crystals from the ignominy of quiet retirement, but found that the insoluble key to the whole process was a reliable method of gauging the exact condition of the crystals after reactivation. Each unit, in order to be effectively used again, was required to function at the rated frequency originally specified by the manufacturer, and unless this same frequency was maintained after salvaging, the crystal would have to be tapped on the chest and pronounced unfit. It was necessary, therefore, to find out to what extent the radio crystals had been affected by the reclamation process, but inquiries to the States revealed that no instantaneous method of testing crystals for accurate oscillation was available.

Enter the talented tech. In a month's time he perfected a crystal tester that helped to return a high percentage of formerly rejected crystals to active duty. Few repair jobs have failed since his apparatus has been in use, and up to recently he has assisted in the reactivation of 50,000 crystals at a substantial saving. 50,000 crystals can't be wrong, and calls for the machine are being received from aircraft repair depots all over the world. Already, two of the machines are in operation in India.

Sergeant Johnson studied radio engineering at Texas Christian University and prior to entering the Army in November, 1942, was a civil service radio technician at Fort Sam Houston, San Antonio.

Name, rank and serial number of the oldest P-38 in active service in the Southwest Pacific is reported to be No. 42-12694, answering to a dozen different nicknames including Sweet Lips, Ruth II and Trudy.

Since joining the 13th Army Air Force back in November of 1942, she has put in more than 700 hours of day and night fighting over Guadalcanal, Munda, Kahili and Rabaul, and has more than several Jap planes to her credit. At various times during her combat life she has flown with the Sun-Setters, Vampires, Dirty Dozen and Fighting Cocks—all squadrons of the 13th AAF Fighter Command.

Rank? Well, this Lightning rates skyhigh with crew chief S/Sgt. Duane E. Shumway of Winslow, Ariz.

When opportunity knocks for most of us, it usually wears rubber-soled shoes and carries a feather pillow in each hand. But for S/Sgts. Frank R. Matarese, Burlington, N. J. and William O. Harrell, Orlando, Fla. both at an ATC base in India, opportunity came right in and made itself at home.

The occasion was the difficulty encountered by maintenance men in separating airplane tires from their rims—often a time-wasting operation that literally "tired" the men out. The two sergeants collaborated to devise a machine that forces tires from the rims of landing wheels by breaking loose both sides of the "shoe" simultaneously—and will handle any size tire from the small type used by liaison planes to the king-size B-29 balloons.

Made from salvaged material at a cost of approximately $200, the machine has a square frame of H-iron, with a circular rim.

"Make mine a double shot" may be appropriate phrasing under certain conditions, but photographically speaking it merely indicates twice as many maintenance mistakes. The sergeant who dreamed up this cocktail of errors claims that he mixed seven ingredients of poor practice in each of the pix. But don't turn the page for a peek at column three until you've proved that he needs glasses! Picture A shows a B-17's top turret gun being installed, while in photo B the lower ball turret is being removed for overhaul. Serving the concoction in order to demonstrate what not to do, are (picture A, left to right) Sgt. Frank R. Flaherty and S/Sgt. John H. Cooper, both of 4100 AAF BU, and (photo B, left to right) Sgts. Cooper and Flaherty and Sgt. William R. King, 4000 AAF BU, Flight Section, Patterson Field, Ohio.

It is mounted on a hinged platform and is raised or lowered by a bomb winch to the height required by the size of the tire. A 20-ton wing jack is used to exert pressure on the circular rim which forces the bead of the tire away from the rim, thus breaking both sides of the tire from the rim at one jacking. The entire operation requires only five minutes as compared to the previous tire changes which consumed anywhere from thirty minutes to six hours.

After a demonstration in which the machine broke down two tires in three and one-half minutes each, the apparatus was warmly approved by the field's tech inspectors and engineering officers.

The critics raved when the Hollandia invasion proved an immediate smash hit in the South Pacific theater, and the brilliant performance of the AAF shared top billing with the smooth work of other coordinated arms. But backstage the supporting cast was raising the curtain on a little drama of its own. . . .

Some time before "opening night" it was discovered that a large number of P-38's being readied at an advance base in New Guinea lacked sufficient range to adequately cover the bombers listed on the program. An urgent appeal was sent to a 5th Air Force Service Command depot on the mainland for the personnel and equipment needed to outfit the fighters with extra factory-made wing tanks. Here, Maj. Jay H. Staley, Steelton, Pa., officer in charge of modification and erection, selected a detail of six men headed by M/Sgt. Willard Laugle, Cincinnati, O., and hustled them into a waiting plane for a flight to the jungle airfield.

For days thereafter Sergeant Laugle and his men worked 16 to 18 hours out of every 24, come heat, come rain, in an effort to meet the deadline. The wiring was rerouted through both wings to the pilot's compartment. New, leakproof plumbing was installed. The stresses and strains developed by the addition of the wing tank were overcome, and an intricate siphoning problem was solved. In addition, each plane was equipped with a warning light which flashed a signal to the pilot fully five minutes before it was time for him to switch to the newly installed tank.

As the ships came off the line they were test-flown by Col. Edward M. Gavin or by his assistant, Lt. Owen M. Wolf, and every P-38 in the group was delivered on time and in first-class combat condition.

The doughty mechs who "kept 'em flying"—longer, were, besides Sergeant Laugle, T/Sgt. Arthur V. Mulvey, Sgt. John Meiner, S/Sgt. Vernon L. Haug, Pfc. Edward Levy and Pfc. John J. Klinkerfuss.

They tell us that experience is the best teacher because you can't cut classes. And when the tail-skid of a B-24 starts sliding off its jack while maintenance work is being done—well, brother, you'll know what's meant by the school of hard knocks.

A star pupil is Maj. Joseph L. Myers of Brooklyn (one of our allies) N. Y., hangar maintenance chief at an Air Service Command depot in the British Isles. Noting that Liberators undergoing modification or repairs were held in position by the tail skid resting on the open crown of the jack, he found that movement by mechs inside the plane often caused the tail-skid to bounce off the jack, damaging the underside of the fuselage and necessitating extensive sheet-metal repair work, besides endangering the lower ball turret.

With this in mind, Major Myers devised a tail-skid cradle welded from salvaged steel, which screws firmly into the jack by means of a two-inch threaded stem, and effectively prevents the tail skid from slipping off the jack. It is made out of ¼" thick metal, weighs nine pounds and its box-shaped sides are two inches high.

Major improvement? We're not merely punning!

***Somewhere in Italy** a giant crane lifts the shattered and stripped hulk of a heavy bomber and swings it onto a pile of other shattered and stripped hulks that have been consigned to the salvage yard for reclamation. Here's a graveyard that pays its own way, for figures in the depot engineering office indicate that over 200 battle-scarred aircraft a month in the Mediterranean Theater are made whole again with salvage.*

Rosie the Riveter would become grass-stained with envy if she were to hop over to an 8th Air Force Service Command Station in England and see the blind rivet gun designed by Sgt. Alfred G. Dannull.

A boon to sheetmetal men who formerly had to peel off large sections of sheet metal or skin in order to get to the inside or undersurface to turn rivets when patching flak holes, the gun now makes shooting rivets into inaccessible sections of skin on heavy bombers as easy as money from home.

Using tapered rivets with the large end inserted into the opening and encased by a closely fitted jacket, a hand-operated bellows type lever pulls the rivet from inside to out, forcing its greater diameter against the jacket, thus expanding it into a washer which holds the rivet securely.

WHAT'S WRONG
IN PHOTOS ON PREVIOUS PAGE

A 1. Psst! Hey, Sarge, get that dome away from its precarious perch! Always place dome carefully on ground while mstallmg guns.

2. The plier-happy sergeant will probably ruin the solenoid cable if he keeps up his love-to-tinker activities. Correct procedure: tighten this connection by hand.

3. Tsk! Tsk! Flexible drive cables can't operate when one is hooked beneath the cover plate and two others are wrapped around the computing sight Don't get your wires crossed, men!

4. Praise the Lord, but don't pass the ammunition—yet Safety rules tell you not to install ammo while working on turret.

5. Roll out the barrel, and put it where it will do the most good. Apparently the mechs haven't noticed that barrel in gun at left is AWOL.

6. One of our filler caps is missing. . . . Watch for its presence in the breather cup in daily inspections. Cap prevents dust and dirt from getting into hydraulic fluid.

7. Stop! There's a limit to beating pins out on the limit stop. Failure of mechanism may cause gunner to fire into plane's fuselage or structure. Friendly tip: Follow T.O. 11-45C-5, dated June 30, 1944.

B 1. Hold that turret, pulEEZE! Incorrectly supported, as shown, it may fall against side of hoist and be damaged. Check AN 11-45G-1, dated April 25, 1944.

2. Screwdriver artistry is only a waste of muscle when removing fire cut-off cam. Here's how to do it: With turret in stowed position, guns fully elevated and pointing aft, support open entrance door by strap to prevent damage to hinge or weather stripping. Remove the eight bolts from cam bracket and ring gear. Move the turret in elevation with hand crank until open door permits removal of cam from turret well.

3. You needn't knock before entering, but at least refrain from leaning on the turret entrance door. Never apply pressure or you may spring the hinge and door won't fit properly in enclosure.

4. The Office of Flying Safety would gasp in horror to see that safety belt draped across the gun on the floor (foreground). The gunner will feel mighty naked if it's forgotten. T.O. 11-45G-1 recommends that it be left inside the turret.

5. One false move and the man in the middle may step on the plexiglas of the end bell cap. When removing such items, place them safely outside the working area.

6. Speaking of undisciplined size elevens, why leave a $2,800 computing sight laying around where it may be broken easily? And why not move the gun out of the way so men won't trip over it? We're thinking of damage to the gun, naturally.

7. Don't look now, but a flexible cable has been left attached to the computing sight. Better practice is to disconnect all flexible cables from the sight and leave them attached to the turret. If removed from turret, cable may be misplaced during repair of the sight and latter will be installed minus a cable.

technique

The A-26 . . . Our Newest Attack Bomber

By Col. V. R. Haugen, *Project Officer XA-26, Aircraft Projects Section, Engineering Division, ATSC*

Out of this war has come a new respect for the attack airplane. The boys who come in low, hit hard and get-the-hell out, have chalked up an enviable record against the enemy.

The Germans started it with the Stuka dive-bomber. But eventually the Stuka died over the western front and Britain. Although it did a devastating job against undefended targets, its lack of defensive armament made it a clay pigeon for fast Allied fighters. Our own A-24s met a similar fate. Yet, the mission for which the dive-bomber was intended—to knock out ground installations paving the way for troops—still was an important play in the game of modern war. There was but one alternative—fast light bombers with heavy firepower attacking at low altitudes, an adaptation of attack aviation which the AAF had originated years before with the Curtiss Falcon and the A-17.

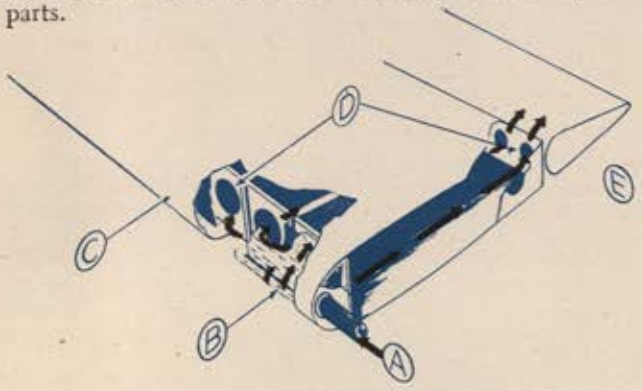
Thus did the attack bomber come into its own. In England, Africa, the South Pacific, A-20s and Beaufighters strafed and bombed the enemy and fought their way back to bases. Then came the A-36, a revamped Mustang used as an attack plane in Sicily. A "new terror" they called it. Other types of planes soon pressed home the new tactical offensive: B-26s with a dozen guns skimming low on sneak raids, B-25s with a 75 mm cannon smashing Jap shipping, even B-17s used for low-flying attack missions in New Guinea.

(Continued on Next Page)

Now, packaging all the improvements possible from extensive experience with those fighting planes, comes the AAF's newest, fastest and deadliest attack bomber—the A-26 Invader, which now is seeing action.

The Invader is the fastest bomber ever built in this country. It is a hopped-up, tough, big brother to the Boston. Speedy and nimble, the A-26 can strike from tree-top altitudes and present only a flash exposure to ack-ack fire. It is designed specifically for operations against enemy aircraft on the ground, naval vessels, landing parties, wharves, towns harboring enemy troops, antiaircraft emplacements, supply dumps, tanks and troops on the march or in bivouac.

Douglas Aircraft Company, which fathered the A-24 and A-20, now has the new bomber in mass production and has made possible its remarkable potentialities by use of some exceptional design features: The Invader is designed to carry an extremely flexible selection of guns, cannons and bombs or fuel which should make its offensive striking power adaptable in almost any combat situation. It is exceptionally clean aerodynamically, employing the recently developed NACA low-drag (Laminar Flow) airfoil wing section. It is equipped with twin 2,000 horsepower R-2800 series engines. It has a new double slotted flap which reduces landing speed and assists take-off. And the entire airplane employs features of maintenance simplification stressing accessibility to all parts.



Duct (A) shoots hot air between inner and outer skins of wing (B, C), through holes in spars (D) and out slot near aileron (E).

Any ground crewman accustomed to work on the A-20 should be able quickly to adapt himself to the Invader. One mechanic on the line at Wright Field quipped: "This baby is a repairman's dream."

We have many reports, from pilots who have flown the ship during tests, on its flight characteristics. All agree that the A-26 is one of the best flying aircraft they ever have flown. It is extremely easy to handle, has well grouped controls, comfortable seating, good maneuverability and is devoid of any vicious tricks. There is no tendency to snap off into a spin, and the plane performs beautifully in a stall.

While security prevents a description of the Invader's startling performance, we can tell you that Col. J. H. Davies, who has had extensive experience flying A-24s, B-25s and A-20s against the Japs, recently had this to say after he had test-flown the Invader:

"This airplane, if properly employed, can be the greatest striking arm of the Air Force."

We who helped engineer the Invader into reality are daily making improvements in armament, performance, maintenance, utility and cockpit arrangement to make that prophecy come true.

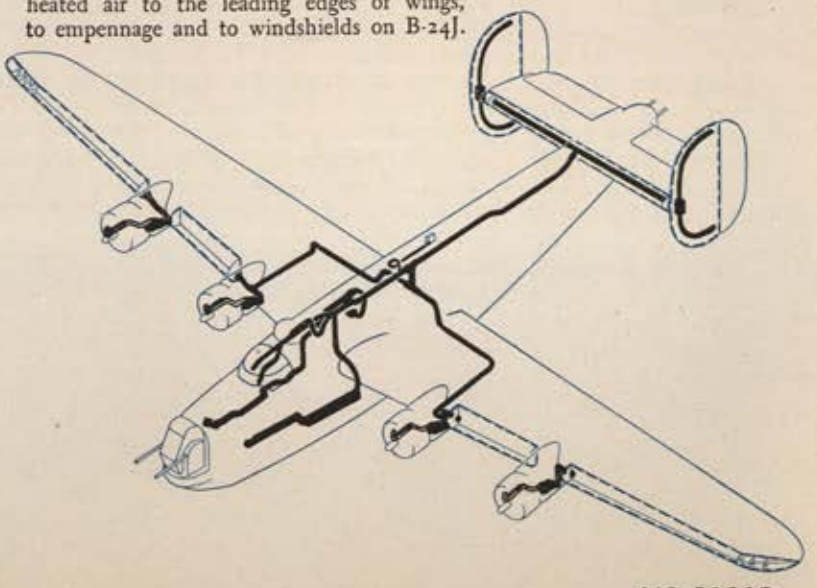
Heated Wing Anti-Icing For AAF Planes

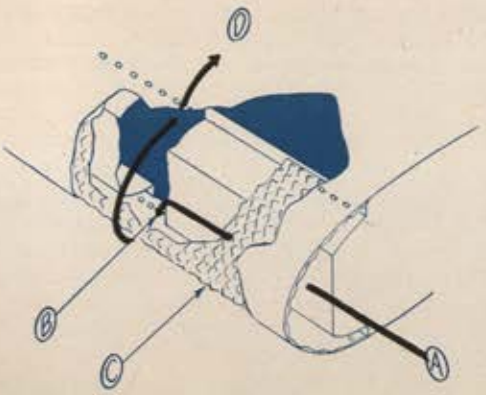
Heated wing anti-icing systems, long under study by NACA and Materiel Command, are being adopted on B-24Js, B-32s and all future AAF aircraft designs. Other present production aircraft will continue to be equipped with de-icer boots.

Limitations of the de-icer boot system have been its failure to break off some types of ice and its inability to prevent ice build-up, which distributes smooth airflow over the wing, before breaking it off. The heated wing system, effective in preventing icing of any kind, also provides heat for anti-icing the airplane's windshield. For summer operation, ducts, heat exchangers and the double-skin leading edges of wings can be removed.

