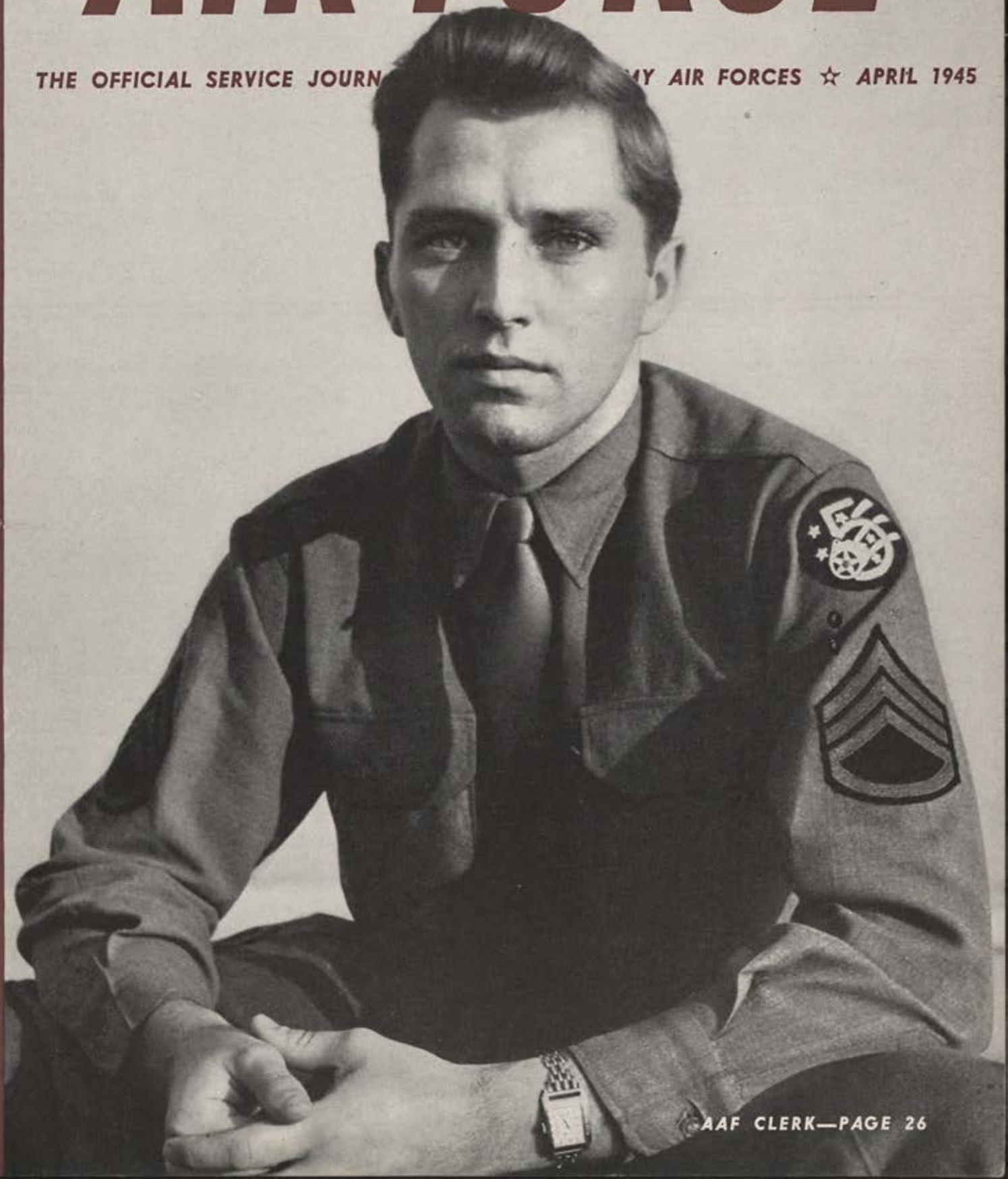
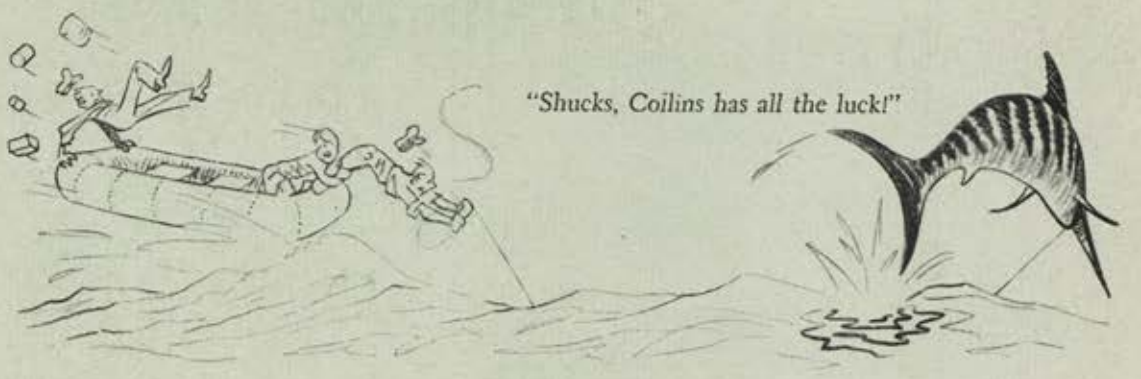
AIR FORCE

THE OFFICIAL SERVICE JOURN MY AIR FORCES ☆ APRIL 1945



AAF CLERK—PAGE 26



"Shucks, Coilins has all the luck!"

SURVIVAL

by CAPT. WM. T. LENT

"Dreadful news, your majesty, a rescue party is on its way."

"It says here, 'Wild game is most plentiful and easiest to find near water!"

"Weren't we lucky to have that personal equipment officer aboard?"

Rendezvous

Black Bread and Calvados

Dear Editor:

On Page 18 of your December issue, there's a handsome two-color reproduction of a photograph. The caption reads: "Flaming debris of exploding Nazi ammunition truck fails to stop 8th Air Force Thunderbolt during strafing mission over France."

Thanks to that caption, the PRO Section of XIX TAC has been thrown into the guard house and put on a diet of black bread and calvados, and I'm writing to you in an effort to get us out.

The guy in that airplane was Capt. Thomas R. Walsh, a Thunderbolt pilot from our 406th Group. He destroyed that ammo truck on 23 June 1944, and the picture you reproduce was enlarged from a 16 mm frame in XIX TAC Combat Film Number 2754.

I'll agree with the world that the 8th Air Force is a nice little outfit; but they've done enough good work all by themselves to get along very nicely without having people give them credit for our work. . . .

Capt. Roger C. Williams, APO 141.

The PRO section of XIX TAC is blameless. The fault was ours. Captain Walsh is a pilot of the XIX Tactical Air Command, 9th Air Force. Incidentally, the photo was taken by Lt. Wille L. Whitman, his wingman.

Note to Captain Williams: we'll send you some white bread if you'll send us some Calvados (an unforgettable form of French applejack).—Ed.

Not So Sharp

Dear Editor:

"How sharp are YOU?" In the February issue you answer question No. 5 on Page 9:—"There is a fire extinguisher and mirror on the jeep."—True!!! The fire extinguisher is under the dash, Bub. That's a gas decontaminating apparatus mounted on the fender. So help me!!

Capt. Walter Klein, MC
Ashford General Hosp.

You and a lot of other gleeful critics are correct. The so-called "fire-extinguisher" is a Decontaminating Apparatus M-2. We are thinking of using one on our quiz expert.—Ed.

Strange Phenomenon

Dear Editor:

In the "Plane Boners" department of the November AIR FORCE there is, I think, a big mistake.

The article is headed, Cincinnati, Ohio, and tells of a P-39 pilot whose engine was on fire. He bailed out and was burned severely.

Your comment was that he would have escaped the burns if he had released his safety belt before jettisoning the cockpit door, for the flames from the engine were sucked in the cockpit.

If this is true, the plane must have been going backward at the time. How else could

(Continued on Next Page)

Vol. 28 No. 4 April 1945

AIR FORCE

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

DEPARTMENTS AND FEATURES

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How Sharp are YOU?

An imaginary two-bits says you can't answer correctly all the questions you will find on Page 45 after looking at this photo for 60 seconds. Score 10 for each correct answer. 100 is perfect. If you do make 100, remember the two-bits is only imaginary.

HOW SHARP ARE YOU? Turn to Page 45

Rendezvous

(Continued from Page 1)

the flames get to the cockpit which in all P-39s I have ever seen or heard about has the engine to the rear of the cockpit separated by a firewall?

Please give me an explanation of this strange phenomenon which induces flames to buck at least a 100 mph headwind and burn our pilots.