The new Thermal Ice Prevention System utilizes a series of ducts which pipe heated air from the engines to leading edges of the wings, empennage and the cockpit windshields. Cold air is scooped in through the cooling system of each engine, ducted to an exhaust heat-exchanger, then to the wings and empennage. In the B-24, inboard engine heat exchangers supply heat to the inner wing panels, the empen-

Diagram shows duct system which pipes the heated air to the leading edges of wings, to empennage and to windshields on B-24J.





A change in design now permits the heated air to escape through perforations in the skin (D) instead of traveling through wing.

nage and windshields, while outboard exchangers heat the leading edge of the outer wing panels and wing tips.

In the wing section, hot air is forced between a dimpled inner skin and the outer skin of the wing's leading edge, then through holes in the wing spars and out of the trailing edge of the wing at the aileron hinge line. The air is sufficiently cooled before passing through the wing to eliminate danger to either gas tanks or structure. Air is discharged from the empennage through perforations in the horizontal and vertical fins where the double skin is joined. The original system for heated wing anti-icing of B-24s was developed by the Ames Aeronautical Laboratory at Moffet Field, Calif.

The Germans were the first to utilize a heated wing method of anti-icing for combat aircraft, and installations on the JU-88 were studied by NACA as part of that organization's extensive anti-icing research program. To assist NACA in flight testing various anti-icing systems, the AAF's Materiel Command in 1942 set up an Ice Research Base, under contract with Northwest Airlines, at Minneapolis, where atmospheric conditions are favorable for icing. Extensive flight tests were carried out on a B-17, B-25, B-26, B-24, C-53 and C-60 through the worst icing conditions that could be found in the area. Ducting, double-skin structure and other equipment were adapted to these planes through the extensive research efforts of aircraft manufacturer and Equipment Laboratory engineers.

Although the heated wing has effectively solved the problems of wing icing, it does not guarantee complete safety of flight through an icing condition. Loss of power through propeller icing still remains a threat, but this factor is expected to be overcome in the near future.

New Super-Fuel

The AAF has developed a super-fuel for use in B-29 and B-32 bombers which will save up to 10 percent in fuel consumption and permit increasing the bombload of the big planes by several thousand pounds.

The secret of the new gasoline is a rearrangement of molecules to produce a more powerful anti-knock chemical solution. The boost comes from a change in mixture of the raw gasoline and with high octane blending agents. More of the latter are used.

Present standard fuel used by the AAF is rated as 100/130, which means the gasoline has an octane rating (anti-knock value) of 100 for cruising and a Performance Number rating of 130 during take-off or for combat reserve power. The high anti-knock chemical content of the new fuel re duces the tendency of the gasoline to detonate, thus permitting more efficient engine operation.

Produced by the nation's petroleum industry to specifications and requirements determined in tests by Air Technical Service Command chemists and powerplant engineers, the super-fuel has the highest rating of any aviation gasolines now in use. But to take full advantage of its power, the engines which it feeds must be strengthened and they require minor internal modifications.

Although the super-fuel is being used in limited quantities, its production is a major problem for fear of impeding the 500,000 barrels-a-day production of present standard fuels necessary for fighting the war. According to R. V. Kerley, ATSC fuel specialist, production of one gallon of the new fuel with present limited facilities delays production of two gallons of 100/130 fuel. Vast new refineries are being set up to permit manufacture of the super-fuel in large quantities. It soon will be in combat theaters.

The fuel has a stronger odor than other fuels because of its new chemical content, but it is not nauseating. A new coloring has been added for identification purposes.

technique TECH TALK

P-47s are being flown as transitional trainers. Removal of the turbo intercooler and allied equipment provides room for an extra cockpit which has standard instruments and controls. Although sacrificing high altitude performance, the aircraft retains its high speed and maneuverability. . . . The PT-23 has been converted to carry two litter patients, thus becoming the first trainer to be redesigned for overseas utility. Compact kitchens, complete with steam tables, have been built for transport in large gliders. . . . Laundries also will be airborne. A portable "wash-day" unit, consisting of a water pump, heater, washer and wringer, and run by a small motor which burns aviation gasoline, fits snugly in a C-47. It can turn out 45 pounds of wash every hour. . . . Small fuel servicing trailers with jeep wheels and an engine-powered pumping unit also have been designed for shipment in a C-47.

A P-38 has been equipped with the high speed strip camera which takes stereoscopic pictures. . . . A viewing instrument incorporating a one-half surfaced mirror and two polaroid filters greatly improves stereoscopic interpretation of black and white or color transparencies. Result is a three dimension picture with fine detail. . . . Panoramic cameras fitted with rotating lenses are being used for plotting aircraft flight paths, bomb and parachute trajectories. . . . An angle mirror attachment on K-24 aerial cameras permits shooting of oblique pictures from a vertical camera station. . . . Newest mapping camera will have shutter range of from 1/60 to 1/500 per second and will be used from old style ring mount.

Mae Wests now have an additional chin strap attached to the upper inflation tube which forces it to hug the wearer's neck and prevents him from rolling onto his face. . . . Lightweight flying suits are being made of nylon. The same goes for hammocks in new emergency kits, litters and, experimentally, new life rafts, since it is lighter than rubberized materials now in use. . . . Specially treated milkweed fibers are being used to soundproof aircraft cabins.

Plastic lenses with high-grade density have been fitted to glasses for pilots and aircrew members. They permit sun scanning without endangering the eyes. Green canopies and windshields which were used to eliminate glare are being discarded because they offer poor visibility in twilight or with night illumination. . . . Tow targets made of fluorescent dyed acetate satin give antiaircraft gunners an easy-to-spot target. Cloth is so bright that dark glasses must be worn by those who work with it.

Telescopic aluminum handles, instead of usual wooden ones, are being tested for a 12-pound Medical Corps litter. . . . Aeromedical experts have engineered a compact, mobile dental trailer van, complete with dental chair. . . . An experimental altitude warning signal sounds a horn at 10,250 feet, reminding personnel to don masks, and again at 40,500 feet, signalling them to use pressure demand oxygen equipment.

Quick-opening triangular pilot parachutes have been tested for personnel chutes. . . . Climatic charts aid airmen in determining proper combinations of flying suits by dividing the earth into several clothing zones for lightweight, intermediate and heavy flying garb. . . . New innersole for flying boots is made of asphalt and buckwheat husks. . . . Three-man emergency tents have been devised for use in the arctic. Type E-2 bombardier's case is a small canvas bag which can be slung over the shoulder. ☆

technique . . . CONTINUED

New Method of Static Testing

By E. R. Weaver, *Engineering Division, ATSC*

As larger aircraft with more critically designed wings have been developed for the AAF, methods of ground testing the strength of the planes under simulated flight conditions have undergone radical changes.

Newest method of static-testing aircraft structures eliminates the traditional system of piling shot-bags and lead weights on wings, fuselages and engine mounts to measure critical loading limits. The new system utilizes rubber-to-metal adhesive tension patches that enable engineers to simulate and measure flight stresses and strains more accurately.

Actual loads are applied by series of adhesive tension patches on the top-side of an airfoil and soft sponge pads on the under-side of the wing. Hydraulic jacks then proportion the applied loads through a system of beams and levers to the patches and pads in accordance with the correct aerodynamic data for the airfoil sections incorporated in the specific design.

Essentially, the tension lifting patch is a flat or curved plate (depending upon the surface to which it is applied) of steel, duralumin or plastic material. It may range in size from a six-inch square to a 6 by 24-inch rectangle, or even an irregular shape. One surface which is applied to the structure under test is covered with a piece of tough, high tensile, rubber or neoprene sponge. The thickness of the rubberized patch or pad varies from ¾ of an inch to 1¼ inches and forms a lifting element on the structural skin by adhesion. The lifting pads or pressure pads are the same size and composition but they are applied to the underside of the airfoil.

Hundreds of tension patches and pressure pads are needed to run a single test, far less, however, than the number of shot-bags required for the dead weight method previously used. A single operator can load and unload the test structure in a few minutes. By comparison, it formerly took days to pile on the shot-bags for simulating loads, since an average of 27 different types of tests are required to static test a military airplane completely.

In the test of a C-54 airplane, for instance, 300 tension patches and 300 pressure pads were used. By this number of tension patches sufficient lifting force was exerted to cause complete failure of the wing.

The adhesive tension patch does not reinforce the plate stringer combination of the wing surface. Wrinkle patterns due to shear lag, which form under the patches in their natural way, can be visually inspected and photographed during the tests. The sponge adheres tightly to the surface deformations and has no influence on the structure.

This method of applying load is particularly effective in the testing of cowlings, canopies, bomb doors, hatch doors, trim tabs and control surfaces. In testing a curved surface the patch bases are moulded to the curvature so that the sponge sheet distributes the load evenly to the structure.

With cements now in use it is possible to develop a load capacity of 2,000 pounds per square foot on any structure for nearly five hours.

Wright Field's Aircraft Laboratory now has two of the new static test machines—one with a lifting capacity of 100,000 pounds, the other with a lifting capacity of 1,000,000 pounds. The smaller machine is used for testing trainers, fighters or small gliders, while the larger machine tests aircraft with gross weights exceeding 13 tons.

By employing the new system, the complete airplane structure including the fuselage and horizontal tail may be tested simultaneously. Controls and control surface operation can be studied during tests since there is no dead load inside the fuselage or piled on the wing to endanger personnel and interfere with control wiring and operation. Absence of dead loads in the fuselage makes it possible to inspect visually the stress reactions of the fuselage inside and outside during tests. All hydraulic lifting equipment and beams, lever systems, electric driven pump, high pressure hydraulic cylinders and auxiliary pumps and gauges are portable, and they can be readily disassembled and conveniently stored.

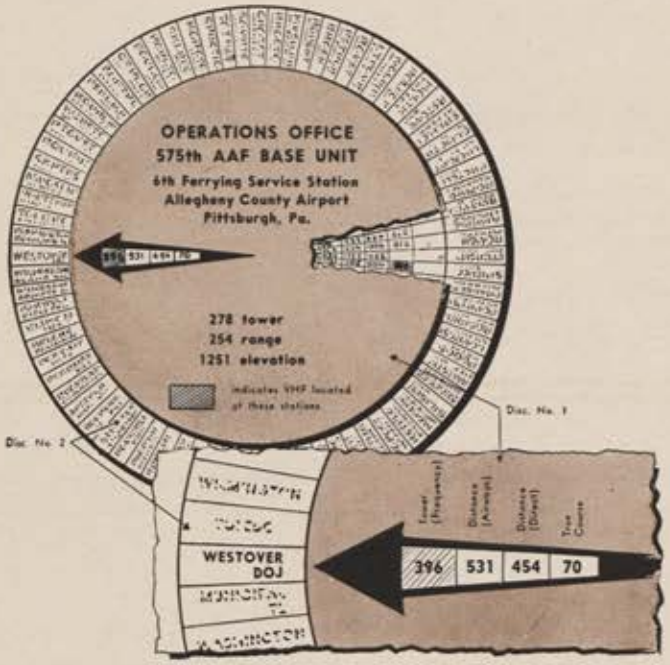
Shot-bags and lead weights were piled on wings, engine mounts and fuselages to measure critical loading limits under the old method of static-testing aircraft structures. The operation was a tedious one, several days being required to test an airplane completely.

Rubber-to-metal adhesive tension patches and pressure pads, used with new static-test machine, enable engineers to measure flight stresses more accurately than they could formerly. Speed, too, is gained. One man can load and unload test structure in few minutes.

Rotating Information Chart

Pilots clearing the ATC's 6th Ferrying Service Station at Allegheny County Airport, Pittsburgh, Pa., can obtain essential flight data by a flick of a finger. This is made possible by an improved rotating information chart, designed by S/Sgt. Arnold M. Green and installed in the operations office.

Figures on tower frequency, distance by airways, distance direct and true course, relative to airfields to which flights



Rotating information chart, in use at the Air Transport Command's 6th Ferrying Service Station, Pittsburgh, Pa., is depicted in the above drawing. Closeup shows flight data provided instantly by the handy device to a pilot clearing the station for Westover Field.

are made most frequently from the Pittsburgh station, are provided instantly by the device.

The chart, as shown in the accompanying drawing, consists of two concentric discs, each covered with a protective layer of plexiglas. To use the device, a pilot turns Disc No. 1 until its arrow indicator points to the listing of his destination on the border of Disc No. 2. The desired flight information then appears in a slot in the arrow.

VHF towers are designated by a dashed red line through the frequency reading.

Although the idea for the chart is not new, Sergeant Green's device is believed to be the first to include readings on tower frequency, VHF and true course.

For the benefit of other airfields which might want to adopt the improved chart, it is pointed out that while Disc No. 2, as illustrated, is divided into 72 sectors of five degrees each, the specifications can be altered to fit requirements. The cutaway in the drawing shows how the information is plotted.

The 6th Ferrying Service Station operations office advises that the chart should be made as large as possible and readily accessible. Its own device is bolted to the counter at which pilots fill out their clearance papers.

Figures on tower frequency, range and elevation appearing on the face of Disc No. 1, as illustrated, apply to the Pittsburgh station. ☆

technique WHAT'S NEW . . .

Insulated Battery Pack. A 12½-pound battery pack for testing thermometers, ohmeters, flashlights and other small electric units in extreme cold, is eighteen inches long, six inches wide and can be carried on a shoulder strap. It has been developed by Wright Field equipment laboratory. The pack contains two dozen 1½-volt dry cell batteries which enable mechanics to test any electrical unit within a voltage range of 1½ to 36. Made of plastic, the pack has a one-inch wall of insulating powder to keep the batteries at an operating temperature from eight to twenty-four hours, depending on the types of batteries used.

Lightweight Engine Cradle. A lightweight engine cradle, Type B-1, made of chrome molybdenum tubing, has been developed by the Wright Field equipment laboratory. A special bracket, attached to the rear engine support ring, permits installation of five radial engine types, the R-1830, R-2000, R-2600, R-2800 and R-3350. Four retractable swivel casters on the new cradle permit easy tie-down in an airplane.

Oxygen Mask Heater. To keep frost and ice from forming inside oxygen masks, particularly in the oxygen inlet port, an electrically heated cover has been designed by the aero-medical laboratory at Wright Field and the General Electric Co. for Type A-14 masks. Made of heavy cloth, it fits snugly over the mask and snaps together around the hose. Small wires in the lining supply the heat. Connected with the electrically heated suit, the mask has a special plug-in socket which permits use of heated goggles.

Chute Harness Adjustment. A new, simplified parachute harness adjusting device, recently standardized after tests by Materiel Command's equipment laboratory, eliminates the tug and the pull now expended by airmen in tightening and loosening the present style harness. Principal components are the "adaptor," knurled sliding bar, and the tab for loosening, both attached to the rectangular base plate. To tighten the lap harness strap, the right hand pulls the free end. To loosen the harness, the adaptor tab is pulled up by the left hand. Either adjustment can be accomplished by one hand with slight effort. The shoulder harness adaptor operates in a similar manner, with only a slight pull required for adjustment.

Intermediate Flying Suit. A scientifically designed, cotton sateen, alpaca lined flying suit for wear over electrically heated suits or under heavy flying equipment has been standardized. The suits, which are lightweight and comfortable, will replace the heavy, bulky, stiff leather outfits that have proved inefficient in extreme cold.

Jeep Flat-top. Newest adaptation of the Army's most versatile vehicle is the "jungle jeep." Designed with a flat platform instead of seats, with the engine underneath, this vehicle can carry 800 pounds of personnel, cargo or supplies in areas inaccessible to larger trucks. A motorcycle-type hand throttle and a hand-operated lever brake are mounted on a swivel tiller bar that replaces the steering wheel. This arrangement enables the operator to lead, follow or ride the vehicle over rough terrain. ☆

INSTRUMENT PANEL

(Continued from Page 36)

and the turn and bank indicator, which are primary emergency instruments, are placed adjacent to one another.

5. The manifold pressure gauge can be installed next to the flight indicator (gyro horizon) with resulting advantage of having power instrument adjacent to attitude indicating instrument for power-attitude set-up.
6. With the manifold pressure gauge installed next to the flight indicator, the pilot with one horizontal sweep of his eyes can go from power indications through lateral and longitudinal attitude indications and by continued glances check the other flight instruments.
7. Because of their central location, there is no parallex error in reading the turn and bank indicator and the turn indicator. (Parallex error is that resulting from reading the instrument from the side, thus giving an untrue picture of the actual position of the indicator pointers.)
8. The rate of climb indicator is in the least conspicuous place. (Instructors waste much time teaching students not to use this instrument except when establishing a desired rate of descent and, in a few instances, a desired rate of climb. If the instrument is in a prominent position, it attracts the student's attention, giving him a tendency to attempt to use it to fly level.)

Modifications of the instrument panels of aircraft already in service so as to incorporate the new Standard Flight Instrument Panel are being carried out in the field as rapidly as possible. New aircraft will come off the production lines with the panel installed. Further, by approval of the Joint Aircraft Committee, the panel is now standard for all synthetic instrument training devices.

It is appreciated fully that this new panel arrangement will not satisfy everybody. However, the Standard Flight Instrument Panel represents the best thought and experience on the subject available in the AAF and, as such, is presented without apology. ☆

"Three million, five hundred thousand and one, and two, and three . . . !"