1st Lt. Edward G. Ready, APO 210.

In a P-39, jettisoning the door while in flight creates a cyclonic action of air in the cockpit which is powerful enough to suck flames from the burning engine into the cockpit from around the armor plate or firewall. With the engine behind the pilot, as it is in the P-39, this hazard is far greater than it is in airplanes where the engine is ahead of the pilot. Also see "Fire-Fighting with Hatches" on Page 52 of this issue, an article on the same general subject.

Who's Yehudi?

Dear Editor:

I have just missed my first "How Sharp Are You?" and lost a bet. It was the January issue. You say there are only three men in the picture.

Who belongs to that hand, background left, Yehudi?

S/Sgt. Ré Atchison, Dallas, Texas.

Our photo retoucher says the hand was quicker than his eye. Credit us with a technical error.—Ed.

In Defense of "Rocketry"

Dear Editor:

Your pithy comment regarding my terminology in my letter concerning "rocketry" compels me to present an explanation in defense of its use.

First, may I state that a new field of endeavor of necessity creates the terminology to describe its activities. And, as you well know, the terminology of science is not, in its formative years, prone to widespread, common usage.

As far as finding "rocketry" in your dictionary, that fact does not condemn the word as being non-existent (except in my mind). Consult the fifth edition of "Webster's Collegiate Dictionary"; on Page 873 we find that "-ry" is a reduced form of the suffix "-ery." On Page 339 we find as one definition for the suffix "-ery": "Act, art, trade, occupation, or the like, as in archery". Thus we have a sound etymological basis for the word "rocketry", the science of reaction propulsion.

In like manner, a rocketeer is a man concerned with rockets and rocketry. And so on ad infinitum.

Robert M. Gordon, Las Vegas, Nevada

Thankery. Brooding over your letter, we ventured gingerly into this etymological realm last month, using the word "jeepery" in In This Issue. Now we're wondering if that makes the men who drive jeeps—jeepers—Ed.

Only One Giant

Dear Editor:

I just came across a copy of the December issue, which contained, I think, a new feature—The Album.

Shown on the page was a front view of a large German World War I Bomber, labelled a Zeppelin. Actually, this ship is the Siemens-Shuckert R-VIII, the largest ship built during the war. Some figures on it are:

Span 48 meters (157'); weight 38,500 lbs; speed at 10,000 feet, 80 mph.

An interesting feature of the ship was the power arrangement. It had six 300 HO Basse and Selve engines mounted in the fuselage, driving four outboard mounted propellers, two geared to each of the four blade pusher props, and one to each of the two blade tractors. To my knowledge, only one of these giants was built.

If contributions are accepted from readers, please consider the enclosed. It is the German Junkers D-1 of 1918, a fighter that was about 15 years ahead of its time. It was put into production, however, and gave a good account of itself. Power was a 160 HP Mercedes . . . .

I have a very extensive collection of old airplane photos, including many oddities and freaks. I will be more than pleased to send you samples of them from time to time if you think that you can use them. I'll have to send back to the states to have my wife print them, but that will be the only inconvenience.

1st Lt. Peter M. Bowers, APO 671.

Thanks for the correction and offer of more pictures of this kind. We'll be glad to see yours or any other reader's collection.—Ed.

Information File

Dear Editor:

It is suggested that an Engineering Officer's Information File be adopted by the Air Forces. Such a publication could be similar to the Pilot's Information File with information of both technical and administrative nature that pertains to Air Force engineering officers. Such a publication would be of value to both engineering officers and mechanics.

1st Lt. Robert S. Sandifer,
Warrensburg, Mo.

Good suggestion. OFS says such a file is already under consideration. Flight Engineers' Supplements are also being considered for use with the Pilot Training Manuals for tactical aircraft.—Ed.

Midget Navigators?

Dear Editor:

The following is quoted from an article by Maj. Luther Davis entitled "The B-29 and You":

"The navigator has a good place to work and a very complete set of self-computing, handy gadgets; an astrodome he can really get a sight from."

With reference to the above quotation,

(Continued on Page 46)

In This Issue

The clerk on the cover of this issue is S/Sgt. Robert Gable of Mt. Penn, Pa., back home after two years on the other side of the Pacific. Our staff photographer took the picture at Redistribution Station No. 1, at Atlantic City, which accounts for the wool shirt and neat tie. Most of the time overseas Gable looked as he does in the photograph on Page 26. Gable went into the Army two days after Pearl Harbor. He was a private until the summer of 1943, a corporal until the end of that year. He went overseas May 18, 1942, clerked at Headquarters USAFIA, Melbourne, served three months with the 19th Bomb Group at Mareeba, then was assigned to Headquarters, 5th BOMCOM, and moved up with them from Townsville, Australia to Port Moresby and Nadzab. No brass bands played when Sergeant Gable came home. His home town paper carried no story. But as Maj. Luther Davis points out on Page 26, without the thousands of Sergeant Gables in the AAF, we wouldn't be winning the war.

☆

Maj. Karl E. Volding, in charge of the Far East Air Forces' Convalescent Training Program (see "Return to Combat," Page 18), claims that for the Jungle Brook Golf Course he brought into New Guinea the first golf balls and golf clubs in its history. Another activity promoted by Major Volding among the convalescent patients was study courses. When one of the patients asked for his help with a stickler in an arithmetic course he was studying the major was more than glad to cooperate. He was stumped and a bit embarrassed, however, when the "arithmetic" turned out to be an involved problem in integral calculus.

☆

Capt. Larry Bachmann, our correspondent in India who wrote "The B-29—Modified by Battle" on Page 6 is having a prolonged love-affair with the Superforts. He writes constantly that it's above comparison with other bombers, and Larry has flown missions in most of them. "The flight engineer," he reports happily, "sits in front of a lot of instruments and handles them like Jessie Crawford at the Wurlitzer and the pilot turns a knob and the plane gyrates like a swan in one of Disney's shorts. . . . There was a mission today but it was very tame and mild. They split the groups up. One half went on a short mission of 13 hours and the other half on a milk run of 11 hours. Nothing much to report on it."

☆

Speaking of food on Leyte, Maj. Herb Johansen who was there and who dug up most of the facts on "Foxhole Medics" on Page 30, has a sad tale to tell of what happened last Thanksgiving Day. There were some advanced combat units who were isolated in western Leyte in close contact with fiercely fighting Japs. The Americans had been living entirely on K-rations, and their comrades at Tacloban were determined that they shouldn't miss the AAF's traditional Thanksgiving dinner. So turkeys were roasted and fixin's prepared and C-47s took off to drop them by parachute in the combat area. An ill wind upset the plan, however, and the feast fell behind the Jap lines. One GI said later that he didn't mind missing Thanksgiving Dinner too much. The thing that burned him up was listening to the Japs crack the turkey bones. He said they were that close.

Actually, the boys in the C-47s were not to blame. When they could see their target, they could usually hit it on the nose. But the almost hourly changes in the tactical situation in that area, with hills and valleys constantly changing hands, caused many similar mishaps. The risk had to be taken, however, because often there was no other means of getting food to the forward units. In fact, the story goes that the Jap radio once beamed a complaint to the American quartermaster asking him to change the menu, as the Japs had run out of recipes for spam.

☆

One of the best read features in AIR FORCE, according to all the surveys, is "This Is Your Enemy," which can be found this month on Page 14. It's about time some credit was given to the anonymous compiler of these pages and the artist who illustrates them. Responsible for the copy this month was Capt. Harry H. Ransom of our Washington staff. He digs through endless reports, selects the most interesting and informative items he can find, and shepherds the final compilation through clearance—no easy job. The illustrator is Cpl. Lou Glanzman, one of our most versatile staff artists, who combines good draftsmanship with fine artistic qualities and a deep understanding of people. He is responsible for the cartoons in Shooting the Breeze (Page 64) and has a hand in the art work on various other pages. He got married the other day, but so far it doesn't seem to have hurt him much. If anything, he draws faster.

☆

The foxhole medics whose activities are described on Page 30 lived up to their name even when asleep. During the almost continual and heavy bombings in the early Leyte days, catching even a few hours sleep at night was all but impossible. Maj. Wilfred E. Rugierro and his staff, however, installed hospital litters in their community foxhole, and, sleeping in relays, managed to get in a few hours much-needed shut eye. Another evidence of their ruggedness is that during one of the worst typhoons to hit Leyte, while other units were eating K-rations, the field kitchen of the 29th Portable Surgical hospital continued to function and even baked a batch of blueberry pies. ☆

All the Answers

In simulated combat, AAF Proving Ground Command paves the way for some of our most effective aerial strikes against the enemy

BY MAJ. ROBERT V. GUELICH
AIR FORCE Staff

In December, 1943, six months before the Nazis launched their first V-1 robombs at London, the AAF Proving Ground Command was tossed a hot potato. Intelligence knew that scores of robomb installations were being constructed in Holland, Belgium and France, and that they all were pointing toward London; they knew the number of buildings, and had all construction details. But neither the RAF nor the AAF had been able to destroy the reinforced concrete units.