—F. WILKINSON

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

Bail-out Training. Flying cadets at Marana Army Air Field, Ariz., are getting realistic practice in bailing out of fighter planes along with regular flying training. Cadets jump from a mock-up of a fighter cockpit mounted on a platform about 20 feet high; harnesses are attached to a line from another tower nearby. After falling free for 10 feet they are jerked to a stop by a counter-balance.

Tower on Wheels. Advanced trainees at Shaw Field, S. C., receive landing instructions and advice from a portable control tower parked near the runway in use. The 18-foot tower is completely weatherproofed and wired to plug into the night lighting circuit. Mounted on four discarded BT wheels, it was constructed of ordinary lumber by the sub-depot from plans submitted by the operations and communications officers. It is towed by jeep and may be removed from the flying field when not in use.

Runway Status Diagrams. Safety-minded officers at Langley Field, Va., have devised a novel method to keep aircrews informed on status of runways. Diagrams of the field's runways are mapped on sidewalks outside operations office exits. In addition to showing transient crews the exact location of all runways, construction work and other hazards are marked on the map. A quick glance tells the story of the field's condition.

Many airbases rubberstamp a diagram of the field's runways on the back of Form 23. Any help offered to make transient pilots more familiar with a field's layout and current condition contribute to safer operations.

Fighter Safety Club. To stimulate pilot interest in flying safety and to reward safe pilots with clear accident records, the 72d Fighter Wing has organized a Fighter Safety Club. Pilots receive leaves of two to five days when they become eligible for three types of club membership.

A pilot who flies fighters for more than 50 hours without an accident caused in any way by pilot error is eligible to become a "pilot member." Reward for this accomplishment is two days leave. "Senior members"—pilots with more than 75 hours accident-free time—get three days leave. "Command members"—those with more than 175 hours —may take five days leave.

The base flying safety officer submits names of pilots when they become eligible for various classes of membership to the commanding general of the wing. Names are checked against accident records. If pilots are qualified, they may take the appropriate leave as soon as it does not conflict with training or other schedules.

Any disciplinary action against a member of the safety club, resulting from careless or negligent flying, immediately cancels his membership, and he must start over again.

Safety Award. A ferrying group at Love Field, Texas, stimulates interest in aircraft accident reduction by awarding this flying safety plaque to the squadron having the

best monthly safety record. Award is made on a basis of the least number of pilot error accidents per 1,000 hours of flying time. The plaque is presented to the winning squadron's commanding officer at a review before the entire group. It is then displayed in the Officers' Club.

Servicing Hints. Combat crew training school at Clovis, N. M., forbids servicing of airplanes during severe sand or dust storms. Static electricity builds up on airplanes and servicing equipment to a greater degree during these storms and sand and grit are more likely to get into fuel and oil systems.

Careless Gun Handling. At a western training field recently, a B-24 tail-turret gunner was preflighting his guns on the ramp before take-off. Another B-24 was parked about 100 feet behind. A sudden burst from the tail guns hit the parked plane, and the resulting fire destroyed the cockpit and flight deck. Two crewmen working in the airplane were injured seriously.

The gunner had failed to observe local and training safety regulations. He had placed a round of live ammunition against the cartridge stop and was preflighting the guns without fire pin restrictors in place. A court martial helped the gunner repent for his error, but the damage was already done. Common sense safety precautions prevent this type of accident.

Airfield Housekeeping. Bits of metal, screws, stones and other debris scattered on airfield pavement cause serious damage to airplane tires and may result in costly aircraft accidents. To correct the problem, the Chief of Engineers has directed post engineers at AAF stations to require frequent cleaning and policing of runways, taxi strips and aprons to keep them clear of material which might cut or bruise tires.

Two-Way Crash Radio. Crash ambulances at Hunter Field, Ga., are equipped with reclaimed two-way radios to facilitate direct communication between ambulances, operations and the hospital. If information or more equipment is needed at the scene of the crash, the ambulance can transmit direct to the hospital, tower or airplane.

New Flight Control Center. The Office of Flying Safety opened its 24th Flight Control Center at Miami, Fla., on August 16 simultaneously with the establishment of a CAA Airway Traffic Control Center. The new centers were opened to facilitate control of overseas and Pan American air traffic formerly handled by overloaded Jacksonville centers.

P-40 Backfires. Backfires in P-40 engines can cause plenty of trouble if they are violent. A recent accident report concerning an engine failure on take-off revealed that the hot air door in the carburetor airscoop was jammed completely closed. The hinge pin was sheared, apparently by a backfire, making control impossible. OFS recommends a careful inspection of the airscoop after backfires either on the ground or in the air.

Plane Boners

THE PREVENTION AND INVESTIGATION DIVISION, OFS, IS COMPOSED OF VETERAN FLYERS. THESE REPORTS INCLUDE COMMENTS BY THESE VETERANS ON RECENT ACCIDENTS. READ AND HEED.

MERRIAM, KAN.—A B-24 on a routine training flight crashed into a residential section after the pilot buzzed his wife's home and stunted over the area for 30 minutes. Three crew members were killed, three others injured and three civilians were seriously hurt. One house was burned to the ground and several others were damaged. The pilot who survived the crash is crippled for life.

OFS COMMENT: No matter what punishment is meted out for his flagrant violation of regulations, this pilot will carry his scars and a heavy conscience to his grave. Low flying and showing off can result in only one thing—trouble and plenty of it. The only place for low flying is in low-level combat missions. It seems pointless to risk aircrews and valuable property in this country just because a few hot pilots feel their oats and want to show off like small boys.

LOVE FIELD, TEXAS — A guard on duty on the ramp carelessly drove his jeep into the tail of a parked AT-7. Damage amounted to several hundred dollars and many valuable man-hours of repair time.

OFS COMMENT: Here's one that cannot be blamed on a pilot. The guard admitted that while driving around the planes he was supposed to be protecting, he looked the other way for a moment and crashed into the trainer. Because of his lack of alertness, the guard was fined and restricted by a summary court. Proper notation of the proceedings was entered in his service record.

CINCINNATI, OHIO — The pilot of a P-39 bailed out because of engine fire. The jump was successful but the pilot was burned severely on his hands and face.

OFS COMMENT: If this pilot had unfastened his shoulder harness and safety belt before jettisoning the door he probably would not have been burned. The opened cockpit created a draft, sucking the flames in around the pilot while he struggled with the safety belt and shoulder straps.

ROMULUS, MICH. — The pilot of a BT-13 landed with the nose high. The plane dropped in and groundlooped, damaging the gear, propeller, engine and wing.

OFS COMMENT: This pilot was an experienced ferry pilot with 22 months of transport time behind him. He hadn't flown a BT-13 during that time. This accident is further proof that no matter how good a pilot is he can get rusty if he fails to keep up with the equipment he uses. A more careful landing check and a little less cocksureness might have prevented this accident.

HERMANN, MO.—A P-40 was flown so low over the Missouri River that the propeller struck the water, breaking the shaft. The pilot attempted to pull up and belly-land in a nearby field. The plane crashed and burned. The pilot was killed.

OFS COMMENT: Another case of a pilot signing his own death warrant by indulging in foolish and unauthorized low flying. A board found the fatality occurred not in line of duty.

CASPER, WYO.—The nose wheel of a B-24 collapsed while it taxied causing major damage to the nose section.

OFS COMMENT: Investigators found that a linkage in the shimmy damper assembly had been installed backward. When a turn was attempted the link broke, allowing the nose wheel to shimmy and break off. Greater care on the part of maintenance inspectors would have prevented this accident. AAF maintenance workers must take every precaution to save lives and materiel. This kind of "goof off" doesn't help.

NEWARK, N. J.—Pilot in a P-51 took off with a badly worn tail wheel tire. Aware of this condition, he attempted to make a wheel landing at his destination. Instead, he brought the plane in on three points right on the end of the runway. The main wheels reached the pavement but the tail wheel struck the edge of the concrete and collapsed. The airplane then bounced and came in on three points again—two main wheels and the propeller. No injuries resulted but the airplane was badly damaged.

OFS COMMENT: This pilot's technique not only went to pot—he had more than 100 hours in P-51s—but he took off when he knew his equipment was in a dangerous condition. Even experienced pilots get into trouble during a momentary lapse of alertness. The only answer is eternal caution. ☆

LIFELINE TO THE USSR

(Continued from Page 27)

20, the temperature went to minus 40, then zero, then plus 5—and that's the way it went all winter.

The fact that we are delivering aircraft to an Ally who does not speak our language presented yet another problem. The Red Air Force pilots had never before seen the planes which they were to fly and the language difficulties were enormous.

Captain Wolfson reported his experience with the problem of checking out the Russians. "A young Soviet pilot with a girl interpreter came over to my P-40 for a check. The Russian climbed into the cockpit, the girl got on one wing, and I got on the other. He asked me only four questions and then took off.

First thing he wanted to know was, "How do you start it?' I told the girl, she told him, and he said *Da*—Russian for yes. Then he asked for the maximum pressure and the rpm for the take-off. His next question was, 'How do you keep the oil temperature and the coolant temperature up?' Finally, he wanted to know how to operate the radio. Then he took the plane up for its test run. And he knew how to fly it, too."

Captain Wolfson's experience took place before a regular system for checking out the Russians was adopted. Maj. Fredrick Kane, operations officer at Ladd Field, was in charge of that problem and he solved it handily.

"For a while," said Major Kane, "we used interpreters in our bigger ships, but that didn't work out too well because there were too many technical terms which the interpreters could not be expected to understand.

So we fell back on the universal language of all airmen—signs. In A-20s, a Russian would lie prone in the passageway directly in back of the pilot. We would point to the instrument recording the manifold pressure used for the take-off and the Red Air Force flyer would memorize it. If we reduced the power at a certain time, we would point to the proper instrument. They knew exactly what we were doing, and we got along very well.

"For fighter planes, we used the cockpit check and lectures. Some of our men spoke Russian and they bore the brunt of this work. All Tech Orders were translated into Russian and mimeographed.

"One of our most unusual situations occurred with the tower operations. The Soviets had never used radio control before. They said that if everything was clear, they just came in. We explained that our regulations demanded the use of radio control, and they learned it our way.

"That gave us a problem in the tower. Our few Russian-speaking men had more important things to do than to become tower operators. We found a civilian who could speak both languages, but he didn't know anything about aircraft procedure. When an airborne Russian called in for a landing clearance, the civilian explained what was wanted to the tower chief, he outlined the necessary procedure, and back it went in Russian to the pilot. Now, of course, we have lots of people up there who talk both languages.

"Those Russians are good. Remember, they have a ferrying problem as complicated as ours, or worse. But they got those planes to the battle-front and made good use of them."

Today, the Northwest Route is nothing more than a routine ferry hop. But many good men were killed before the tremendous problems were licked. No one can say to what extent the planes ferried along the route helped turn the tide at Stalingrad and enabled the USSR to throw back the enemy. The Russians know very well that in bridging the gap between Great Falls and Fairbanks, many Americans died for the same purpose as the defenders of Moscow. As one Soviet general said, "There are graves of those who died among the snows of this route which mean as much to us as those at Smolensk, Stalingrad, or Sevastopol. We feel they died fighting beside us." ☆

Costume contrast. note the boots and pull-over tunics worn by Red airmen in this typical scene at Ladd Field, Fairbanks, American terminal of the Northwest ferry route to the USSR.

Rendezvous

(Continued from Page 1)

glide-path transmitter as the localizer transmitter and the localizer transmitter as the glide-path transmitter. . . .

Pfc. J. T. Wylie, and Pfc. Arthur J. Serrabian, Greenwood, S. C.

Right, and when we find the culprit who switched captions he will have one stripe less than either of you. —*Ed.*

"Smokey?"

Dear Editor:

. . . In regard to the cover picture of the August issue of AIR FORCE, I am certain of the identity of the paratrooper. It is Pvt. Robert J. "Smokey" Noody, of New York, of the 82d Airborne Division and who has been awarded the Bronze Star in Normandy. The picture was made on D-day before invasion and was sent to me by Private Noody after his return to England. . . .

Catherine Balowsky, Charlotte, N. C.

Everybody agree? —*Ed.*

Mistaken Identity

Dear Editor:

SALLY—NOT BETTY

. . . On page 24 of your September, 1944, issue of AIR FORCE you have identified the aircraft on the right side of the page as a type BETTY when in reality it is a type SALLY MARK III.

As identification instructor, specializing in Japanese Aircraft, of the Will Rogers Field CCTS (PR), I wish that in your next issue you would make the necessary correction as all my student pilots are avid readers of your publication. . . .

Lt. Haven Waters, Oklahoma City, Okla.

. . . Let me be one of perhaps several thousand who call your attention to the incorrect identification. Unless I'm losing my mind and eyesight, the plane is beyond doubt SALLY. As the first photo interpreter with the 5th Air Force in the SWPA, I shall never forget my dear friends BETTY and SALLY. . . .

Maj. J. E. Smith, Muskogee, Okla.

. . . According to the latest information we have on the subject of aircraft recognition and identification, this particular plane is the SALLY. . . .

Pvt. Edward R. Austin, Truax Fld., Wis.

. . . An error was immediately noted. . . .

Paul E. Yost, San Antonio, Texas

We are building a special dog-house for our picture editor. —*Ed.*

Excitement

Dear Editor:

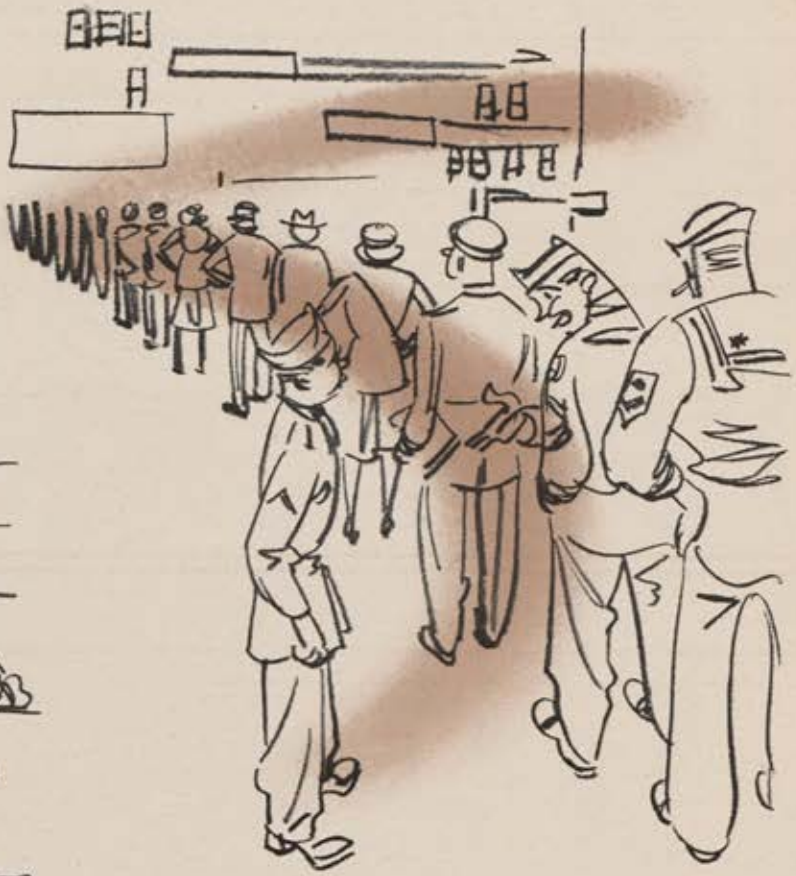
. . . On the inside back cover of the September issue of AIR FORCE appeared a picture of the wounded in a C-47. Two of

(Continued on Page 51)

"OFF THE BEAM" by CAPT. WILLIAM T. LENT

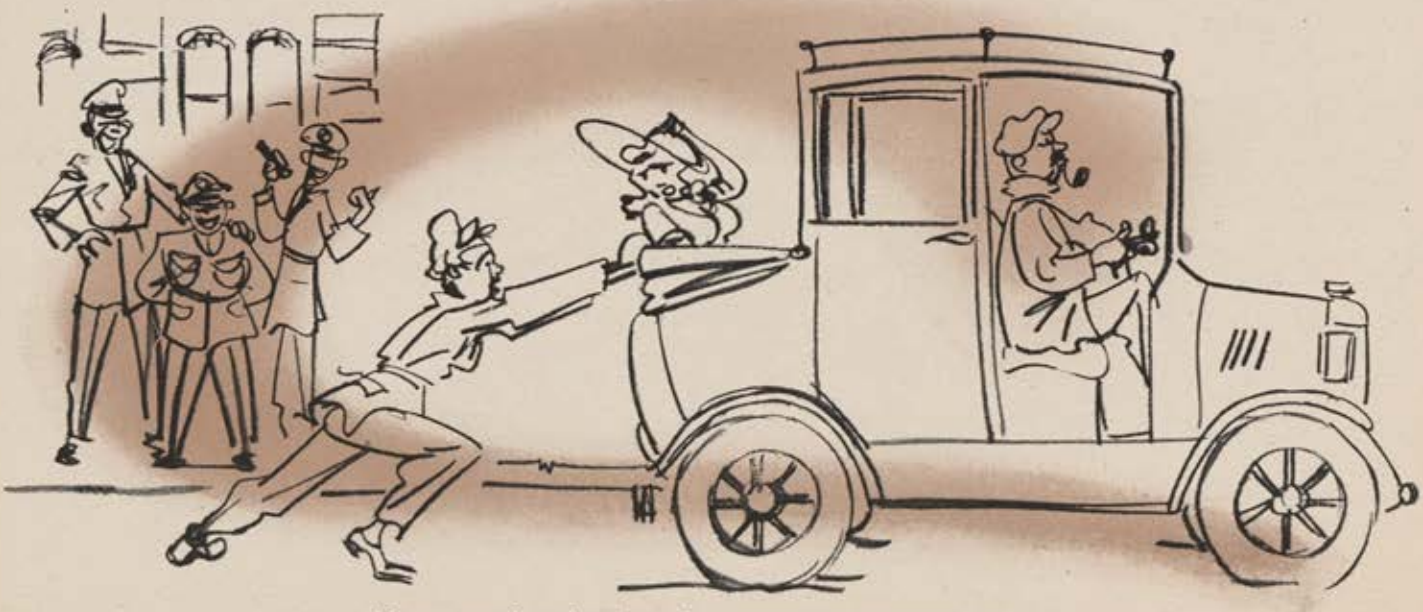
London Leave

"Pink elephants, snakes, gremlins and now British tea!"