Assignment of the Proving Ground Command was to build a duplicate robomb launching site, buildings to be made of reinforced concrete three feet thick, and develop a bombing technique that would destroy such installations.

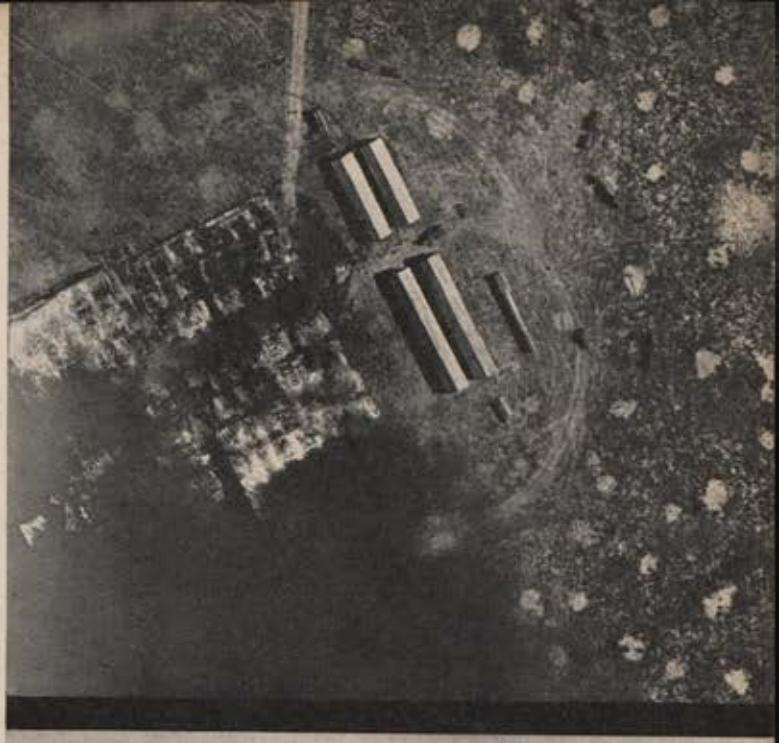
Twelve days later one complete installation and two extra sets of important component buildings were completed. In two more days, the engineers had completely camouflaged the site and several antiaircraft batteries had moved in to defend the target against anything the AAF might dream up.

Then, the bombers and fighters threw everything they had at the rugged structures—bombs, rockets and cannon shells with instantaneous and delayed fuzes. More than 400 attacks were made from 30,000 feet down to ground level with B-17s, B-26s, B-25s, A-20s, P-38s, P-47s and P-51s. Every time the airmen thought they had solved the problem, the ack-ack boys would check in to report the planes had been sitting duck targets.

Finally, the fighter pilots found the weak spot of such an installation and, in the presence of General of the Army Arnold, they blew the installation to bits and were out of sight before the ack-ack could touch them.

With reports and motion pictures in his hands, Lt. Col. D. G. Hawes of the Proof Division's Bombing Section, then

(Continued on Page 59)



PROVING GROUND

Eglin's proof-testers constructed a simulated Tokyo on one of the bombing ranges and conducted a series of tests to determine what type bombs would be most effective against installations of the real Tokyo. Photo at left was taken 30 minutes after an incendiary attack on the Eglin Tokyo; fire-fighters could not check the blaze. B-29 crews bombing the Musashina Tokyo plant, at right, used information from Eglin.

BATTLEGROUND

PROVING GROUND

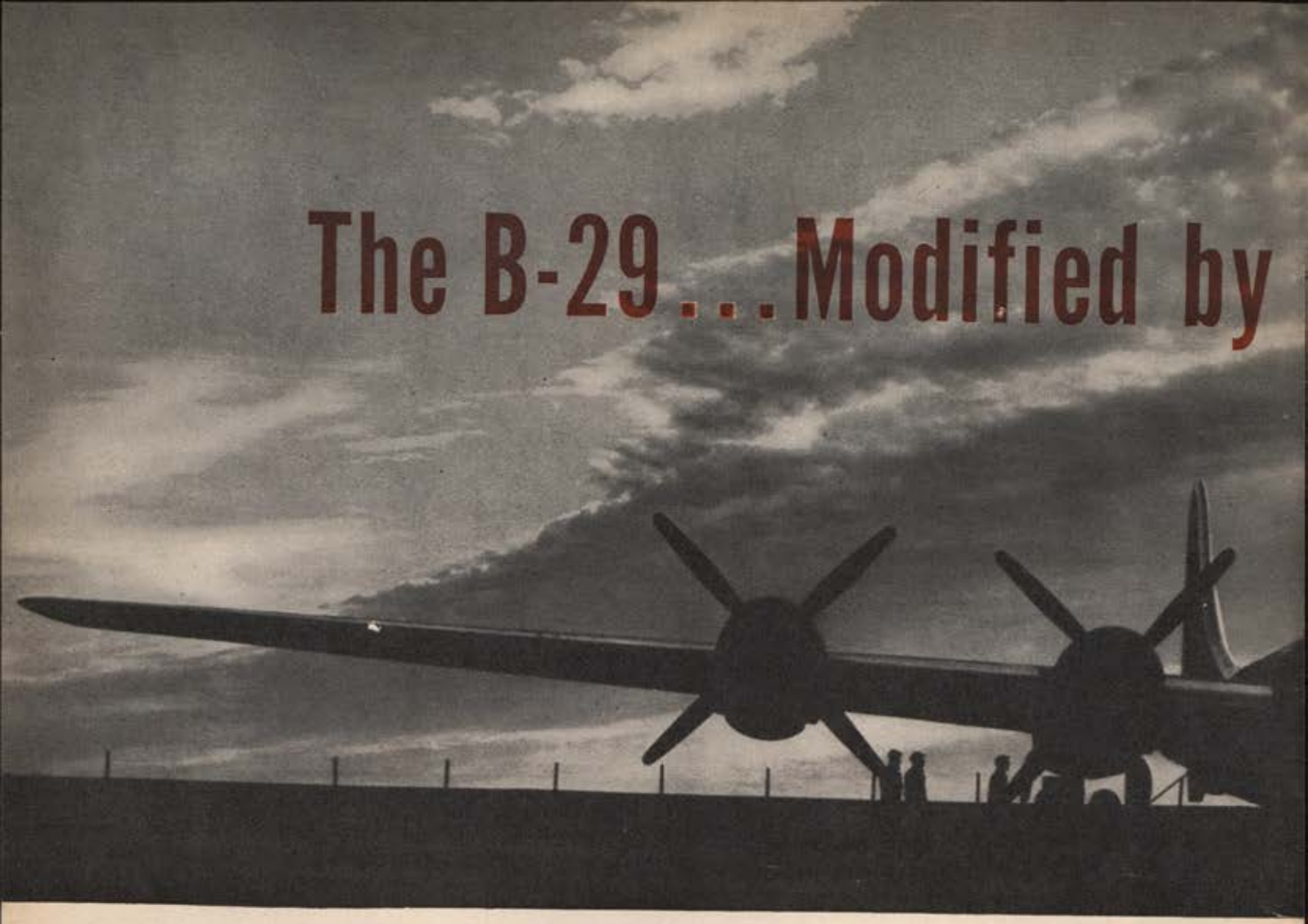
Bomb experts at Eglin have experimented with attacks on all types of targets and from many different altitudes. Photo at left was taken during test of bomb spacing. Another neat spacing job is shown at right, accomplished by the 5th Air Force in its three-day attack upon the Jap airfields on Hollandia. Using bombing techniques that surprised the Japs, B-24s, B-25s, A-20s destroyed 284 Jap planes on the ground.

BATTLEGROUND

PROVING GROUND

Eglin's big job in December, 1943, was to find out how Nazi robomb emplacements could be knocked out. Launching site with buildings of reinforced concrete was constructed, camouflaged, protected by antiaircraft. More than 400 attacks with variety of bombs and aircraft had to be made upon the site before the solution was found. Nazi site at right gets a taste of the Eglin technique from the 9th AF planes.

BATTLEGROUND



The B-29...Modified by

BY CAPT. L. P. BACHMANN

AIR FORCE *Overseas Staff*

Two B-29s, traveling in opposite directions, passed each other in the skies over Africa. They looked identical. But the plane headed for home was one of the original Superfortresses that had gone overseas with the 20th Bomber Command a year ago. The plane headed for China and combat was a new, improved B-29—the ship which had resulted from that year of sweat, blood, grime and guts, from the practical experience of the men who first took the Superforts into actual operations. It was a B-29 modified, as all military planes must be modified, by battle.