"I don't know whether it's a restaurant or theater. I've been in line only an hour."

"No, it isn't your mustache, Malcolm, it's just closing time."



"I can remember when it was fun to run out of gas on a date."

On the Alert

TIMELY ADVICE FROM THE AIR INSPECTOR

Administration ★ Supply and Maintenance ★ Operations and Training

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

EMERGENCY EQUIPMENT

Inspection of planes to insure that they are stocked with all authorized emergency equipment avails nothing if flying personnel fail to take advantage of such facilities when a mishap occurs. Take the case of the Allied fighter pilot forced down in kangaroo and kunai grass nine miles from his South Pacific base. Apparently he figured the hike back would be a cinch, for he started out minus his Very pistol, emergency rations and other equipment furnished him for just such an occasion. A search party found him 36 hours later in a swamp with water up to his neck and mosquitoes covering his face. He was too exhausted to move. Native trackers carried him back to the base.

FUEL TRANSFER SYSTEM

A number of forced landings due to malfunction of the fuel transfer system have been reported. Investigation has revealed that in numerous cases pilots neglected to check the system until shortage of fuel prevented continuance of flight to an adequate airport. All tanks and fuel transfer systems should be checked before reaching the "point of no return."

AIRPLANE CRASH FIRE FIGHTING

Attention of all concerned is invited to TM 5-316, "Airplane Crash Fire Fighting," which discusses equipment, fire and rescue hazards, crash operations and training. One sentence in the manual—"There is no substitute for common sense"—carries volumes of sound advice.

LETTERS OF TRANSMITTAL

To conserve manpower and paper, every effort should be made to eliminate letters of transmittal for forms and reports whenever feasible. Particular attention should be directed toward elimination of letters transmitting routine material. (Sec. III, WD Cir. 310, 1944.)

PROPER PACKING

Substantial damage to materiel in shipment is due to improper packing and carloading. Attention is invited to the provisions of Sec. VI, WD Cir. 316, 1944.

BOMBER CREW TIPS

Each crew member should have a thorough knowledge of his particular section of the plane so that in an emergency he can immediately inform the pilot of the exact nature of the trouble and also make repairs if necessary.

The pilot should be prepared to cope with difficulties arising from engine failure or flak damage to gas tanks. Even when one engine is lost, straggling behind a formation can be avoided if increased power is utilized without delay.

TANK CARS AND TRUCKS

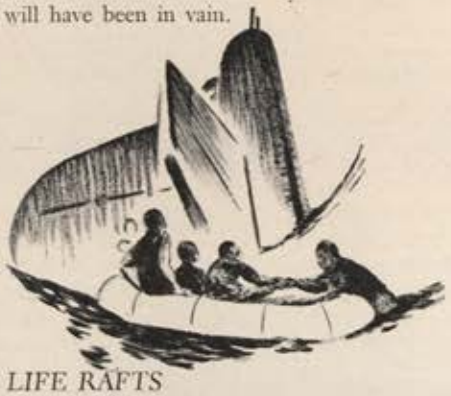
Because aviation gasoline transportation facilities are taxed to the limit, tank cars and trucks should be promptly unloaded and released.

DISABILITY PENSION

Each enlisted man who is discharged for disability has the right to file an application for Disability Pension. The application should be filed before discharge, while necessary clinical and other records are readily available for transmittal to the Veterans Administration. (Sec. IX, WD Cir. 293, 1944.)

MAIL ORDERLY

Perhaps there is no more important link in the Army's entire mail system than the mail orderly. If he doesn't perform his duty properly, the Army Postal Bulletin points out, all the planning and effort that has gone into the handling and dispatch of mail across thousands of miles by land and air will have been in vain.



LIFE RAFTS

Pertinent TOs governing the equipment and inspection of life rafts must be complied with prior to a plane's departure from its home station for overseas.

DRYING AERIAL FILM

When aerial film won't dry during a complete cycle through the A-5 or a similar machine, use of two dryers in tandem will solve the problem. This advice is passed on by a field air inspector, who warns that a good size loop of film should be left between the machines to compensate for variation in speed of the two driving motors. In areas where flies and gnats are numerous, a cheese-cloth "tunnel," large enough to accommodate the loop, should be used between the dryers because the film emulsion is usually tackiest at that point.

HOW TO MAKE THE ENEMY HAPPY

Satire was used to improve AAF motor vehicle maintenance in New Guinea. Posted on the bulletin board was a letter of commendation from "Hq. Japanese Imperial Rat's Nest" to "Personnel who give heroic and continued inattention to 1st and 2d Echelon Vehicle Maintenance." The letter cites for special praise such negligence as:

"*Failure to have oil changed and vehicles properly greased.* This results in many burned out parts and general deterioration of vehicles. Velly good!

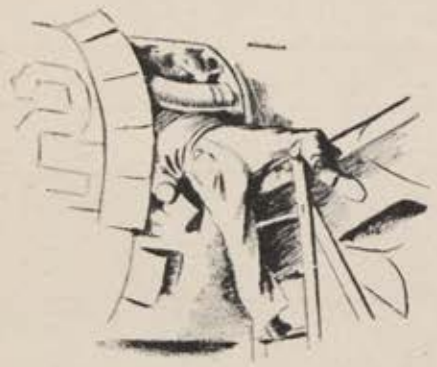
"*Failure to check inflation of tires.* This results in premature wearing out of scarce rubber. The Emperor is really tickled about this.

"*Failure to keep wheel lugs tight.* The extra wear on tire and wheel bearings as a result of this practice keeps the roads to the repair shops hot and also warms the heart of Tojo.

"*Failure to give prompt attention to small repairs.* This necessitates parts replacement which could have been avoided by earlier attention. The new parts occupy shipping space that otherwise could be used for mail and food.

"*Driving like hell.* Enough broken springs, mangled fenders, caved-in grills, and torn-

off door handles can equal in cost the destruction caused by an air raid. The thoroughness of this contribution has been exceptionally noteworthy."



Q and A

Q. Must letters of recommendation accompany an application for officer candidate school?

A. Letters of recommendation are not required by current regulations and they are considered unnecessary and undesirable. (Sec. I, WD Cir. 319, 1944.)

Q. Does a provisional unit, as defined by WD Cir. 241, 1944, submit a morning report?

A. No. Personnel on duty with provisional units will be carried on detached service by the organization to which they are permanently assigned. The parent organization will submit strength returns for all assigned personnel. (WD Cir. 241, 1944.)

Q. Where are qualifications outlined for awards to motor vehicle drivers and mechanics?

A. In Sec. II, WD Cir. 248, 1942. This circular should be checked by commanders concerned, because many qualified drivers and mechanics have not received awards for which they are eligible.

Q. Is the wearing of a miniature aviation badge authorized?

A. Yes. With the exception of flight nurses, persons authorized to wear the aviation badge may wear on their shirts a miniature badge, approximately two inches from tip to tip, if they so desire. (AR 600-35, Ch. 1, 29 July 1944)

Q. May base units have an insigne of their own?

A. The adoption of an insigne by any AAF base unit with allotted enlisted strength of 100 or more is authorized, subject to approval of the Commanding General, AAF. The insigne may be used on aircraft permanently assigned to the base unit, on patches to be worn on pockets of flight jackets, field jackets, coveralls and work uniforms, on unofficial stationery and in decorating recreation buildings, barracks and mess halls. (AAF Ltr. 35-46, 1 August 1944, Subject: "Insignia for AAF Base Units.") ☆

AIR WAR IN THE SOUTHWEST PACIFIC

(Continued from Page 35)

With the stage set, the first act of the play for Biak came on May 27 when Allied troops established beachheads on the island. Although the landings were made at little cost, stiffening enemy resistance indicated the Japs had a strong cast lined up back of the beaches to keep us from stealing the show. Jap army and navy aircraft were rushed hurriedly to the scene and the number of fighters intercepting our attacks doubled. Thirteen enemy bombers, of which six were destroyed, bombed and strafed Allied ground positions. On June 2 there were 13 enemy bomber raids. We had a strong cast in the area, too, however, and 59 Jap planes were destroyed, with 15 probables.

Displaying a measure of his former daring, the Jap attempted to reinforce Biak on June 8. Two cruisers and five destroyers heading for the island were successfully attacked by 10 B-25s north of Vogelkop. One destroyer was sunk, another was left in a sinking condition, a third was seen blazing furiously and a fourth also was set afire. Late that night, the remnants were observed bearing northwest.

General Kenney's technique of pressing one gain while paving the way for the next jump was evidenced by a bold Allied air attack against the Jefman-Samate area on June 16. Seventeen B-25s with fighter cover destroyed more than 50 enemy planes in combat and on the ground and sank several ships. Our fighters estimated that there had been between 85 and 90 Jap planes on the ground, waiting to intensify resistance at Biak. The plan was nipped in the bud and at Biak the end was in sight. During the week of June 24, all Biak airfields were occupied by the Allies, and to make things even more difficult for the Jap to supply and reinforce his battered garrisons, 5th Air Force search units were regularly knocking down enemy transport planes operating along the formerly safe routes between the Philippines and southern areas.

Our persistent attacks in the Jap's backyard paid off on July 2 when an Allied amphibious force landed at Noemfoor, occupying Kamiri airstrip. Lack of air opposition could mean only that the enemy had at last conceded defeat in western Dutch New Guinea and had abandoned it as untenable.

July 27 saw the first of our medium and fighter units over the Halmaheras, when B-25s joined fighter-covered B-24s in an attack against airdromes in the islands. Thirty enemy planes were destroyed on the ground and 15 in the air against a loss of two planes for the attacking force. The major result of this attack was not the actual destruction of enemy aircraft but the fact that it forced the Jap to evacuate to the Philippines all of his air strength except that needed for immediate defense.

To the south, the final step in the retaking of New Guinea came on July 30 when an Allied amphibious force with strong air cover landed at Sansapor in the Vogelkop area. Thus, Manaokwari was added to the by-passed roster, leaving a Jap garrison of some 15,000 effectively cut off. Following this occupation, only token enemy air activity was encountered in the Halmaheras, and the islands became a happy hunting ground for Allied planes.

During August, our bombers pounded airfields and shipping in the islands virtually at will. Days went by without a single case of interference. Ships and parked planes were destroyed in quantity with very few losses on our part.

This lack of opposition continued into mid-September, even over the southern Philippines where our bombs had begun to fall with regularity. Then on September 15, with almost monotonous repetition, an Allied amphibious force, preceded by air and naval bombardment, landed on Morotai in the northern Halmaheras without opposition. Not a single Jap rose to question our dominance of the air.

Thus, Japanese tactics and strategy had become an almost unfathomable pattern of confused defense. With the hysteria of a man overturning furniture in the path of a pursuer around a locked room, the enemy had continued to throw reinforcing troops into our line of advance, knowing full well that they inevitably would become lost battalions, isolated and strangled.

The Jap obviously is building for a desperate stand in the Philippines where his own Rabaul position is reversed. Our bases are drawn into a thin line while he has the freedom of dispersal on an unlimited number of well stocked and equipped airbases. His internal supply lines are well covered by land-based aviation.

Yet, even with a large concentration of air power, good communications and a battlefield in his favor, he has the defensive attitude of a beaten man. Disorganized and demoralized, he is being allowed no time to dress his wounds and regain his balance.

A short time ago, this statement was heard over the Japanese Domei radio: "Frankly, the war situation in the Pacific is not favorable to the Japanese."

Frankly, we agree. ☆

COMBAT MAY MAKE YOU LAZY

(Continued from Page 5)

without working for it persists—but the reason is gone. It's damned foolish then for us to lie on our backs and pretend we're winning the war just by wearing our ribbons.

Another thing. We sometimes have chips on our shoulders for men who have been in this country sweating out gasoline rationing while we've been trying to de-luft the Luftwaffe. We don't realize that a lot of these guys are honestly as sore as boils because they've been stuck in this country when they wanted to be doing what we were. Also, we seem to forget that some of the jobs in the States are damned hard work.

Well, it's their chance now. If there's any real justice in the AAF redistribution program or in various personnel rotation projects, combat men have to be able to take over jobs at home while those who have been here all the time go out to meet the Nips.

This should be a good thing. It gives people with lots of missions behind them a chance to settle down and live forever, free from the dangers of combat. It gives men who have been griping their heads off in Kansas a chance to collect a couple of stories to tell their grandchildren. And it should be good for the AAF. Getting people who know what it's all about, who understand the problems, into training and administrative jobs should mean that those jobs will be done better. Combat experience will have a chance to get into the nooks and crannies where it never was before.

But obviously this entire plan falls apart if even a small percentage of the returnees are uninterested or lazy. Their attitude will work a hardship on all of us, including those who damned well would like a chance to spend some time near T-bone steaks and chocolate milkshakes.

I'm trying to lay off preaching but, as I see it, those of us who meet this problem have just got to settle down, grit our teeth and go to work. When we were aviation cadets we had to do a lot of dull, routine, irritating things. We wanted our wings and we took what was dished out in order to get them. Now we're big boys and many of us have our wings plus a few Jerries or Nips. And we've got to go to work again. This time there isn't a pair of shiny wings hung out ahead of us like a frankfurter in front of a bulldog, but there's plenty to be gained nevertheless. As for the ground men with overseas stripes, they can write their own analogies. This goes for them just as much as for aircrew members.

The kind of work we can do—those of us who have "had it"—is showing up at many airfields in the States where returnees have rolled up their sleeves and performed to the best of their ability. If it's a new outfit being activated and organized, a man back from overseas can help enormously. He knows what's important and what's not.

When you're overseas you hate to think that somebody at home might be doing a bad job because he read someplace that the war is over. Well, no matter what the newspapers say, we know there's plenty of war still to be fought. Those of us who have tangled with the enemy should know that better than anybody else. Yet the amazing fact is that many of those very combat men are the worst offenders when they get back to the States.

When you return, you will be well treated, probably will have your picture taken and get a nice, long leave. But after the shouting is all over, you will find there's a lot of work to be done and you're expected to help do it.

In other words, you still have a war to fight. Sorry, but that's the gen. Combat may make you lazy. If you know that and watch it, maybe you'll have an easier time than some of the rest of us have had. Good luck. ☆

Cpl. Max Finkelstein of Los Angeles vowed he would kiss the first MP he saw—if he got back safe. Max did and this is his proof.

OPERATION: REUNION

(Continued from Page 4)

who came back, few could put it better than T/Sgt. Peter Beyerle, waist gunner from San Diego.

Said Peter, a small, blue-eyed guy, "The United States Army looks after its boys. There isn't a one of us who doesn't realize what was behind this rescue. The 15th Air Force had always given us extra good care, and while we were in prison we knew they would get us out somehow. For the ones who needed medicine, it came on the first planes. There's no other air force like the 15th, and no other country like ours."

As for the men who flew the 500 sorties of the main operation, one Fortress pilot spoke for all of them, "I'd like to do it everyday," he said. He gulped slightly, but he wasn't embarrassed. "Did you see the look on the faces of those guys when they stepped out on our field? That made it the best mission I ever flew." ☆

Kicking off his shoes and socks to dance on friendly Italian soil, S/Sgt. Edwin Braswell of North Carolina is seen trucking on down.

Rendezvous

(Continued from Page 46)

the wounded men in that picture are now patients in this hospital.

One is Lt. Richard Sandoz on the lowest bunk right, who was awarded the Purple Heart. The other one is Mancel Mortensen, T/5, who is just across the aisle from Sandoz.

This picture caused great excitement in our hospital. . . .

Octavia Fellin, Santa Fe, N. M.

The $100 Bet

Dear Editor:

. . . We are sending the enclosed letter to you in the hope that you may be able to help Lt. Skogsberg. . . .

"Gentlemen:

"In order to settle a bet of $100, please settle this question and submit the proof. Enclosed you will find a stamped, self-addressed envelope for your convenience. Besides the $100 bet this is a question of prestige, so please answer it promptly:

"Two planes are moving in the directions indicated by the arrows (parallel), at the indicated speeds, separated by the indicated distance. A gun with a muzzle velocity of 800 feet per second is fired from plane 'Two' at plane 'One.'

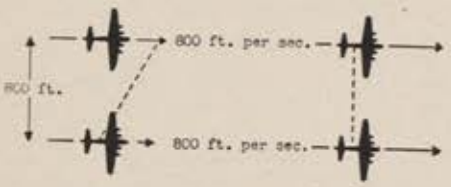


Fig. 1 Fig. 2

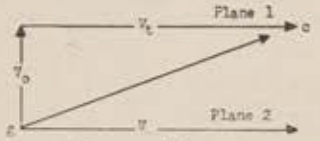
"Assuming there is no air resistance, and no wind pressure, will the gun be sighted directly on the target, or will target be given lead, and if so, how much?

"Arthur T. Skogsberg, 1st Lt., Signal Corps."

The New York Times
Information Bureau

According to the experts:

Figure 2 in your letter shows the correct line of aim for the tactical situation outlined. Ignoring bullet drop due to gravity, and bullet slow-down due to air resistance, the situation may be analyzed vectorially as follows:



The vector $V_o = 800'/s$ in muzzle velocity; V_t is forward velocity of defending a/c is $=800'/s$, and is also equal to V_t, the target velocity. Adding V_o and V_t vectorially gives gc, the velocity of the bullet along path gc. The actual speed of the bullet for assumed conditions would be

$$\sqrt{800^2 + 800^2}$$

Therefore, the collision point is C if the defending gunner aims directly at the target aircraft (again ignoring gravity and bullet slow down). —*Ed.*

In This Issue

Our cover girl this month is a honey, as all the boys who have taken her up will testify. She's got curves just where you want them, and she is fast company.

This baby is the latest AAF plane to go into combat, and you can properly refer to her as the "Invader" when you aren't saying A-26.

You probably know another plane, the A-36, as the Invader. Here's the explanation. It seems that the name Invader was reserved for the A-26 by a U.S.-British subcommittee on airplane names back on January 13 of this year. We say "reserved" because at that time the A-26 was a classified airplane, and the name couldn't be announced.

While the A-26 was under wraps, the A-36, developed from the P-51, was establishing a good record as an attack bomber. Over in Africa some of the boys who flew A-36s thought it deserved a name of its own. They came up with the name of Invader and it caught on in a popular but unofficial sort of way.

So the A-26 is the Invader by prior claim and official action. The A-36 is officially the Mustang, same as the P-51.

Outside of that, our cover girl has few complications, as the article about her on Page 39 states. For the photograph we are indebted to the Douglas Aircraft Co., which built the A-26. And it's only fair to tell you that a piece of armament has been removed from the cover photo at the direction of those old rascals in the censor's office.

Speaking of the A-26, our picture editor in a frantic last-minute rush to make deadline for this issue came across some new shots of the attack bomber. Because we paste up our dummy layouts with photostats (fitted to proper size) of the photos to be used, he ran from editor to art department in one convulsive motion and ordered the A-26 photostats. Then he sweated out their return. Finally they came, by special courier from the photostat company, and the picture editor tore open the package while the art director stood nearby, drooling for the A-26 material. We will never quite understand what happened at the photostat company. The package contained about the right number of "stats," but none of an airplane. They all were of Errol Flynn.

From S/Sgt. Mark Murphy, our correspondent in France who wirelessed the report on Patton's air support (Page 54), comes a letter relating his darkest moment in the ETO. He says: "Somewhere near the front I had a middle-aged and slightly peculiar war correspondent wished on me. We were looking for a certain outfit and we finally found it all camouflaged in the woods with a bunch of GIs sprawled on the grass, eating. I kept asking the whereabouts of the PRO (meaning Public Relations Office, of course) and was finally directed to the medics! Just what those characters thought I was doing rushing up there at high noon with an elderly, burgundy-colored war correspondent and demanding to be fixed up, I'll never know."

Maj. Walker M. "Bud" Mahurin, author of "Combat May Make You Lazy," Page 5, is one of the AAF's leading fighter pilots. Now commander of a fighter squadron in Florida, Mahurin flew with the 8th Air Force's famed Zemke Group, which at the time numbered Bob Johnson and Gabby Gabreski among its other "hot pilots."

Regarded as a perfectionist in the art of fighter warfare, the slender, easy-going Mahurin in combat was quick to capitalize on an opening and smart enough to withdraw when the situation demanded.

Mahurin is not superstitious and never arms himself with talismans, but like most fighter pilots he attributes a lot of his success in the air to pure luck.

"You've got to be lucky in this business," he says. "Otherwise, I wouldn't be here now. I've made too many mistakes to let myself believe that I'm good."

Col. B. B. Cain, author of the article on SWPA operations on page 30, is one of the most experienced air officers in the Pacific. Before going to Australia in April 1942 he was attached to the RAF in England. In the Pacific, although not a combat officer, he flew on many missions. He has more than 100 combat flying hours, took part in the Bismarck Sea battle, and received the Air Medal for one action in which his plane sank a Jap warship. A regulation now forbids him to fly combat; he's too valuable a man to risk that way.

Devotees of home cooking may want to know more about the special dish featured on the inside back cover. This month's Pass It On Girl is Jeanne Conrad, a Conover model. Jeanne is from Rochester, N. Y., is 20 years old, 5 feet, 7 inches high; weighs 115 pounds, and her BWH measurements are 34, 25, 35. She has grey-blue eyes and dark brown hair. If you don't know what BWH means, kick it around awhile. You have a friend who will know. No, captain, not *Boy Whatta Honey!*

We really don't ask you for much, so when we say we still need copies of January and February 1943 issues of Air Force for our files we hope you'll be able to dig up some for us and send them in. ☆

CROSS COUNTRY

MEN of the AAF—including the hundreds whose lives he saved, though they never knew his name—owe a debt of gratitude to an officer of the Corps of Engineers, whose death has recently been reported. He was Lt. Col. Linn M. Farish, who parachuted into the interior of Yugoslavia for three different ninety-day periods during the last year to plot "escape maps" and lay out improvised airfields for Allied airmen who had cracked up on Balkan missions or been forced to bail out in enemy territory.

In addition to the technical data he compiled, Colonel Farish secured the cooperation of Marshal Tito and his Partisans in rescuing flyers who had fallen into enemy hands, or were hiding out in the countryside. He personally led several expeditions to repatriate men who were being sheltered by friendly Yugoslavs, but whose injuries prevented them from reaching a field from which they could be flown out. On one occasion, in company with Lt. Eli Popovitch of Chicago, he made a five-day trip on horseback to bring in a wounded flyer, crossing enemy lines half a dozen times during the journey. On another, the two men saw a B-24 fall in a mountain area, and spent two weeks tracking down the survivors and moving them out in ox-carts.

Colonel Farish was killed in a plane crash late in September, and it was only recently that details of his work were taken out of the "secret" file in which they had been accumulating since he began back in September 1943. Some idea of how he felt about his job may be gathered from one of his reports in which he wrote: "The United States of America is mentioned in the same breath with God in Yugoslavia." If it is, a large part of the credit is owing to such officers as Colonel Farish.

☆

A special effort is being made to get men out of the guardhouse and back on the job. General Arnold has ordered a rehabilitation program for garrison prisoners—those confined to base or post guardhouses—and one big reason is that the fullest possible duty performance is needed from everybody. The program is underway at 110 U. S. continental bases, under the supervision of the Office of the Air Provost Marshal.

A prisoner who shows proper spirit is given extra privileges—more freedom, less guarding, possibly different quarters. He is given refresher courses and shown how to keep out of trouble in the future. Special training suited to his needs in certain military occupations is given and a record kept of his progress. Special schooling is given those having little education. Self-government under supervision is encouraged.

Life in the lockup won't be luxurious, of course. Guardhouses still will be places where self-respecting GIs won't want to be. There still will be strict discipline and hard labor as regular routine, but when a man shows a real desire to behave and improve his situation, he can get out quicker and be a more useful soldier.

☆

A reservoir of male pilots being available for all flying assignments at home and overseas, all WASP personnel will be in-activated on December 20. In place of an honorable discharge, to which WASPs would have been entitled had they been on military status, each will receive a certificate of service. They will return to civilian life with the knowledge that they played an integral part in shaping the AAF and have demonstrated, in the words of the Commanding General, that, "Women have the ability and the capacity to perform the most difficult jobs in flying."

☆

Men whose duty assignments will keep them in Army of Occupation posts after V-E day comes or who will be awaiting their turn for shipment home will benefit from an extensive educational program now being shaped by the War Department. To the extent that the military functioning of a unit permits, part of the duty day previously devoted to military training will be utilized for academic or vocational work under qualified instructors drawn from enlisted and officer personnel. Men will be encouraged to pick up their schooling from any point from the sixth grade through the first two years of college, thus preparing them for continuation of their education at home under the "GI Bill of Rights." The contemplated courses will cover science, pre-professional and liberal arts, with free choice to the individual in line with his postwar plans. Use may be made of some educational facilities overseas, and there may possibly be a provision for study at foreign universities.

☆

Our correspondent in Britain sends along a recent addition to the enlisted man's vocabulary. Over there they're calling the newly authorized gold stripes for overseas service (one for each six-month's period spent outside the U. S.) "Hershey Bars."

☆

With combat losses lower than anticipated and Allied air superiority manifest in all theaters, pilot trainees now will get an additional five weeks of training prior to graduation.

This means that men who were scheduled to graduate on October 16 will not receive their wings until November 20th. Detailed curricula for the additional time to be spent in each phase of training have been drawn up and go into effect on October 16.

☆

Physically qualified Regular Army officers of troop age who have served two years in staff or overhead assignments in the continental U. S. without overseas service since December 1941 will be released for assignment to command positions in the U. S. or for any overseas assignment, according to a recent directive. "Troop age" is defined as 42 or under for a major, 45 or under for a lieutenant colonel, and 48 or under for a colonel. It is planned that all will be reassigned by January 1, 1945. The directive is not inflexible, since in some cases the efficiency of an office might be affected. Exceptions must be submitted to the Deputy Chief of Staff for his personal approval.

☆

If you've been scrounging through captured enemy material in search of a "dud" shell for the postwar mantelpiece—don't. A War Department restriction now prohibits bringing or sending any explosive items home as souvenirs. Firearms are also taboo, as are nameplates from captured equipment, or any articles whose value for service, research, training or scrap outweighs their charm as trophies. In any case, an enlisted man or officer bringing any souvenirs home must have a certificate, in duplicate, describing the article, and signed by his superior officer. Theater commanders will determine what items in the various areas have value for military purposes.

☆

Further details on the demobilization plan to follow V-E day are sparse, but evidence is accumulating on how the War Department is dealing with the general problem of getting men back to civilian life as they become surplus.

Disability or Convenience-of-the-Government discharges can now be obtained by enlisted men who do not meet present minimum physical induction standards and for whom no appropriate assignment is available. The new ruling applies equally to men serving overseas or in continental assignments. The Medical Department will pass on the physical status of the man involved, and the CO under whom he is serving will determine whether or not an appropriate assignment is reasonably available.

☆

Veterans who are eligible for discharge after hospitalization are getting active assistance in seeking Federal employment under a new AAF program. Local Rating Boards for civil service examinations are being established at all station, regional and convalescent hospitals. Under this program veterans

may be examined and certified locally for Federal Civil Service positions on a country-wide basis prior to leaving the hospital.

☆

High over the Ammoniak oil refineries at Merserburg, Germany, on September 28, an AAF bombardier pressed a button, and that was the millionth ton of bombs dropped by an AAF plane in 33 months of war. In recording this milestone, General H. H. Arnold noted that it has "cost us men and materials." Battle casualties of the AAF since Pearl Harbor stand at 72,000 (dead, missing, prisoners of war and wounded) plus 5,300 non-battle casualties. A total of 14,600 have been lost on combat missions, and the training of 163,147 pilots, 31,293 bombardiers and 31,906 navigators has cost us 1,000 planes in flying accidents. Four thousand more have been worn out and 2,500 checked off as "no longer fit to fly." The breakdown of flying hours shows that 4,342 hours have been flown domestically for each plane lost or worn out, while the fatality rate, in training, of 2% means that one man is killed for each 2,700,000 miles flown, a distance equal to 100 trips around the world.

☆

Recent shifts in command assignments in the AAF include the appointment of Brig. Gen. Wm. W. Welsh as Assistant Chief of Air Staff, Training, and the assignment of Maj. Gen. Wm. O. Butler as Commanding General of the 6th Air Force. A former incumbent of that post, Maj. Gen. Ralph W. Wooten, is now Commanding General, United States Army Forces, South Atlantic.

☆

As of July 1, 1944, a 50% increase in pay has been authorized for officers, warrant officers, nurses and enlisted men required to participate in frequent glider flights, but who are not in flying-pay or parachute-jumping status. Such increases shall not exceed $50 per month for enlisted men, or $100 for other personnel.

☆

Taking note of some of the strange and wonderful designs that have been etched onto field jackets and fatigues, the War Department has directed that the practice be discontinued immediately. Drawings, designs, mottoes, names—they're all out. Only authorized and prescribed decorations may be worn.

☆

Reversing the customary, the editors of AIR FORCE have a change of address to report to its readers. From now on, it's the AIR FORCE Editorial Office, One Park Avenue, New York 16, New York.

PICTURE CREDITS

THIRD COVER: T/Sgt. Roger Coster, AIR FORCE Staff Photographer; Conover model. 22: AIR FORCE staff photograph. 39: Douglas Aircraft. 57: AIR FORCE staff photograph.

All other illustrations secured through official Army Air Forces and Signal Corps sources. Requests for prints of photographs for official use and publication appearing in AIR FORCE should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.

The Intercom

As a medium for the exchange of ideas, AIR FORCE presents these answers to its Question of the Month. Replies are those of personnel recently returned from combat duty in the areas indicated.

QUESTION: What was the worst boner you saw pulled in combat?

T/Sgt. Burton Eaton, radio gunner, Southwest Pacific: "I was changing the feed system on the waist gun and I stopped to go down to the strip and watch some fighters come in. Two other men said they would fix my gun for me. That was my big mistake. I was lead radio man on the next mission and I didn't get a chance to check my guns until we were attacked. That was another mistake. I opened up on a Zero and nothing happened. Somebody had put my belt switch in backwards. I really learned a lesson from that. From that day on, nobody touched my guns but me."

S/Sgt. Hubert Green, C-47 radio operator, England: "On D plus 1, we were to drop supplies to the paratroopers in France. There was an extremely heavy fog—we could barely see our wing lights. About 10 minutes out, the radio went bad, the fog closed in, and we were in the sky with hundreds of other planes. I got excited and neglected to check the simple things in my radio set. I couldn't find anything wrong. After the mission was over, I discovered that a switch had been knocked out of place—an easy thing to fix if I had followed ordinary procedure. It could have been fatal."

Lt. Donald Ryerson, navigator, England: "On a bomb run over Osnabruck, one group was flying about 500 feet below another group. They swung over underneath the high group during the run. There should have been inter com communication to warn the bombardiers not to drop their bombs until the path was clear. And some of the other members of the crew should have informed the bombardiers not to drop their bombs. But everything went wrong and a bomb hit the wing of a plane in the low group, tore it off, and the ship crashed. It never should have happened."

Lt. Robert Parke, bomber pilot, England: "We made a four-hour mission in the prop wash of our lead group. We were flying in the low squadron of a high group on a raid that called for climbing to altitude on the way to the target. Our group leader didn't climb fast enough to keep his low squadron out of the prop wash. Radio communication was poor and we were bouncing around. We had no control over our planes. Fighter opposition was heavy and the leader wanted to present a solid front but he stayed directly behind and on level with the lead ships. It was mighty rough."

S/Sgt. James Moore, gunner, Italy: "On a mission to Marseilles, I neglected to check my suit heating equipment. When we got to 15,000 feet I started getting cold, so I turned it on. I turned it to 5 and nothing happened. I raised it to 10 and no results. 15, 20—the more I turned the colder it got. It wouldn't go any higher and I was freezing. I found out later that I had a short in my left glove and left elbow. But I never knew it. I damn near froze to death. That was one mission I didn't sweat out. It happened on my 13th mission, too. My own fault, though."

S/Sgt. Kenneth Reavey, gunner, England: "Over Dunkerque our high flight ran into flak and broke up. They took individual evasive action and made themselves excellent fighter bait. The low flight did the right thing—we stayed together. You are just as liable to run into flak when you peel off as you are when you stick together and you bring the added disadvantage of opening yourself up to fighter attack. There's no sense in inviting trouble—our low squadron stuck together and we got through the flak belt but the other boys got jumped and they lost a couple of planes."

Patton's Air Cavalry

By S/Sgt. MARK MURPHY

AIR FORCE Overseas Staff

THE history books and the military manuals will, in the coming years, doubtless devote much space to Lt. Gen. George S. Patton, Jr.'s drive across France and the part that Brig. Gen. O. P. Weyland's 19th Tactical Air Command took in it.