When it began operations, the 20th Bomber Command had for its essential mission the strategic bombing of Japan. Also, it was charged with supplying itself across the Hump, the worst air route in the world. Although aided in this by 18 C-87s at first and then by three squadrons of C-46s, as well as ATC, men of the 20th had to fix up their new planes as tankers and learn more about them through such transport operations.

They were required, further, to operate in a climate where the heat inside the airplane, even while flying, sometimes went up to 150° F. Men on the line burned their hands whenever they touched metal exposed to the sun.

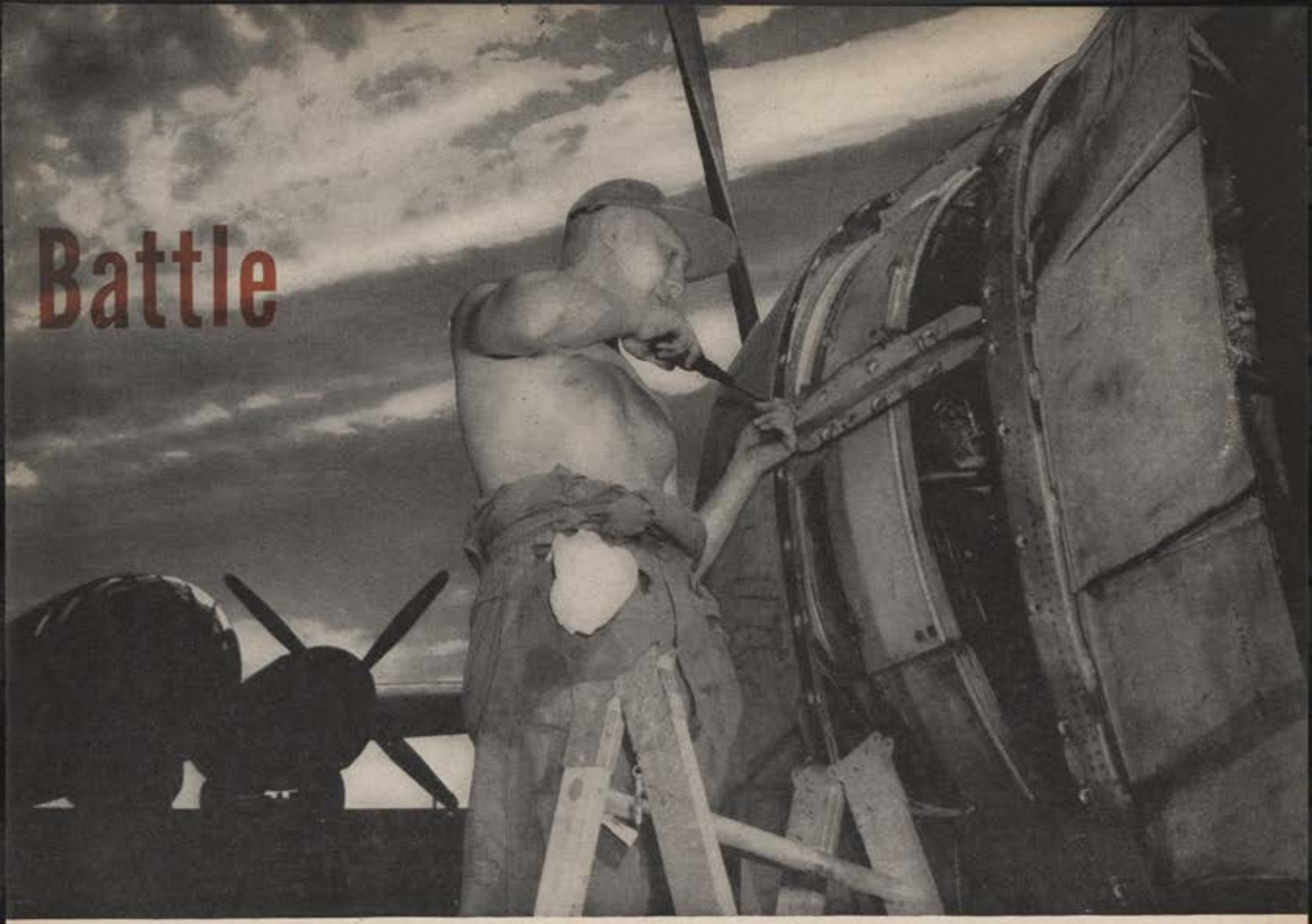
The 20th had to work out new tactical methods of operations for a bomber that was faster and heavier and flew higher than any previous tactical airplane.

Flight and ground crews of the 20th were to learn many things—that bombs drop differently under these extreme conditions, for example, and that fuzes arm the bombs in a different manner at the B-29's heights and speed. But that was to come later, after the first major problem was licked. That problem was the new bomber itself.

The B-29 was like the Genie of the Arabian Nights. It had to be harnessed. Like Aladdin, the 20th Bomber Command was given something with a few strings attached. The Command had to contribute something, too. The plane was as nearly perfect as it could be made on paper. But planes are not flown on paper. It was only through experience that the Superfort could be shaken down and the bugs eliminated. Flyers, engineers, above all, the ground men, made enormous contributions, as may be witnessed by the improved B-29, which carries twice the bomb load of the original plane and is better in virtually every other way.

The greatest problem in the B-29 was the engine. The airplane or frame has always been highly satisfactory. There is no doubt that the engine, too, would have proven itself had the plane been used as originally planned. During the training period in the U. S., the Wright engines had functioned without difficulties. But the use of the Superfortress was changed when it went overseas. It was required to carry excessive fuel and bomb loads on operational and combat missions. The engines began failing because of the progressive over-burdening to which they were subjected.

But the pilots and flight engineers concede that they did



Battle

The men of the 20th Bomber Command were pioneers in eliminating the bugs from our biggest bombe

not fully understand the characteristics of the new plane. They were not getting the most out of it. They were like a young fighter awkwardly using a right hook which eventually would develop into a knockout punch, and since there was no time for major engineering changes, they met most problems by different methods of operating procedure.

At times, the groups comprising the 20th Bomber Command operated off airdromes where the ground temperature was over 120°F. This was an outside temperature in excess of the maximum carburetor air temperature for the engines themselves. It caused the Wright engines to act like overworked mules and sometimes they balked. It is estimated that when the cylinders are overheated the engines produce 200 horsepower less than under normal conditions. One way this could be overcome was to take off while it was somewhat cooler, generally between 1700 and 0900 hours. Another method was the obvious one of shortening the period of running the engines up before take-off. That meant speeding up the period between engine turn-over and take-off. Without eliminating any part of the check-list, the crews cut this time in half. It was soon discovered that the spark plugs fouled when the engines were run at a low rpm. This forced the bomber to taxi at an rpm which heated the engines over the danger point. Other spark plugs were quickly procured.

At first, the greatest operational strain put upon the B-29s was that of flying the Hump carrying maximum loads, generally of gas. Designers of the bomber had anticipated such tonnage but had figured that the planes would fly low for the first hours, gradually rising to altitude as fuel was consumed and the plane became lighter. But in flying the Hump the Superforts had to climb immediately above 20,000 feet. They could not fly lower even in clear weather because of heavy ATC and other traffic below them.

One of the important operating procedures that had to be learned the hard way was the relationship between airspeed, cylinder head temperature and cowl flap setting. The plane's designers figured it out and made the settings but they knew these were approximations. It was up to the flyers to get accurate information quickly and to pool their findings.

In the early days, the pilots got trapped into the vicious air cycle of getting their engines on the wrong side of the power curve. An example of this is a bomber flying at ideal conditions of about 200 mph. The cylinder heads are at a normal temperature; the cowl flaps are closed. Then the flight engineer notes that the temperature has increased by 5° F. in the engines. He opens the cowl flaps three degrees to get more air and off-set the increase in temperature. This greater wind resistance causes the speed of the aircraft to drop. The pilot notices this and is forced to increase his power. This in turn causes the engines to get hotter. And the engineer, in turn, opens the cowl flaps wider, thus causing the plane to slow down even more.

The way out of this obvious method of causing the plane to stall is for the pilot to dive the craft and get it on the "step." The step is that position of an airfoil at which the airplane flies the fastest at the least power output. As the bomber regains speed the pilot reduces power and closes the cowl flaps. The increased airspeed and lower power cools the engines, and the bomber is back on the correct side of the power curve. This fine balance was

Mechs sweat over Superfort's engine at Kwang Lai airport, China.