In the Third Army's furious dash, air power was used with as much or more imagination than it had ever been used before, and a brief review of military tactics may help a little to explain just what was done.

From the time of Philip of Macedon, army commanders have worried about flanks, simply because most of the time an army is much longer than it is wide. To the rear of an army's front line are reserve troops and supply depots and communications. A standard method of winning a campaign is to strike the enemy's flanks, destroy his supply routes, and cut off his front line troops from support and materiel.

In past wars, cavalry often was used to protect the flanks of an army. In the present conflict, the Germans frequently have employed armored patrols for the purpose. The roving cavalry or armor would cover its own flanks, spot any enemy strength and engage the opposition until support arrived.

Patton, however, had another idea. He was in one hell of a hurry, so he called in Weyland and gave him the task of protecting an exposed flank—not the flank of an army moving methodically across known terrain, but that of a mechanized army moving with incredible speed, now in one direction, now in another, destroying the enemy, heading ever toward the German homeland.

And so for the first time in history, air, in addition to its duties of column support, reconnaissance and all the odd work of a tactical force, was given a task which until recent months in this war had been a ground job. This was no mere reconnaissance assignment. Weyland's forces were expected to cover the exposed area and handle anything that developed. Previously, armies had moved so far, stopped, regrouped and moved on again. Patton, confident that his air support would protect him, kept on going for weeks after it was expected he would stop. He and Weyland took on a job requiring nerve and skill as well as imagination.

The 19th Tactical Air Command and the Third Army were kept under wraps until August 1, although both had been activated for some time, and the 19th had done a lot in the softening up of the French coast prior to D-day. Late in July, there was the business at St. Lo, the breakthrough and some feints which caught the Germans neatly. The British were left to hold the pivot at Caen, their troops engaging the bulk of German units in the area, while the Americans cut loose on a wild jaunt through France.

Although take-off of the 19th on August 1 was delayed until late afternoon because of bad weather, the Third Army had launched operations bright and early, and, in the hours remaining before dusk, the airmen were able to knock out armor and trucks.

After the ground forces broke through in a drive past Avranches, the 19th really had its work cut out for it. Groups were assigned to hang over the armored columns of the Third Army, to prevent attack by enemy planes and to knock out stuff holding up the columns. Armed reconnaissance squadrons had the long range jobs of isolating battlefields, which is a military way of saying they had to kill any troops coming to the support of the enemy, to spot and break up any concentrations, and to keep the enemy constantly off balance.

AAF pilots were told not to bust any bridges because that might hold up the progress of the American armies who were definitely on their way. If there were no targets for the column-supporting groups, they were left free to wander 30 miles ahead in search of objectives to bomb or strafe. Fighter Control stations kept track of what was going on and often sent squadrons out to hit targets noticed only minutes before by recon outfits.

Patton moved his headquarters, and the 19th TAC headquarters moved, too. The command's tasks grew daily. In addition to giving the Third Army armed support by con-

U. S. troops which liberated St. Dizier on September 1 found these Nazi planes, smashed by Allied aircraft that preceded the advance.

Elderly French woman passes wreckage of German tanks in the streets of Roncey. Nazis were driven from area during St. Lo offensive.

The 19th Tactical Air Command covered the flanks of the most spectacular breakthrough of the war

ducting reconnaissance missions, there was the job of protecting a bottleneck at Avranches, through which the Third Army's men and materiel were pouring, and some work to be done on ships in the harbor at St. Malo. Pilots were going on three and sometimes five missions a day.

Almost daily new groups were being added to the 19th as its functions were broadened. In the first five days of the Third Army's drive, the airmen flew 1,088 sorties and lost only three planes. They knocked out 250 motor vehicles, 12 tanks, nine horsedrawn vehicles, four locomotives, nine railroad cars and two naval vessels; cut five railroad lines; destroyed 17 gun positions, seven fuel and supply dumps, two marshalling yards, a gas tank and an enemy headquarters, and attacked 21 troop concentrations. All this was in addition to ceaseless patrol and reconnaissance.

The enemy withdrew to concentration points at Brest, St. Malo, Lorient, and on the Painpol Peninsula, and the Third Army, finished with Normandy, had overrun Brittany where the fields and weather were better for air operations. The enemy tried to cut our traffic through Avranches, and Patton started east in a move threatening the Germans facing the U. S. First Army and the British in the area of Mortain and Vire.

Meanwhile continuing the Brittany campaign, Patton set out to get the river Loire for his right flank. The 19th TAC was assigned to guard this flank, and dispatches of those days read something like the description of a character of Stephen Leacock's who jumped on his horse and rode off in all directions. Word from the Third was received at the 19th's headquarters that "movement east, south and west by ground troops was greatly facilitated."

By the end of the first week of the campaign, the 19th was in full strength, and some of the Luftwaffe got up to be knocked down, 33 enemy planes being destroyed on

Fighter-bombers at Chartres derailed key cars (right) in Nazi supply train so that ground troops, close behind, could salvage cargo.

Sharp-shooting fighters choked off supplies for Nazi armies with attacks like this one which made locomotive look like uprooted tree.

August 7. Patton kept moving his headquarters close to the head of his columns. But 19th TAC headquarters had communications troubles. The farther it moved inland, the farther it was from its airbases.

General Weyland, however, flew up to confer with General Patton nearly every day, and operations continued unceasingly. Planes blasted enemy armor and gun positions, flew over areas that the Third Army might move into, bombed and strafed targets they found there and watched over the supply routes.

When the Germans used our color recognition panels on their tanks, the TAC pilots would fly low and look over the vehicles as carefully as a six-mile-a-minute speed would permit. Then they'd zoom upward, circle and come back down to pelt the enemy with bombs and bullets. The Germans had to use horsedrawn equipment much of the time, and our flyers killed a lot of horses, something which bothered them considerably more than killing Germans, who needed it.

During the action which closed the Argentan trap, some of the 19th's Thunderbolts pounced upon a concentration of nearly 1,000 enemy vehicles and destroyed at least half of them.

At this stage of the campaign, enemy ground troops began surrendering to the TAC flyers. One unit of about 400 Germans waved white flags at a fighter squadron which was lining up for a strafing attack. The squadron reported the location of the troops to Fighter Control and waited around until some ground soldiers rounded up the Boches. An 18-year-old boy among the prisoners said the field kitchen of his outfit had been bombed and that he hadn't had anything to eat for four days. Our planes then dropped leaflets outlining the advantages of yielding and thousands of German troops capitulated voluntarily.

German concentrations were falling one by one, and on August 18 there was a harvest of 7,000 jammed vehicles. Because most of the enemy equipment was in the British sector, the 19th was denied the jackpot. While the American flyers were credited with a few hundred trucks, some tanks and railroad rolling stock, the score of the RAF's 2nd Tactical Command was 1,159 motor transports destroyed and 1,724 damaged; 124 tanks destroyed and 96 damaged.

Meanwhile, the Allies had landed in Southern France and were 30 miles inland. The Germans were very unhappy.

Late in the month a cold front cut down flying time, and on several days the Third Army sent its own armored patrols along its right flank on the line of the Loire. There was little danger, though, because the 19th TAC had taken care of the enemy all along that 400-mile stretch. When the planes were flying, there was either no air opposition or plenty of it, the enemy preferring to jump our P-38s, P-47s and P-51s when it had an eight or ten-to-one advantage.

Our scores usually ran about four enemy craft destroyed to one of ours lost. On one occasion, eight P-51s dispersed more than 80 German planes. Another day eight P-47s, jumped by twelve ME-109s and twenty FW-190s, got six and damaged one for an American loss of two planes and pilots. In a broadcast to its troops, the German high command declared that the Luftwaffe while outnumbered, *really* was doing something, even though German soldiers "tied to a single front" might not realize it.

As the enemy tried to cross the Seine before the fall of Paris, the Thunderbolts made things miserable for him. There were practically no bridges left standing, and some of the Germans were trying to swim across the river. Most of them were using ferries, and the 19th, making things worse, put delayed action bombs in the ferry slips.

Pressing ever onward, the Americans skirted Paris on two sides, leaving the 2nd French Armored Division to occupy the encircled city after the French Forces of the Interior had a field day routing Germans out of their fine billets.

On August 25, the Luftwaffe took a terrific beating. Mustangs and Thunderbolts of the 19th and of the 9th Tactical Air Command of the 9th Air Force destroyed 77 enemy planes in the air and 50 on the ground, got 11 probables and damaged 33. The total American loss was 27 aircraft. Over Germany, 8th Air Force fighters and bombers accounted for 11 in the air and 40 on the ground. The Germans launched a few jet-propelled craft which travelled like hell but never got anywhere near our planes.

The 19th's assignment after the fall of Paris was a tough one, calling for widely diffused action. Patton was far across France and the TAC was supporting him. At the same time it was bombing Brest and other enemy targets in Western France. When these coastal installations finally capitulated, Weyland was able to devote his full strength to the campaign in the East.

In September things began to slow down, although in the middle of the month the 19th herded in 20,000 Germans to surrender in one of the oddest actions of the war. These troops yielded to what amounted to a couple of platoons of infantry and a battalion of MPs brought up for the purpose. A young infantry officer arranged the surrender after days of negotiations when he threatened, among other things, to have some circling P-47s come in and bomb the Germans. The Thunderbolts had been attacking them for weeks and they didn't want another minute of it.

Ground-air cooperation between the 19th TAC and the Third Army reached an all-time high a few weeks ago, if you can go for the fantastic story they tell at TAC headquarters. It's about a young airman, a lieutenant colonel, who was forced to bail out behind the German lines. According to the tale, he hid in a town for two days, waiting for Patton's columns to approach the area. After a Frenchman had sneaked him across the lines, the colonel reached Third Army headquarters, where he described the enemy-held town and its defenses and suggested that it be taken immediately.

"Give me a forty-five and I'll take it myself," the flyer is said to have volunteered.

The colonel's enthusiasm is supposed to have so pleased the two-gun man, to whom he was reporting, that half an hour later, American tanks rolled into the town, proceeding on information an AAF officer had obtained on flying-boot reconnaissance. ☆

KEY MEN

(Continued from Page 22)

operator when someone failed to ask for authentication. The enemy is tricky enough—don't fall for his obvious attempts.

It is not the purpose here to level the finger at radio operators and place all the responsibility on their shoulders. Many times, the mistakes they make can be prevented by cooperation from the rest of the crew. When the navigator or pilot receives a bearing from the radio operator that seems to be out-of-line, it is their duty to question it. Radio operators are willing to admit their mistakes, but they say that too often the pilot does not even consider them part of the crew. One radioman justifiably complains, "I made 47 missions with my pilot and I swear he doesn't even know my name." Pilots should understand the radio operator's job and see that he attends to it properly. In the following case, the fault was the radio operator's, but the pilot could have prevented it had he talked the matter over with his radioman.

A B-24 was flying from Italy to Africa to get supplies. The radio operator had forgotten to get the letter of the day. It was his job to get that information, but the pilot could have checked him before the take-off. As it was, weather forced the plane down to 1,000 feet and it passed over a friendly convoy. The radio operator reports, "They blinked the letter of the day at me and I couldn't answer. I shot back the colors of the day, but they kept after me for the proper code letter. Finally, three planes took off from some baby flat tops and buzzed in to look us over. We did everything but sing the *Star Spangled Banner* to indicate that we were friendly. They must have been satisfied, for they did not shoot at us. But it was awful close and the whole thing could have been serious. I was at fault, of course, but the pilot could have asked me about it before we left."

Radio operators are extremely important men, especially in an emergency. When a plane is lost, or is about to go down, the quick work of a good radio operator can often save the lives of the crew. As a B-26 radio operator put it, "We thrive on a crisis. When everybody gets excited, it's the radio operator who should keep cool and get the proper messages through. Well, one time I was the guy who got excited and we damn near went into the ocean because of it. We were returning from a mission with a bad engine. The pilot wanted to check his position and asked me to get a QTE. In my excitement, I misunderstood him and I got a QDM instead. With one engine out, and the danger of the second one going, we didn't have any time to cruise around while I rechecked and got the signal he had asked for in the first place. I realize now that when he gave me his instructions I should have repeated them and had him give me a confirmation. But I had one eye on that bad engine and another eye on the water, so I wasn't paying much attention. I finally did get the QTE and we got back without too much trouble. But I hate to think of what might have happened if that second engine

went bad while I was wasting time getting the wrong information."

One of the greatest causes of errors made by radio operators comes as the result of their desire to relax before the missions are completed. The case originally cited of the radioman who took off his headset during a flight is an extremely common source of trouble. Equally important are the radio operators who sometimes forget that they are also gunners. There was the radio operator in the Southwest Pacific who unloaded his guns when he was practically home. The catch is that he was only *practically* home—not actually at his base walking away from his plane. After he unloaded his guns 20 minutes from his home field, two enemy planes attacked and killed the waist gunner. Unloading guns is a quick and easy operation that should be completed after the landing. The mission isn't over until a report is made to the intelligence officer.

Precautions against the possibility of making mistakes can be taken on the ground at the home airfield. Experienced radio operators recommend that the radio transmitter be checked and calibrated with a frequency meter at home, and in the air when necessary to break radio silence. The radio transmitter is zero beat against the frequency meter. If the frequency meter goes dead, the aircraft should not leave the field until a replacement meter is obtained, or the meter is adjusted. It is vitally necessary that the frequency meter contain fresh batteries. Radio equipment must be checked and inspected by the radio operator daily to insure continuous and reliable radio communications service. If these precautions are overlooked, it means trouble. This trouble can be prevented before the mission is airborne; it cannot be overcome after the airplane is targetbound except by aborting.

Mistakes have been made and will continue to be made until the human element is replaced by a system whereby mechanical men can fly airplanes. Until then, the smart thing to do is learn from the mistakes of others and don't repeat errors previously made. The next error may be the fatal error. ☆

Lost Parachutes

LOST

Nos. 41-31493, 42-199747, both S-1 type; return to Lt. Dale Richardson, Post Parachute Officer, Merced Army Air Field, Merced, Calif.

No. 42-559807, chest type, lost at Baggage Room, 578th AAF BU, Municipal Airport, El Paso, Texas, 20 September, 1944. Return to Lt. F. P. Williamson, Section A, Box 350, Army Air Base, Alamogordo, New Mex.

Nos. 42-3832, 42-332930, 42-533345; return to Personal Equipment Officer, 451st AAF Base Unit, Army Air Base, Salinas, Calif.

Nos. 42-140964, 42-140859; return to 36th Photo Reconnaissance Squadron, Personal Equipment Section, Army Air Field, Muskogee, Okla.

WHAT IS YOUR AIR FORCE I. Q.?

Here is your monthly brain-twister. Chalk up five points for each correct answer. A score of 90 or above is excellent; 75 to 85, good; 60 to 70, not too bad; below 60, tsk, tsk. Answers on Page 59.

1. Tokyo has a population of approximately
- A. 3,500,000
- B. 5,000,000
- C. 7,000,000
- D. 1,500,000

2. Our 90 mm antiaircraft gun has a vertical range of approximately
- A. 18,000 feet
- B. 40,000 feet
- C. 5,000 feet
- D. 27,000 feet

3. A star on the American Defense Ribbon indicates
- A. Three years of service prior to Pearl Harbor
- B. The wearer volunteered and was not drafted
- C. Service in the armed forces outside of the continental limits of the United States on or before December 7, 1941
- D. One major engagement in the American theater

4. Mather Field is located nearest to
- A. Los Angeles, Calif.
- B. Portland, Ore.
- C. Sacramento, Calif.
- D. Austin, Texas

5. When pulling the rip cord on your parachute, you should
- A. Draw your knees toward your chest
- B. Spread your legs widely apart
- C. Put your feet together and your legs straight
- D. Cross your legs

6. The U. S. Savings Bond which is called the GI Bond because it is sold only to military personnel has an issue price of
- A. $18.75
- B. $ 7.50
- C. $ 3.75
- D. $12.50

7. The reciprocal heading of a directional course of 70 degrees would be
- A. 180 degrees
- B. 250 degrees
- C. 160 degrees
- D. 140 degrees

8. The name popularly given to the C-69 is
- A. Skytrooper
- B. Constellation
- C. Commando
- D. Skymaster

9. The first all-AAF bomber attack made on Berlin took place on
- A. Nov. 7, 1943
- B. Mar. 4, 1944
- C. Jan. 11, 1943
- D. Oct. 3, 1943

10. The 10th Air Force's area of operation is
- A. India, Eastern Balkans and Thailand
- B. China
- C. The Solomons and the Bismarck Archipelago
- D. India, Burma, Thailand and the Bay of Bengal

11. A group communications officer is classified under
- A. S-1
- B. S-4
- C. S-3
- D. S-2

12. American airplanes have never been operated in temperatures of minus 60 degrees.
- A. True
- B. False

13. Flight nurses on flying status draw extra pay of
- A. $60 per month
- B. 50 percent of base pay
- C. $75 per month
- D. $100 per month

14. American troops landed in North Africa on
- A. November 6, 1943
- B. October 27, 1942
- C. September 18, 1943
- D. November 7, 1942

15. The P-63 has a four bladed propeller.
- A. True
- B. False

16. Under the official point system for separation from the Army, the number of decorations and awards won will receive no value.
- A. True
- B. False

17. Army Serial No. 1 is held by
- A. General George C. Marshall
- B. General Henry H. Arnold
- C. General John J. Pershing
- D. No one

18. A major general in the AAF receives the same base pay and allowances as a lieutenant general.
- A. True
- B. False

19. A cantilever wing has
- A. Tapered edges and external bracing
- B. No external bracing
- C. A dihedral angle to the fuselage
- D. Straight edges and no external braces

20. Identify this airplane:

TRAINING AIDS

Navigation Training En Masse. The Dead Reckoning Navigation Trainer, Type G-2, a composite assembly constructed in the form of a classroom, is now being distributed to Training Command navigation schools. Students using the G-2 are confronted with types of problems encountered during actual flight and are required to work at the same speed as they would be in an aircraft.