Great clouds of smoke from Showa Steel Works furnish backdrop for B-29's engine during daylight raid on Anshan, Manchuria.

one of the most important lessons learned by the early crews of the B-29s.

During this period the engineers in the United States were far from idle. As fast as they got reports of difficulties they worked out new means of overcoming them. To help keep the engines cool, the cowl flaps were shortened. This also allowed the now larger openings to be exposed even when the flaps were closed and permitted a larger circulation of air. One of the greatest sources of engine trouble was valve failure due to high cylinder head temperature and inadequate lubrication. The engineers at Wright Field corrected this by a new system of oil crossover tubes which connect the cylinders in the same bank.

A greater margin of safety was provided, especially at take-off, by the modified cam slots in the propeller domes. Through this new equipment it is possible to get an additional 200 rpm—a small increase but one that makes a difference.

The electric propeller governor head caused trouble because of the high frequency of the Wright engine used in the Superfort. Enormous vibration caused the small resistors and resistor clips to break. When they broke the propeller governor jammed at the rpm being employed. New type resistor clips are now being used and improved.

More than anything, the problem of fuel has always been the bugaboo of the 20th Bomber Command. Where the 21st Bomber Command could get gas in to its Pacific island bases by boat, the only method of supplying the planes in China of the 20th Bomber Command was to fly innumerable trips across the Hump. Knowing this would have to be done, the early B-29s had an improvised fuel system with an off-loading manifold to permit the planes to be used as temporary tankers. Some of the bomb bay tanks were semi-permanent and very difficult to remove. The new plane has these tanks installed in a section of the aircraft that was formerly empty. The additional tanks can be quickly installed in the bomb bays.

When pressurized at high altitudes on some of the early missions, the windows of the Superfort frosted like a glass suddenly thrust into a refrigerator. The bombardier could not see the target and, even worse, the gunners were trying to find the enemy fighters through an opaque glass. The cabin air heaters were rearranged so the warm air now hits the windows in a constant air flow and it is no longer necessary to aim the guns by guesswork.

It is one thing to be the Human Cannon-ball in the circus and be shot into space to land in a net to great applause and a fat salary. It is another to be a waist gunner in a B-29 kneeling at your position and suddenly have the glass blister in front pop out due to the strain of the pressurization, and find yourself hurled hundreds of feet straight out before starting a 20,000 or 30,000-foot drop. Two things were done to correct these unintentional acrobatics. A new-type laminated blister is being used and a new-type harness was devised which holds the gunner inside even if the blister is punctured or blown out.

The B-29 is the last word in bombers. In some details it is too much the last word. The extraneous items can become a dangerous nuisance, for they take up weight and space which can be occupied by additional fuel or bombs. There is plenty of room for each man to do his job at his station but the Superfort is not a Pullman car, regardless of what the rumors are. There is no space for fancy-pants equipment.

One of the first things that went were the elaborate electric stoves for those wonderful hot meals like the ones mother used to make. No one has enough time or energy to play mother when he is flying combat in the stratosphere. Besides, flight rations and K-rations, supplemented with fruit juice and coffee are as good as a picnic—if you can think of a 4,000-mile bombing mission over Jap territory and water as a picnic. The de-icing equipment was removed as unnecessary. In some of the earlier missions where little opposition was met, the ammunition loads were reduced to half and less.

A healthy bomber has its bomb bay doors open for the shortest possible period. Not because it might catch cold

(Continued on Page 36)

THE SHOOTING STAR

The P-80—our newest jet fighter—is living up to its name

Scores of fighter pilots returning from combat have expressed a desire to take over the controls of a jet plane as their next job. A tremendous interest has been shown in the new P-80 "Shooting Star," and a great many questions asked about the transition training.

It is impossible at this time to answer fully either the who or how of training for the P-80. Introduction of the Shooting Star to operational use and the conversion of AAF personnel to its use, however, will be much smoother and present fewer problems than were involved in the debut of other types of aircraft.

The jet is so easy to fly that the average pilot can make the transition from the conventional type fighter after a very short period of training.

And because no complicated transition program is necessary, fighter squadrons in theaters of operations are as likely to be converted to the Shooting Star overseas as are units still in training in the United States. Neither will there be a special P-80 training program for ground crews, who, like pilots, will be trained on the job.

Another decided advantage in the shift to jet is that the AAF has a jet-propelled fighter already available for preliminary training—the P-59. It is expected that this predecessor of the Shooting Star will be as useful in introducing the P-80 as the B-17 was in B-29 training.

Every pilot who has taken the P-80 up has been impressed by its flying qualities. Warm-up is instantaneous, thrust is available in less than a minute after starting. Taxiing and landing require certain knacks that an experienced pilot can easily pick up.

"The P-80 is hot, and it's easy to fly," is the conclusion of Col. Bruce K. Holloway, veteran 14th Air Force fighter pilot, after flying the new AAF jet-propelled fighter plane. "In contrast to a P-51, the P-80 is so smooth and quiet that you can talk in a normal voice with the engine going full blast. What impressed me most was the absolute lack of vibration. You don't seem to accelerate, but rather have a constantly increasing feeling of power. You roll along and gradually gain flying speed. Best of all there is absolutely no torque. Flaps help on take-off because you need a much longer run in the P-80 than you do in a P-51, but that's true of any jet-propelled job.

"As soon as the Shooting Star picks up a little speed, you really begin to appreciate the power. With the constant thrust the jet gives, you still have good acceleration in the higher speed brackets. Once the P-80 is wide open, it seems to float through the air with the greatest of ease. There's absolutely no sensation of tension or vibration when it's opened up, in direct contrast to any other type of plane."

The P-80's chief influence on fighter tactics will come, of course, from its speed. In simulated combat, returned pilots from Lt. Gen. Carl Spaatz's Strategic Air Forces in Europe and flyers of the 20th Air Force have cooperated with commands in the United States to demonstrate the combat qualities of the plane. Bomber crews learn as much as jet flyers from this kind of collaboration. One B-29 crew, however, swears that they didn't even see the P-80 make a pass —it went by so fast.

Most impressive statistic thus far announced about the P-80 is that the first model was designed, constructed, and flown in a period of 143 days. For this swift development there are two reasons. The first is the relative simplicity of the plane; the second is the scope of the experimental program which preceded it. Aerodynamically the Shooting Star is one of the cleanest aircraft ever built. The fuselage is of semi-monocoque construction, all the skin being flush-riveted to reduce surface drag. By elimination of the propeller, ignition system, cooling system, carburetor, and all the more complex controls of the conventional fighter plane, construction was made relatively easy.

Ease of construction carries over to the maintenance and repair of the P-80. Its engine can be changed in about 15 minutes, compared with the 8 or 9 hours required by a standard fighter (see "Almost Too Simple," AIR FORCE, January, 1945).

The story of how this airplane reached production is short but impressive. In July, 1943, the Air Technical Service Command provided Lockheed with an English engine patterned on the jet invention of British Air Commodore Frank Whittle. Drawings and general model specifications made by Clarence L. ("Kelly") Johnson, chief research engineer of Lockheed, were approved, and the plane was designated XP-80. Behind a wind tunnel in California, "Kelly" Johnson pitched a tent and into it corraled 23 engineers and 105 workmen. With a handful of rough sketches he started to build the Shooting Star piece by piece. On November 15, the XP-80 was delivered to an ATSC experimental flight test base in California. A process that usually takes about a year and a half had been completed in less than five months.

In February, 1944, AAF test pilot Captain Wallace Lien initiated the Army test schedule, and immediately broke all existing U. S. speed records, subsequent test flights by Captain Lien and Majors Everett Leach and Fred Borsodi led to the incorporation of the General Electric version of the turbo-jet principle. Other modifications were later incorpo-

(Continued on Page 58)

Cracking Ice

BY S/SGT. DOUGLAS J. INGELLS

AIR FORCE Staff

Rime ice has formed on the lower forward section of this wing. It is made up of white, rough crystals which build up and grow out to the windward.

Ice completely enclosed this cockpit and froze the windshield wiper against the solid sheet.

A B-17 was grounded at Ogden, Utah, because of bad weather east. Treacherous icing conditions were reported throughout Colorado, Nebraska, the Dakotas. But the Fortress pilot insisted he could go through, anyway. This pilot had good reason for his confidence.

The B-17 took off, battled through tough ice clouds, landed several hours later at Minneapolis, Minn., without a single speck of ice on it. The pilot was Walt Bullock, veteran of more than 16,000 flying hours and now senior pilot at the AAF's little-known Ice Research Base in Minneapolis where scientists and airmen are finding out about ice and its effect on the airplane. The plane was a specially-equipped, heated-wing B-17 that cut through the heavy ice formations like a hot knife through butter. The flight was a proof-test to see how the new system worked.

Despite the test, however, Bullock warns: "There isn't a pilot living who can say he knows a lot about ice. If he makes that claim he's a liar because none of us, until recent months, has been able to stay in the stuff long enough to learn anything about it."

If any men know, these pioneers at the Ice Research Base are the ones. During the winter months of 1944-45 this small group of engineers and pilots—who take off and fly purposely into the teeth of ice storms as part of their daily diet—has provided the first truths about ice and its effects on flight characteristics of aircraft. For the first time, because of heated wings and tail surfaces and anti-icing devices for propellers—which they helped to develop—these men can fly in severe icing conditions long enough to study, measure and photograph the how, why, shape and effect of ice formations.

Ice is the airman's greatest hazard. He can fly blind through the thickest fog without fear, relying solely on his instruments. He can, with latest devices, land safely in zero-zero weather. But when ice forms on the leading edge of a wing, changing its shape and slowing down its speed; when the stuff cakes up on propeller blades decreasing their thrust; when it collects on radio antenna and snaps it off, or when it gets into a carburetor and stops an engine, then the "white devil" becomes a pilot's worst enemy. So, if the AAF is to have global flying in all kinds of weather, it *must* defeat icing problems. That is the goal of the men at IRB.

Their work is best summed up by Lewis A. Rodert, who is head of NACA's engineers at the base. He calls it "looking for ways of de-icing planes and making our ice prevention systems pay for their own ride."

"Our job is to take an airplane," Rodert explains, "consider its overall performance and the purpose for which it was designed, then build into it ice preventives that will make the plane do the same things under every conceivable icing condition."

To defeat ice, the AAF, commercial airlines, the National Advisory Committee for Aeronautics (NACA) and U. S. plane manufacturers—all represented at the Ice Research Base—have been responsible for three anti-icing systems—chemical, mechanical, hot-air. The chemical sys-

The AAF's Ice Research Bureau is winning the last battle in its war on the "white devil" of flying

Civilians play an important part in the battle to overcome ice. Here an engineer examines a droplet catcher.

Action of a deicer boot along the leading edge of the vertical fin kept this section cleared.

Temperature of the outside air is taken by an engineer inside a C-53. It is done by sticking poles wrapped in sensitive paper out into windstream.

tem can be compared to sprinkling salt on an icy walk to melt it. The mechanical system (de-icing boots) cracks off the ice after it forms, while the hot-wing uses hot-air piped into the wings and empennage to prevent ice from forming.

Of the latter, which is the newest, test pilot Bullock says: "With the heated wing you don't pick up any ice. The leading edge gets so hot you can fry an egg on it."

Each system is satisfactory for its particular assignment according to IRB's extensive actual flight data. But now the researchers are going a step further—developing instruments that will tell a pilot when to turn on his anti-icing units, whether or not the systems are working, what kind of ice he is flying in, how to get it off the airplane. In addition, they are seeking the answers to three pertinent questions which have arisen with changing aircraft designs: What effect does ice have on new airfoil shapes and smooth skin surfaces of our latest planes? Will the high speeds now attainable with some aircraft produce so much friction heat over the plane's surfaces that pilots won't have to worry about ice? How will jet engines function under icing conditions?

Camera stations in the fuselage of a heavy bomber called 'Bug-eyes" allow photographing water droplets as they strike the airfoil and turn to ice. Hair-like strain gauges measure the change in lift or drag. In this way the scientists can tell the size of the water droplets, the temperature of the airfoil surface when the droplets strike it, how long it takes them to change to ice.

A B-25 airplane—"Flamin' Mamie"—has latest heated-wing installation which is instrumented to measure ice accretion. On one flight in January this year it was discovered that an inch and a half of ice built-up on the unheated portions of the airplane in the time it took to descend through approximately 3,000 feet of stratus overcast. In similar tests, the fastest ice accumulations noted has been two inches in five to ten minutes. During tests in which ice was allowed to build up on the leading edges of the wing before the heat was turned on, a maximum of one minute was required to rid the wings of ice.

Numerous other tests have proved:

There are two kinds of ice—rime ice and clear ice. The former consists of white, rough ice crystals which build up and grow out to the windward. It is the type you see around refrigerator coils. The latter is hard and glassy, like cubes in an ice tray.

The kind of ice depends upon the size of water droplets in a cloud. Small droplets produce rime ice. Large droplets produce clear ice. If droplets are small, final freezing occurs quickly. If droplets are large, they have opportunity to spread out into a thin sheet forming clear ice.

The type of cloud determines the size of water droplets. In clouds with little turbulence, there is no presence of large drops of water, therefore, only rime ice is accumulated. Turbulent clouds sustain large droplets, producing clear ice.

The concern as to whether the ice is rime or clear is entirely eliminated by the hot wing.

Rime ice is responsible for a new problem called "Run-

back." Some of the small droplets freeze instantly when they hit an airfoil section but others flow backward and freeze later on a wing portion that has no heated surface.

The most dangerous temperature zone for icing is between 0° F and —18° F with the most serious icing-up occurring around —70° F.

"The extent of our knowledge," asserts Ray M. Potter, Chief engineer of the IRB Staff, "depends on the ingenuity of our engineers to design instruments for measuring occurrences that we never before have been called upon to measure."

This laminar flow airfoil section mounted atop a B-24 is a complex laboratory of instruments used in the fight to overcome icing hazards.

This B-25 used for frost tests got its name when it caught fire on a take-off. Scampering figures depict Pilots Walker and Olsen, below.

The trick "bug-eye" cameras are one example. Another is a gadget that looks like a rocket projectile. With it engineers catch snow flakes from the airstream in the open end of a tube, hold their shape and size until they spat against a small glass plate and leave their imprints to be photographed.

A similar device, but much smaller, has a pair of tiny jaws that snap individual water droplets out of the air, impinge them on a small film so they can be studied under a microscope. Use of a photo-electric cell and a beam of light which shoots across a wing surface measures the number of water droplets striking the wing.

Eventually there will be instruments on the pilot's instrument panel which will tell him the presence of ice and what to do about it. The next step will be instruments which the pilot cannot see that will automatically turn on and off the wing and propeller anti-icing systems. Flying through ice will then be as simple as flying blind through fog.

Other test instruments are being fitted to the skin of "Flamin' Mamie" to determine the effects of friction heat at high speeds. Sometime soon the pilots are going to take the plane, get some ice on it and dive it in the neighborhood of 400 mph to see if they can lose the ice because of the heat caused by the rushing air over the wings.

What this can mean is quite simple. If the heated wing normally requires 100° heat to keep off certain ice formations and it is learned that high velocities produce—say 30° heat over the plane's surface—then it would be necessary only to furnish 70° heat to the wing. That could mean a saving of weight and size in present hot-wing systems.

NACA's Rodert points to another interesting prospect for heated-wing airplanes. He cites the example of the Frenchman, who, long ago, got 30 percent more range out of an artillery shell by heating its forward end. The "hot head" caused the air in front of the shell to heat-up and expand back over the shell's surface creating additional forward thrust. The same thing may be true of the heated wing, which, if it is made hot enough would throw back more thrust creating the effect of a heat engine.

"If it works," Rodert explains, "then, maybe, we can make heated wings pay for themselves by turning their own weight into more mph."

The more simple tests engaged in by IRB are concerned with cabin heating, windshield de-icing, frost formations. The first is the direct result of our fighter pilots complaining about getting "cold feet" because something was wrong with cabin heaters in fighters.

The P-63 is one example. Previously, warm air came into the cockpit from one side of the cabin. In the particular case of the Kingcobra the pilot's right foot was blistering hot while his left foot was freezing. It was the same on the P-38. Now engineers have made a "Y" shaped ducting arrangement that heats the whole cabin evenly.

A new method of eliminating ice from windshield is working effectively. A water-repellant chemical can be rubbed on like furniture polish and forms a smooth outer-coating for the glass. Tried on the windshield of the B-17, it caused water droplets to bounce off like rubber ball.

At present a B-25 is at Edmonton, Canada, for frost tests. Initial results show that frost on the airplane's wing cuts down its lift, requires increased power for take-off. Using hot air to get the frost off the leading edge of the wing the plane loses very little lift, is assured of take-off with safety. By eliminating the frost entirely from the whole surface of the airplane, take-off distance is reduced by one-half.

The scientists are also studying the psychological effects which icing conditions can have on a pilot. Al Becker, another of the pilots, admonishes that "Ice is like drinking too many Manhattans, if you don't watch out for it the stuff will catch up with you." He cites several cases when he has seen ice forming on the wings and not paid much attention to it only to find himself in a tough spot minutes later.