The classroom assembly consists of accommodations for 48 students and one instructor. The students' positions are constructed in the form of navigation compartments, each equipped with a complete array of simulated navigation instruments and connected with controls located at the instructor's desk. Problems set up by the instructor are indicated at each of the student positions. Progress of each student is denoted on a separate chart by a traveling recorder or crab. Various factors involved in dead reckoning navigation, including mechanical and instrumental variations, may be incorporated in the control and indicating circuit of the G-2.

All navigation instruments needed to make a successful mission are included in this student's booth of dead reckoning trainer.

Manual on AACS Procedures. An AACS Information File has been published to provide consolidated and standardized reference material for control tower operators, radio operators and cryptographers in the Army Airways Communications system serving aircrews in every theater of operations and in the United States.

It also is intended for use as a training textbook.

The loose-leaf file is divided into seven sections: Organization of the AACS, Control Tower Procedures, Weather, Air Traffic Rules, Airways Traffic Control, Radio Range and Airways. The publication was prepared by AACS and published by AFTAD. Designated Air Forces Manual No. 11, it is distributed, through channels, by AACS, Asheville, N. C.

Films for Electrical Specialists. Two training films portraying the fundamental theories of electricity and electronics have been prepared by the Walt Disney Studios. They are AF-213A—Basic Electricity and AF-213B—Basic Electronics.

Wide distribution of the films has been made in line with a recommendation of the Air Technical Service Command that every electrical specialist in the AAF see the films at least once.

Gunairstructor Answers. The following questions and answers concerning the Gunairstructor are published as a matter of interest to personnel at installations using the trainer. The answers were supplied by officers thoroughly familiar with the device.

Q. Can hits be scored while slipping or skidding?

A. Yes, on the older machines. More recent machines, however, are equipped with a device which will prevent hits when controls are improperly coordinated and show the instructor that the student is using improper coordination.

Q. Does the device require rudder to maintain a turn?

A. No, but, as in an airplane, skidded turns can be made with rudder alone. However, flying students are taught the principle that turning action depends upon the angle of bank which is obtained by coordinating rudder and ailerons. Hence, in order to maintain correct flying habits and prevent control abuse, the practice of coordinating rudder and aileron to start turns should be carried out in the Gunairstructor.

Q. Does the student's plane appear to be moving sideways?

A. Illusions of this kind can be produced by improper operation on the part of an unskilled instructor.

Q. Is there a means for the instructor to check the student's range estimation?

A. Yes. Four marks on the screen where the ring of the gunsight appears to the eye of the student give the instructor a measuring device by which he can estimate range in the same manner as the student. However, these four marks are sometimes difficult to see against the constantly shifting terrain projection, and a new attachment for this purpose is under experiment.

Q. Is successful operation and instruction affected by the skill and interest of the instructor?

A. Decidedly yes. It can be expected that any trainer will be operated badly by an unskilled or by a careless, though skilled, instructor.

Trainers vs. Training Aids. Many personnel in the field have been inclined to look upon training devices as representing primarily the means of enabling students to train themselves. Generally speaking, they are not designed for such a job.

They are meant to be aids in training. They do not supplant the instructor; they assist him. They afford the instructor a more efficient means of demonstrating particular problems and their solution.

Shark Info. An information bulletin on sharks has been published by AFTAD for the Arctic, Desert and Tropic Information Center. Although pointing out that sharks, as a water hazard, have caused more mental discomfort than physical injury, the bulletin discusses the various kinds of sharks and offers many useful facts on how to avoid them if attacked.

The pamphlet, listed as ADTIC Information Bulletin No. 4, may be obtained through channels from ADTIC, AAF Tactical Center, Orlando, Fla. ☆

Connected to each student's navigation training booth is a "crab" which records progress of the mission. The installation shown here, in use at the AAF Navigation School, Selman Field, Monroe, La., is arranged for easy checking on individual students by the teacher.

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.

Official Pin Adopted For NAAFW Members

At last the woman you left behind can wear a pair of silver wings for you without running afoul the myriad Army regulations forbidding civilians to wear military insignia.

A new pin, designed to be worn by the wives, widows, mothers, daughters, or sisters of AAF personnel, has been adopted as the official badge of the National Association of Air Forces Women. The only qualification is that the wearer must be a member-at-large of the NAAFW.

The wings are of sterling silver with an enamel center (actual size above). They have been ordered in quantity and can be obtained through NAAFW headquarters after November 20. Personnel, both in U. S. and overseas, who wish to purchase these pins as Christmas gifts for the women members of their immediate families can do so by taking out memberships in their names and enclosing annual dues plus purchase price of the pin. Send the name, address, and relationship of the woman you are enrolling in the association, together with your serial number, to: National Association of Air Forces Women, 1702 K Street, N. W., Washington 6, D. C. Dues for members-at-large are $1.00. Price of the pin, including postage, is $1.50 plus 30 cents federal tax.

Women who want to purchase the wings themselves must enclose with their remittances the name, grade, and serial number of the AAF man to whom they are related.

Answers to Quiz on Page 57

1. (c) 7,000,000
2. (d) 27,000 feet
3. (c) Service in the armed forces outside of the continental limits of the United States on or before December 7, 1941
4. (c) Sacramento, Calif.
5. (c) Put your feet together and your legs straight
6. (b) $7.50 7. (b) 250 degrees
8. (b) Constellation
9. (b) March 4, 1944
10. (d) India, Burma, Thailand and the Bay of Bengal
11. (c) S-3 12. (b) False
13. (a) $60 per month
14. (d) November 7, 1942
15. (a) True 16. (b) False
17. (c) General John J. Pershing
18. (a) True
19. (b) No external bracing
20. JU-88

NOVEMBER IN THE AAF

. . . before December 7, 1941

1898, NOV. 9: Construction of man-carrying power airplane authorized with allotment of $25,000 to Samuel P. Langley.

1918, NOV. 4: $60,000,000 appropriated for Air Service.

1918, NOV. 11: Armistice. U. S. Army Air Service units participated in 215 bombing raids, flew 35,000 hours in combat, shot down 755 enemy aircraft officially confirmed.

1918, NOV. 14: Brig. Gen. Wm. Mitchell appointed Chief of Air Service, 3rd Army.

1920, NOV. 25: Pulitzer Trophy Race won by Lt. C. C. Moseley. Distance: 132 miles. Speed: 178 mph.

1921, NOV. 15: First flight of Roma, largest American semi-rigid airship, is made.

1922, NOV. 14: Unofficial American non-stop distance record is set by Lts. Kelly and Macready. Distance: 2060 miles.

1925, NOV. 20: Night photographs taken from bomber, using 50-lb. magnesium bombs.

1930, NOV. 6: Medal of Honor is presented to Capt. E. V. Rickenbacker for World War I service.

1931, NOV. 3: Cross-country flight at 20,000 feet from Selfridge Field, Mich. to Washington, D. C., completed by 94th Pursuit Squadron, all pilots using liquid oxygen. Flying time: 2:05:00.

1935, NOV. 11: World record balloon ascent is made. 72,394.795 feet.

1939, NOV. 7: Mackay Trophy for 1938 is awarded to 2nd Bombardment Group for 10,000-mile flight from Langley Field, Va. to Argentina.

1939, NOV. 20-21: Total of 71,133 miles of night flying is reported by the Air Corps Advanced Flying School, Kelly Field, Tex.

1940, NOV.: First navigator training in Air Corps schools begins at Barksdale Field, La.

1940, NOV. 1: Hq and Hq Sq, Hawaiian Air Force, activated.

1940, NOV. 19: GHQ Air Force removed from jurisdiction of the Chief of the Air Corps and as an element of the field forces, is placed under the command of the general commanding the field forces.

1940, NOV. 20: Hq and Hq Sq, Panama Canal Zone Air Force, activated.

1940, NOV. 21-23: Announcement of flight tests of B-25 and B-26 is made.

1941, NOV. 21: First of 16 B-24s, the first tactical planes piloted to overseas destination by AAF personnel, leaves Bolling Field for the British at Cairo.

1941, NOV. 22: 35 heavy bombers, all B-17s, now in the Philippines.

what becomes of our CONVALESCENTS?

"We are not going to bubble over with a lot of effervescent fizz about 'How to Get Well in Ten Easy Lessons.' You men entering here have seen too much blood and muck to swallow such lines. But you can be sure of this fact: every day men who came here shot to pieces walk out of this hospital ready, able, and eager to compete with anybody—be it for a civilian job or a blonde."

This is the straightforward introduction to the AAF's convalescent hospitals that overseas returnees get when they enter, wounded, ill, mentally and physically worn out. And the hospitals make good their boast with the most far-sighted combination of medical, vocational, and educational reconditioning yet developed.

As an outgrowth of the Convalescent Training Program inaugurated in 1942, several AAF convalescent hospitals throughout the country are now receiving the sick and wounded from ports of debarkation, redistribution stations, AAF station and regional hospitals and Army general hospitals. Administered by the newly-organized Personnel Distribution Command, they are strategically located at these points: Fort Logan, Colo.; Miami Beach, Fla.; St. Petersburg, Fla.; Albuquerque, N. M.; Nashville, Tenn. and Ft. George Wright, Wash. In addition, a similar convalescent center at Pawling, N. Y., now under the 1st Air Force as an adjunct to Mitchel Field, soon will be absorbed by the Personnel Distribution Command, along with several others.

The Personnel Distribution Command also has established liaison with ASF general and AAF regional hospitals by assigning especially trained liaison officers and NCOs to 120 of these installations. They perform *non-medical* service for AAF casualties destined for future assignment to AAF convalescent hospitals and redistribution stations or, in rare cases, for return to civilian life. They assist hospital staffs in handling AAF patients' problems such as records, pay, awards and decorations, and orientation prior to processing for future reassignment.

Suppose you've been a patient in a station or general hospital. Unless you're returned directly to duty or to civilian life, chances are that you will enter one of these convalescent centers. If you come home from overseas suffering from combat fatigue, you'll probably be sent to one of them immediately upon your arrival in this country. If you come from a previous hospital, you are now over the acute phase of your illness. Your definitive medical treatment is concluded and your specific injury or ailment has come to take on secondary importance to your overall condition. Also, by now you are ambulatory—you are able to walk about, if only by using crutches.

Complete medical recovery is the chief aim of the convalescent program, but medical officers know this means both physiological and psychological fitness. As a result, the SOP of any of these convalescent hospitals is a skillful blending of medical care, supervised, though not regimented, exercise, healthy play, academic and vocational training—all aimed at the recovery of the "whole man."

"One boy back from the ETO came to us with a serious arm injury—piece of flak over Bremen got him—and he was favoring the wounded arm to the point of not using it at all," says a convalescent training officer at Pawling. "His medical officer told us he must exercise those muscles or they would atrophy. Well, the boy had signed up for our farm project so we decided to have him dig those post holes we needed to fence the livestock corral. That's one job you just can't do with one hand. In a very short time even the MO was astonished at the improvement in the condition of the arm. When we had run out of post holes to dig, the soldier volunteered to help us clear a section of nearby woods. While he worked with us he learned a lot about the farming business—so much so, in fact, that he has decided to go in for it after the war."

"We had a lieutenant here a couple of months," says the shop foreman at Ft. George Wright. "He'd lost an arm in a booby trap in Italy. Before he went into the AAF he'd had some engineering experience and our machine shops interested him more than anything else. He came around one day to ask if there was any machine he could manage with just one hand. So I showed him how to operate a radial drill press. In a week's time he was working it like an expert. It did wonders for his self-confidence."

A corporal who had injured his back in the Southwest Pacific signs up for courses in wild life conservation at Nashville. He plans to enter this field after the war and thinks it would be a practical idea to learn all he can about game preserves, bird refuges, and stocking streams while he's recuperating.

Before he joined the AAF, a captain now recovering from leg wounds was an aviation company executive. When he goes back to his job after the war he figures the company's business will take him to South America, so he uses the

"Se Habla Espanol" in this language class, one of 20 or more varied subjects patients can study at AAF convalescent hospitals.

Anyone in a combat zone may be a casualty. Anyone in the AAF can have an accident. If you're one of the unlucky ones, with a long period of recovery ahead, here's what probably will happen to you

weeks he must stay at Albuquerque to learn Spanish by the latest conversational methods.

This is typical: your medical officer orders considerable exercise for those stiffened fingers. You've always wanted to play the piano, but you've never had time to learn. This is a chance for you to do both at the same time, and have a lot of fun in the bargain. Or if the piano class doesn't appeal to you, you can elect typing instead. If you have lost some fingers in combat, that needn't stop you. An instructor at Ft. Logan, for instance, can rattle out 100 words a minute through a system of his own which uses only a few of his fingers. He has taught the system to several AAF men who have lost fingers and they are becoming nearly as proficient as he.

Where possible, this same principle holds with recreation. "It's much better to have a man ride a bike around the post than it is to confine him to a bike-machine in a gym," says the CO of one convalescent hospital. "We'd rather have him row a boat on one of our lakes here than make him spend a couple of hours on the rowing machine."

What do you have to do at the convalescent hospitals once you land there? Well, there's very little you *have* to do, and therein lies one of the important rules that govern the program's operation. But you may, if you wish, climb mountains, paint landscapes, brush up on your radio code, operate lathes, learn the inside workings of a propeller, take courses in navigation, play golf, milk cows, go fishing, or train pigeons.

Added up, it spells *therapy*. It means faster recoveries, physical and mental stimulation, overall fitness. It does not mean job-training, for that is not the purpose of the program; what it does mean, however, is that the convalescent can use the weeks—usually six to ten—he's at the center in work and study that can be useful to him when he returns to the Army or to civilian life.

The program is not "fixed" in any sense of the word, nor are its supervisors smug about any of their accomplishments.

The "milk run" is a good antidote for combat fatigue and gives all comers a chance to learn the practical aspects of dairy farming.

Training in many types of machine work speeds convalescent time and equips patients with valuable skills they may be able to use later.

A wood block supports injured legs while this GI hammers away at a handsome aluminum tray he plans to send home when finished.

Highly-trained physical therapists outline to patients the specific exercises necessary for correcting their particular condition.

They admit all the problems have not yet been solved and they welcome new suggestions from their patients. "Maybe you've figured out a new angle on limbering up a stiff joint," they say, "Don't be hesitant even if it seems to have that Rube Goldberg touch. Develop it in one of our 'shops' here, let us know about it, and we'll work it out with you."

"This is still the Army and you will still be able to dig up some gripes," men are told upon entering, "The difference here is that maybe we can do something about your gripes. There is another difference between this and the rest of the Army. We are not greatly interested in Cpl. J. J. Jones ASN 10456784. We are a lot more interested in an individual, Joe Jones, with a personal problem we are going to work out with him."

The solution of your personal problem begins within 24 hours after your arrival. You will have confidential interviews with your vocational specialist, personal affairs officer, medical-surgical officer, and educational officer. There are plenty of the inevitable military forms to be filled out but—this comes as a distinct shock to some—you won't have to do the paper work. The consulting staff does it for you—and in easy stages—by merely asking you the necessary questions.

You will get, of course, a complete medical examination, after which you are assigned to a Flight Surgeon, your "personal physician." That's precisely what he will be, too, for the duration of your stay—your doctor and one who, like yourself, has also seen plenty of overseas action. The convalescent hospitals have borrowed from civil life the idea of the family doctor to get as far away as possible from the clinical impersonality of the usual patient-medical officer relationship. Here one doctor is assigned to a specific group of men. He stays with them until they leave.

Your doctor reviews your case, decides what kind of treatment you should have, explains exercises you can do for yourself, those you must do under supervision, and advises certain sports that will help your particular condition. His report also goes to your vocational and educational officers with recommendations about the kind of classes that might be of special benefit.

By and large the decision as to what classes you attend will be yours. However, if your physical condition indicates that you will, in all probability, keep your original MOS, you will be advised to take refresher courses in that field.

Classes in 20 to 30 different subjects is about par for one of the convalescent hospitals. You may sign up for art in the morning and journalism in the afternoon or you may spend the entire class time from 0800 to 1600 in the aircraft repair shop.

The fact that you are a novice, that your only experience in woodwork was whittling a piece of wood on the front porch, or that the closest you ever came to radio repair was replacing a burned-out tube, needn't deter you. You'll have plenty of company; the majority of the students in these classes are rank beginners. Your instructors, both GI and civilian, will be patient and indulgent.