In addition, Becker says: "A pilot becomes alarmed and excited when he sees his airspeed drop off too rapidly or feels his controls become sluggish—two initial indications that a plane is flying in ice. He knows that things aren't happening in his favor. Then, when propellers ice up and throw back big hunks of ice that go crashing into the fuselage or tail—that's enough to scare hell out of anyone."

Recently one of the B-24s had its props ice up, large chunks of ice were thrown back against the fuselage—one piece crashing through and hitting a test observer in the face. On that particular flight, which was the worst last winter, IRB almost lost an aircraft, but engineers learned an important lesson. Sticking it out in the ice with the plane vibrating like a triphammer, they discovered a fault in the Liberator's heated empennage system which has resulted in production changes.

Thin layers of ice formed in spots along the leading edges of the vertical tail fins even though the heat was on. The two layers of skin which form the duct through which heat is passed were too close together and the excessive vibration "joined them" in certain places stopping the flow of hot air and allowing ice to form. On the latest systems skin layers are farther apart.

Ironically, this actual test only confirmed what engineers with their pencils and pads had predicted might happen "under certain conditions." Fortunately, they found out what would cause it in time to do something about it before someone got hurt.

On the strength of such tests, the lessons learned and the ultimate preventives that are being prescribed, the AAF is looking forward to the day when the dreaded word *ice* means something you find in a cocktail glass after a smooth flight and a happy landing. ☆

the orange flash

By an AIR FORCE Overseas Staff Correspondent

The South African Air Force has handled some of the toughest assignments in the whole war

The Liberators floated over the burning sections of Warsaw at 500 feet, with their flaps down. Nazi searchlights tracked them, antiaircraft fire mushroomed around them, and enemy night fighters were vectored in to point-blank range.

The Libs dropped lower. They even slowed down.

The bombardiers were not looking for a pin-point target. They were searching for flares which would indicate where Polish partisans were holding out. These Liberators were carrying supplies.

"Three hundred and fifty feet," a copilot said. A bomber on the wing spun and crashed in flames. "Three hundred feet." Two more bombers were caught by the ack-ack. "There's the flare!"

Dodging in and out of flames which rose above their altitude, the Libs made two runs over the blazing target. Crews watched precious packages of supplies tumble towards the partisans.

Twelve hours after they had taken off, some of the Liberators landed at their Italian bases—only some, for the losses were an even 40 percent. But the underground fight against the Nazis had been aided. The South African Air Force had done another good night's work.

A few days later this same South African squadron was briefed for another drop mission on the Polish capital. The only comment came from the other night flying Liberator squadron of the SAAF. They demanded that they share the hazards on this and any other such missions. The AOC (Air Officer Commanding) nodded his agreement. And on the remaining four missions to this target the two SAAF squadrons put up an equal number of aircraft and suffered the same staggering losses—40 percent. Each time they dropped the supplies that were flown from England to Italy and then to Warsaw's partisans.

They were gallant but futile missions. The partisans were crushed.

"I guess it was the toughest target we've ever had. And we've had our share of them," one of the flyers said.

Planes of the SAAF dropped supplies to Tito's Yugoslavian Partisans. They mined the Danube, did their share of bombing German and Italian targets, fought with the Balkan Air Force, battled the Italians in Ethiopia, formed a large part of the Desert Air Force, and are still operating in strength with the Mediterranean Allied Air Force.

In the air war over Ethiopia, they used Junkers JU86s which had been taken from South African commercial airways and converted into bombers. Later, they got Marylands—Glenn Martin F-67s—manufactured originally for France. In Africa, they flew A-20s, Spitfires, and Beaufighters in tactical operations, Mosquitos for photo-reconnaissance, and Catalinas and Venturas for antisubmarine patrol and sea searches. With the Balkan Air Force, they had Venturas and A-30s. Now, most of their planes are made in the United States, like the C-47s they fly in a transport service between Rome and Pretoria, the capital of the Union of South Africa.

"Just give us a plane," they say. "Any plane, and tell us where you want us to fight."

Many kind things have been said by our fighting men concerning the South Africans, but little is known about them. The fuselage markings on their aircraft are the same as those of the RAF except that the center ball is orange instead of red. On every South African's uniform, just above the shoulder seam, is an inch-wide orange strip known as the "Orange Flash." The SAAF is the only British allied air force which is not "Royal" and which has no initials in the center of the wings. Instead, it has the many-colored crest of the Union of South Africa.

They are experts at Pathfinding and night bombing. Their tactical work has won the admiration even of the Germans who referred to two SAAF desert squadrons as "more dangerous than several dozen squadrons which are operating against us, shooting up our lines of communications and forcing us to move at night." And they have done every other type of flying in the book. When you count up our allies, be sure to put the men of the "Orange Flash" with those at the top of the fighting list. ☆

THIS IS YOUR ENEMY

. . . it's your life or his

Receiving End. Marshal Model's pet phrase describing Allied airpower as Germany's "Enemy No. 1" and numerous less articulate comments about what bombing has done to German towns, troops, and attitudes are well known. The feeling of a German who watches his own forces under attack day after day has been set down simply by a Wehrmacht writer. He escaped St. Vith; his comment is on the operations that followed.

"Today is sunny. American bombers arrive early. Alert, alarm, all clear, another alarm. So it goes. We hear that the Army Group has been advancing since 1300. There is good feeling everywhere.

"The advance to the west continues. Traffic is heavy. The buzz bombs are being launched. Prisoners, more prisoners—all American. I talked to the German civilians and asked them how the Americans behaved when they were here. They were favorably impressed. Our attack coincides with the American regrouping of forces.

"Clear sky. Jabo weather. MPs have a hard time keeping things going. What a job! Rain and snow. Again we move. We walk instead of going by automobile down the highway. American Jabos attack everything on the road.

"Brilliant day. Only the Jabos hang like a swarm of wasps in the sky. Bombers flying eastward at great height. Which German city today? My luck lasts. Yesterday a bomb near the house, with me in the cellar. Today a bomb just a few yards away. The bomb carpet—never has there been anything like it.

"Again, Jabos like wasps. Flak gets a few. Two German fighters are shot down.

"Clouds. No Jabos. What a relief!

"Clear day. American bombers flying east. Thanks to Providence the Fuehrer has given us strength to endure."

April Again . . . April is a month of fables in Japan. In any other country the fact would occupy the calendar makers, a few poets, and the sentiments of the people. In Japan this month's fables are closely connected with the war. In April, 1942, the ministers of state lingered over every festival, reciting victories. Three years later, Japan now faces a different April, and there is a different chorus.

Chief among the "Days" of this Japanese month are April 3, anniversary of the Death of the First Emperor; April 29, Birthday of the Reigning Emperor; and April 30, Festival of the Yasukini Shrine. The Fourth of July, Christmas, and Easter coming in one month would be a holiday analogy. But the military equivalent would not be there. Mysticism of these days spurred the 1942 victories and encourages the grim defense of the Empire in 1945.

The bravest note struck by the senior statesmen in the national celebrations will be that of Kamikaze, or Divine Wind. In 1263, the story goes, Kubla Khan, leader of the Mongols, took the empire of China. In 1275 and again in 1281 he sent his fleets against Japan. Storms scattered them, and the invasions failed. It was a Divine Wind that saved the island, the Japanese say. In 1945 the name is perpetuated by special air squadrons; and there is no title more honored in the Japanese forces today.

"Today a bomb just a few yards away. . . ."

The Japanese ministers of state have prefaced celebration of the Emperor's birthday with apologies for the bombs that have come uncomfortably close to the palace. With anger they have rejected the foreign title Mikado, and for weeks official pronouncements have echoed "Tenshi, Son of Heaven," and "Tenne, Heavenly King." This is neither poetry, nor madness. A Mikado can be whittled down to exile and oblivion—but not a Heavenly King.

The Yasukini Festival comes very close to the ordinary Japanese soldier. The festival centers in a Tokyo shrine, built at the time of the Russo-Japanese war but associated with the prehistoric name of Japan, Yasukini, Peaceful Country. Departing for the front, Japanese soldiers promise to meet again at the Yasukini Shrine in some April after they have been promoted to Kami or Shinto gods in token of their death in battle.

The April fables of Japan have a good deal to do with Japanese sentiments; more important, they are essential to Japanese military spirit.