"Try it a week", they'll say, "if you don't like it, change to something else next week."

"We make no attempt to throw the trades at these students," says an instructor at Ft. George Wright. "First they become interested in making something they need themselves or would like to give to their girls. Maybe it's a steel fishing rod and reel, or some ash trays made from condemned piston heads, or engraved trays from scraps of metal. You ought to see some of the really fine steel knives made by men who have never touched a lathe before. But what starts out purely as a hobby can easily turn into a desire to continue the same thing on a serious scale. And so, in purely incidental fashion, we are opening a few

post-war work opportunities for them while they are here."

A patient is allowed to make anything he wants to—and does. The completed article becomes his own personal property to keep or send away. Baby cribs for GI Junior, for instance, are among the most popular items in the woodwork class, and billfolds have top priority in leather work. If you sign up for motor repair, you can learn how to repair that car you've brought to the center with you; you can even give it a paint job if you want.

On the more serious side are courses—both beginner and refresher—in physics, mathematics, navigation, meteorology, electronics and a dozen others. If you become a qualified radio operator in the time you're at the hospital, that achievement is credited on your official service record. Link-trainer time is likewise chalked up.

Farming offers a perfect combination of medical and vocational rehabilitation, and several hospitals are making the most of it. The first—and still the most extensive—farm project in the AAF hospital program is the one at Pawling. In the heart of the Empire State's fertile Dutchess County, the hospital's 540-acre farm is quite literally what the doctor ordered: fresh air, sunshine, healthy exercise and a chance to learn the farming business from scratch. It is drawing an increasing number of patients, both former agriculture students and a surprising number of city dwellers who have long dreamed of "settling down and running a chicken farm when I get out of the Army."

These days farming is as scientific and well-planned as a bombing mission. There's plenty to learn about the intricacies of agricultural chemistry, crop rotation, breeding, or dairy farming—as any farm student will tell you. The Pawling farm gives you this know-how in the most practical way: by letting you help run the farm while you're at the hospital. You'll run it as a business, and you'll watch it pay off.

Running a farm in the AAF however is a new experience and not without its difficulties. Even pigs and turkeys come in for their share of red tape. "The whole Army is run by ARs, but so far there are no ARs which cover the number of eggs a hen should lay a month," moans one of the farm officers. "We are attached to the hospital and while it was quite all right to request a quantity of pills, it was something else again to have a load of fertilizer appear on the requisition slip. The first time we wanted to sell a calf, we had to send a formal military request through channels to 1st Air Force headquarters. By the time it finally came back to us, with seven indorsements, our calf had become a cow."

Well, you've been at the hospital for say, two months. You've worked, rested, exercised, eaten well, you're feeling strong in mind and body, you've learned to produce again, and your doctor decides it's time for you to appear before the disposition board.

You'll sit down with your vocational, educational, medical, personal affairs, and classification officers to decide on your future assignment. Where possible, you'll be returned to your previous duty. If you cannot do that job now, the board will recommend a different MOS. In eight cases out of ten you'll return to some Army assignment; in the other two cases you will get CDDs for your return to civilian life.

Whichever it is, your outlook has undergone a pretty complete change since you entered the hospital. If you're not aware of it, all you have to do on your way out is look at the new patients coming in. "Do you think those guys are not feeling low when they hit here?" ask the program's directors. "They are disgusted with hospitals; they are disgusted with themselves; they are dripping with cynicism. We don't kid ourselves into taking credit for their recovery. The real work, and the real sweating is done by the individual men who walk out. All we do is give a few tips." ☆

The Library

Each month in this section AIR FORCE *presents new titles on aviation subjects which are available to AAF personnel through the AAF Field Technical Library Service. These monthly book lists supplement the Selected Bibliography of Aviation appearing in the Official Guide to the Army Air Forces and are compiled by the Headquarters AAF Library.*

ABRAMS, TALBERT. *Essentials of Aerial Surveying and Photo Interpretation.* N. Y., MC GRAW-HILL, 1944. The methods of aerial photography and the construction of maps and mosaics.

AYLING, KEITH. *They Fly to Fight, the Story of Airborne Divisions.* N. Y., APPLETON-CENTURY, 1944. An account of the training and combat functions of airborne infantry men.

COOKE, DAVID C. *Model Plane Annual, 1944.* N. Y., MC BRIDE, 1944. 3D ED. New annual publication of the standard year-book.

CRAWFORD, WILLIAM, JR., and SAUCIER, TED. *Gore and Glory.* PHILADELPHIA, MC KAY, 1944. The story of a Fortress pilot of the 19th and later the 43rd Bombardment Groups.

FRIENDLY, ALFRED. *The Guys on the Ground.* N. Y., EAGLE BOOKS, 1944. Tribute to the Air Service Command GI's.

GEMMILL, CHALMERS L. *Physiology in Aviation.* SPRINGFIELD, ILL., C. C. THOMAS, 1943. Effects of flight on the human body.

GENTILE, DON S., and WOLFERT, IRA. *One Man Air Force.* N. Y., L. B. FISCHER, 1944. The life record of one of our top aces.

GRANT, HUGH D. *Cloud and Weather Atlas.* N. Y., COWARD MC CANN, 1944. Photo record of all cloud states with their weather implications noted in the explanatory text.

GREENHOOD, DAVID. *Down to Earth, Mapping for Everybody.* N. Y., HOLIDAY HOUSE, 1944. The facts of map reading and map making for those who know nothing about the subject.

GREGORY, H. F. *Anything a Horse Can Do.* N. Y., REYNAL & HITCHCOCK, 1944. The history of the development of the helicopter, new enough to include the potentialities of the XR-6.

HEINMULLER, JOHN P. V. *Man's Fight to Fly, Famous World-Record Flights and a Chronology of Aviation.* N. Y., FUNK & WAGNALLS, 1944. An album and biographical record.

LeSOURD, LEONARD. *Sky-bent, Letters of a Draftee.* BOSTON, BOSTON UNIVERSITY PRESS, 1943. Letters to the home town paper on the career of a draftee through cadet training to wings.

OLSON, EVERETT C., and WHITMARSH, AGNES. *Foreign Maps.* N. Y., HARPER, 1944. A guide to foreign maps providing a key to languages and symbols that appear on maps of foreign agencies.

OTT, LESTER. *Transport Aircraft of the World.* N. Y., FRANKLIN WATTS, 1944. Illustrations and brief descriptions of today's and tomorrow's freight and passenger planes.

PAUST, GILBERT. *Here's How to Fly.* N. Y., ESSENTIAL BOOKS, 1944. Elementary presentation of the basic facts of flight, and the technique of small plane operation.

RAFF, EDSON D. *We Jumped to Fight.* N. Y., EAGLE BOOKS, 1944. A Commanding Officer's account of the training and the first combat experiences of the U. S. Paratroopers.

STERN, MICHAEL. *Into the Jaws of Death.* N. Y., MC BRIDE, 1944. A collection of first person narratives of war action, including reports from several of the crew of Memphis Belle.

STEWART, JOHN Q., and PIERCE, NEWTON L. *Marine and Air Navigation.* BOSTON, GINN, 1944. Sea and air piloting text.

VAN ZANDT, J. PARKER. *Geography of World Air Transport.* WASHINGTON, BROOKINGS INSTITUTION, 1944. $1.00. The first volume in a series which will explore from an economic point of view the world possibilities of the new aviation.

WAUGH, E. D. J. *West Point.* N. Y., MACMILLAN, 1944. The United States Military Academy's history including a brief chapter on the building of Stewart Field and its importance.

WILSON, GEORGE E. *Aircraft Identification for Fighting Airmen.* N. Y., MC KAY, 1943. An identification handbook based on multi-view pencil drawings rather than 3-view silhouettes.

ZWENG, CHARLES A. *Zweng Aviation Dictionary.* NORTH HOLLYWOOD, CALIF., PAN AMERICAN NAVIGATION SERVICE, 1944. An encyclopedic dictionary with definitions and biographical entries. ☆

SHOOTING THE BREEZE

Burma. A Japanese light antiaircraft battery, hoping it had solved the problem of mobility in this area, mounted all its equipment on the broad backs of elephants. After months of intense training, the unit set out for jungle maneuvers. They made an impressive start, with a brass band leading the elephant herd, and the local citizenry cheering them on. But again the Japs had outsmarted themselves. A week later the battery straggled back to camp, tired, hungry, carrying one lone Bofors barrel, but otherwise gunless, equipmentless and elephantless. The Japs had failed to take into account three vital factors: 1—The presence of cow elephants in the column. 2—That there is a certain, definite season in every year, from an elephant's point of view. 3—The possibility of encountering wild bull elephants in the jungle.

England. A colonel went on a mission as an observer. The flight ran into serious opposition from both fighters and flak over Europe, and the B-17 was hit. A 20 mm shell struck the top turret, and the gunner fell to the floor, covered with blood. The colonel rushed back to give first aid, saw the boy's still form and thought he was either dead or close to dying. The officer was about to administer a hypodermic when the gunner opened his eyes. The colonel bent over him, placing an ear close to the boy's lips, expecting some last, feeble words.

"Geez, Colonel," the gunner said, "I'm beginning to think there's not much future in this racket."

Australia. When the WAAFs (Australian air Wacs) were first issued shorts, a commanding officer noticed that the new garments were generally too long, hanging rather sloppily below their knees. Hoping to find some solution, the gentleman called out the girls and lined them up for an experiment. He asked several of the more apparent cases to fold the legs of their shorts up to various lengths. Finally he decided upon the most suitable length and had all the girls fold their shorts to the same length. The officer then reviewed the results and seemed quite satisfied with his decision. So satisfied, in fact, that he didn't realize how his next command would sound: "All right, girls. Now you can let your pants down."

England. In the 9th Air Force is a B-26 whose nose will probably never catch up with its tail. It happens that a plane named Marty Marauder collided with a plane named Goatee Hell. The nose was sheared from one aircraft, and the tail from the other. Mechanics skillfully put the two ends together to produce a B-26 now known as Marty Marauder—Goatee Hell. The nose has made 51 missions, the tail is credited with 57.

England. An AAF lieutenant had golf clubs, but no golf balls. Taking his problem directly to the English public, he inserted a want-ad in a local newspaper. He received this reply: "Dear American officer, I am Peter Turner, aged 9. I will trade my four golf balls for two packages of candy or chewing gum. But if you fly a B-17 or a B-24, you can have them for nothing."

Bougainville. The Jap battle flag was soiled by muddy hands, and in one corner there was a small patch which looked impressively like blood. The transient colonel, waiting for the next plane, wanted the flag to remind him of his twelve hours on this historic ground. Something nice to have, a Jap battle flag. The officer bargained shrewdly, secretly willing to pay whatever price was finally asked. Eventually he haggled the price down to $25, and a few hours later was on his way back to the States. On the plane he displayed it proudly, unaware of the knowing glances which passed between members of the crew. Back in San Francisco, the colonel showed the flag to a friend who, ironically, could read Japanese. He happily translated the Jap characters that the GI jokesters had printed on the counterfeit flag, "Souvenir of Your Visit to Bougainville."

India. An S-2, who considers himself a student of human nature, couldn't get the aircrews in his outfit to read the weekly intelligence summaries. He tried leaving them around the dayroom and he even tried putting little squibs on the covers reading: "Study this. It may save your life." That didn't work so he thought and thought and finally tore the covers off popular magazines and put the summaries under these. That didn't work either.

Finally his sergeant suggested an answer. And it worked beautifully. What they did was get big red covers marked "FOR THE COMMANDING OFFICER'S EYES ONLY." Then they hid them in the bottom shelves of the S-2 library.

Now they have a 100% readership.

England. A major we know had heard a lot from paratrooper friends of his about the joys of jumping. "It's a feeling of complete freedom," one enthusiast told him. "Like swimming naked in the moonlight."

So the major, who happens to be a great lover of swimming naked in anything, arranged for his first parachute jump under the tutelage of the lieutenant who had sold him on the idea.

They landed at the edge of an airfield. The lieutenant got jauntily to his feet but could see no sign of movement from the major. He ran to him and immediately noticed the surprising fact that the major's leg went in one direction, his ankle in another.

"Hah!" said the major. "Like swimming naked in the moonlight, is it?"

"Well," said the lieutenant shakily, "wasn't it? Before you hit, wasn't it?"

"All I know," said the major with great dignity, "is that in the future I'll confine myself to the crawl." Whereupon he passed out.

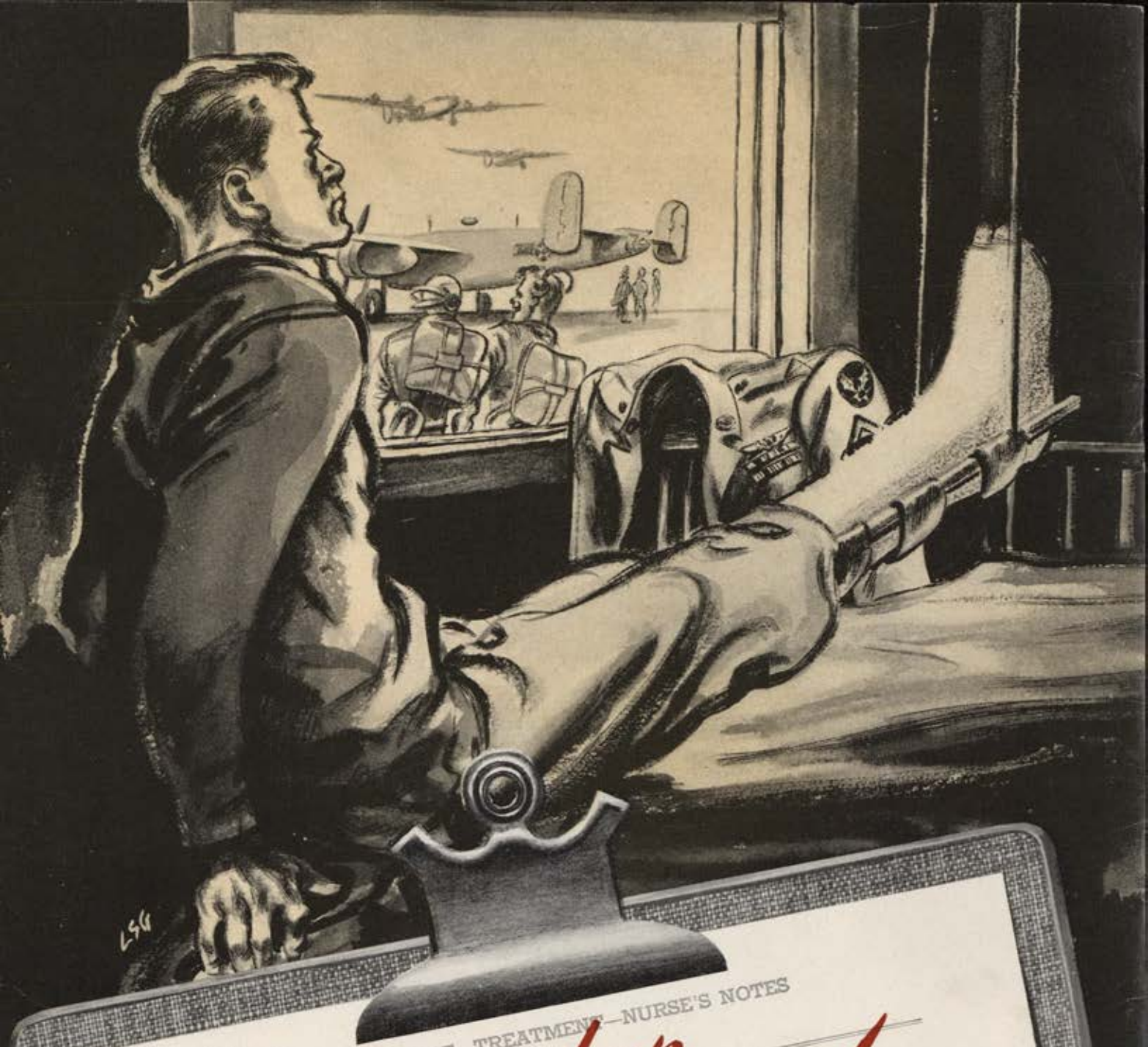
U.S.A. The hazards of flight increase rather than diminish and B-29 side gunners are now enjoined to keep their parachutes on at all times. Seems that any sudden release in pressure may blow them clean out of the plane. This happened recently to Sgt. W. K. Tilman while on a training flight at high altitude. The change in pressure was so sudden that his ears were stopped up for days. "Couldn't hear a thing," he says. "Not even harps." ☆


AIR FORCE


Please...


...Pass this copy on...


...and brother, I do mean You!



Form 53 H-1
Medical Department, U.S. Army
(Revised May 31, 1939)

TEMPERATURE—TREATMENT—NURSE'S NOTES

Cracked up ...in a jeep!

Months of training shot to hell. Tough on his crewmates, too. Because of his carelessness, a replacement is flying in his spot. Some of the perfection of teamwork is lost—needlessly.

Carelessess and thoughtlessness—on or off duty—are more dangerous than enemy gunners, more dangerous because more men are exposed to them. Don't take needless chances with your life or limbs. Observe personal safety rules.