Seen from the Air. Aircrews have recently reported a variety of Japanese tricks which add up to ingenious and potentially effective defense. For Japanese ingenuity, the best evidence is the bomb crater that isn't there. Expert at disguising everything from an airstrip to a destroyer, the Japs are using a powder substance which, scattered on the ground, looks very much like a bomb crater. Down in the Solomons area, where Japanese equipment has not given out but is running low, massed rifle fire is being used against low-flying allied planes. It isn't flak, but nobody who has faced it sneers at this last-round defense. In other parts of the Pacific, anti-aircraft guns are not lacking. An American bomber crew spotted a Jap transport carrying an unusually large AA platform in the bow, mounting four three-inch guns. In addition there were a 25 mm in the tub forward, and six light AA guns—probably single mount, 25 mm—mounted three on each side of the bridge. On the side of passive defense, the most impressive show the Japanese have made is the set of fire-prevention devices in Tokyo. Their effectiveness is accented by earlier amateur prophecies that a few incendiaries would burn that capital to the ground. Less important but more picturesque is the "wooden kimono" devised for Japanese railroad engines. Bomber crews flying over occupied areas report that the Japs have massed planking around the boilers as protection against Allied strafing. For wiliness as distinct from outright defense, the Japanese and the natives friendly to them showed a pretty good hand this winter. Best trick was their attempt to lure rescue planes into dropping food and supplies by setting out simulated distress panels in terrain unsuitable for aircraft landing.

The Name Is Pelz. After the GAF's damaging attack on Allied airfields early in the year, veteran observers described the operation as "pure Pelz." The phrase echoed the fighting reputation of Generalmajor Dieter Pelz, commanding Jagdkerps II, GAF tactical command in the West. Typical of this assault was the mission of a group of ME109G 14s. Led to the front lines by a JU88, they did most of their flying over hostile territory at 150-200 feet. Slashing in at a time when they hoped Allied flak would be light, they took tremendous losses. The operation, which had mustered pilots even from instructors pools, was planned and carried out without regard to loss.

This "all-out" fighting has characterized the youthful German general since the days when the Luftwaffe was the scourge of Europe. Praising Pelz's record as a Stuka leader in the old days, his Patron, Marshal Goering, said that he was the aerial master of "Ueberfall" and "entscheidender Angriff"—surprise and decisive attack. General Pelz's aggressiveness has often been expensive to the Luftwaffe. In 1942, his forays against Allied shipping in the Mediterranean cost him so many planes that his unit was forced to disband. In the next year he commanded attacks against English cities and headed Fliegerkorps IX during the little blitz of 1944. More recently he was prominent in the Normandy campaign.

"Massed rifle fire is being used against Allied planes—"

The Old Familiar. While a great deal of Japanese propaganda has been devoted recently to new Japanese aircraft, the old familiar planes continue to get their share of attention from aircrews. Pilots in the Eastern Air Command have been tipping their helmets to the acrobatic skill of Zeke pilots. More than the widely advertised Jap skills in maneuver, however, these pilots emphasize the fact that the enemy flyers apparently are thoroughly acquainted with the fighting characteristics of planes like the P-47. . . . A P-38 pilot has reported his recent experience with a very maneuverable Oscar Mk II as follows: "This bandit went out of a right turn into a dive, followed a split-S with a chandelle, dropped down to the deck and poured it on for a getaway, during which he joined his ancestors." . . . The Peggy is vying with

the Sally as Mitsubishi's "flying museum." On a Peggy recently examined the following equipment was noted: full feathering constant speed hydraulically operated propeller, a Focke-Wulf type cooling fan, a Browning type 20 mm cannon, a flexible metal ammunition chute, and a new radio altimeter. Koiso was not joking when he promised, "We will use whatever is useful wherever we find it."

"The old German trick of flying a captured and reconditioned American plane—"

FYI. . . . B-29 crews continue to report varied color schemes among Jap fighters: black, grey, silver, and olive-drab Tojos; black and olive Oscars; silver, grey, olive, and dark green Zekes; grey and olive Tonys, and a sprinkling of mottled brown, brown and orange, and brown and black combinations. . . . The old German trick of flying a captured and reconditioned American plane into the vicinity of a bomber formation continues. Obvious purpose is to give altitude, speed, and direction to flak and fighter stations. . . . Jap gliders have come into greater prominence since the invasion of the Philippines. The Betty has appeared as tow-plane. . . . "Orgelpfeife" is the name for the German trick of simulating more than one plane. The idea is for a flyer to give numerous call numbers, changing his voice and dialect. One German fighter pilot flatly claims he made a bomber crew think his one plane was 12 fighters. He didn't say which crew. . . . Numerous reports from the 14th make it clear that Jap planes have been made much safer and that their pilots are less likely to bail out than formerly. . . . Schwarz von Berk, German commentator, points out that the alphabet of invasion was slow getting past the first letter: Avranches, Aachen, Antwerp. Herr von Berk, being a scholar, neglects to point out to his readers that even in Low German, Berchtesgaden and Berlin do not begin with Z.

The Enemy's Enemy. It is unlikely that the Japanese Air Force has seen many American movies since 1941. A training pamphlet explaining what American flyers are like fills in the gap. As others see us, Americans do not understand what the war is about. We do not understand Greater East Asia. We do not like the British, the Russians, the Irish, the South Americans, the French, the Spanish, or anybody but us. We don't even like people in our own country sometimes. The reason for this is that originally we were all British, Russians, etc., etc.

An American, the Japanese flyer is asked to remember, has a very strange religion. It crops out in queer places. It is likely to make him homesick (a complaint very common with an American away from a city). It can turn into depression, elation, or sudden foolish bravery. It has no connection with the way the country is governed. American politicians, the pamphlet points out, are not divine . . . just elected.

An American is most likely to talk when flattered. He can easily be flattered about practically anything—his country, the AAF, his equipment.

American airmen (principally because they don't understand East Asia and do not associate fighting with religion) do not "blaze with spirit." They do, however, have good equipment ("Whenever they have overcome, it has been because of overwhelming numbers and superior equipment"). They fight wildly and wastefully. They are obsessed with pride. They rely on speed and machinery—a chief reason being that most American aircrews grew up with automobiles. They shoot well, mainly because they have spent their youth hunting wild game.

The symbol of the American airman, the pamphlet concludes, is the Soulless Machine. The Japanese airman, on the other hand, is Spirit. "Blazing with this spirit, the JAF will win the war, if it takes 1,000 years." Unlike the Soulless Machine, the Japanese Spirit doesn't bother about time.

Enemy "Souvenirs". Interest in the Germans and the Japanese can be carried too far when it includes "souveniring." Not long ago a relatively new piece of German communication equipment was studied to the great advantage of every Allied unit that has to meet the German plane carrying it. The equipment had reached Technical Intelligence in a very roundabout way. An eager-beaver had tried to adapt it to his own use without letting the rest of the AAF in on the news. Commendable as experiment may be, it wasted valuable time in this case.

In another instance, a small Jap gadget was picked up among the souvenirs of a soldier in the Pacific. It had been well known for some time, but had not been captured in quantities sufficient for study by the units concerned. The soldier who set it aside was absolutely correct when he said it wasn't "unique," and absolutely honest when he added that he didn't have the foggiest idea that it was of military value. But the simplest rule to follow in dealing with enemy material is this: Let Technical Intelligence have the first look and the last word.

Lesson in Language. The stories about Japanese difficulties with the English language, and their occasional prowess in American versions of English works are legion. Col. Jack Dale, Assistant Chief of Operations for the Third Tactical Air Command, a veteran of nearly 200 missions against the Germans and the Japs, gives the other angle. The Colonel was once explaining laboriously to a Jap airman the difference between the planes that the two enemies flew. In pidgin English he gave an elaborate description of his fighter, gestures and all. After a considerable oration, he relaxed. "You mean," said the Jap, "that you fly a P-40E." ☆

Recon photo shows 855-foot drydock, capable of servicing 50,000-ton ship. This huge dock was towed by British from England, taken by Japs in 1942.

As B-29s approach, little harbor boat throws up futile smoke screen, vessel in drydock gets up steam, throws her lines off.

strike at SINGAPORE

Lead bombardier, Lt. J. McCraw, gets bullseye. Other bombardiers followed.

In a spectacular smash at Singapore harbor, India-based Superforts completely demolished the huge George V floating drydock, one of the last available to the harassed Jap navy. This attack was bitter tea to the Japs who had just spent three months repairing the caisson gate, breached by B-29s in an earlier raid. The Superforts expected 10/10ths cloud cover over the target, were pleasantly surprised to find a clear view of a 460-foot cargo vessel sitting in the drydock. The Japs did all they could to frustrate the attack with ack-ack, fighters and last-minute smoke screens. Three fighters were knocked down. Brigadier General Roger M. Ramey, 20th Bomber Command CO, stated: "The bombing accomplished ranks as one of the finest examples of precision bombing of the war."

But this photo, taken next day, shows drydock flooded, ship gutted with decks awash.

Ship burned so fiercely PI boys could not determine drydock's damage from this photograph.

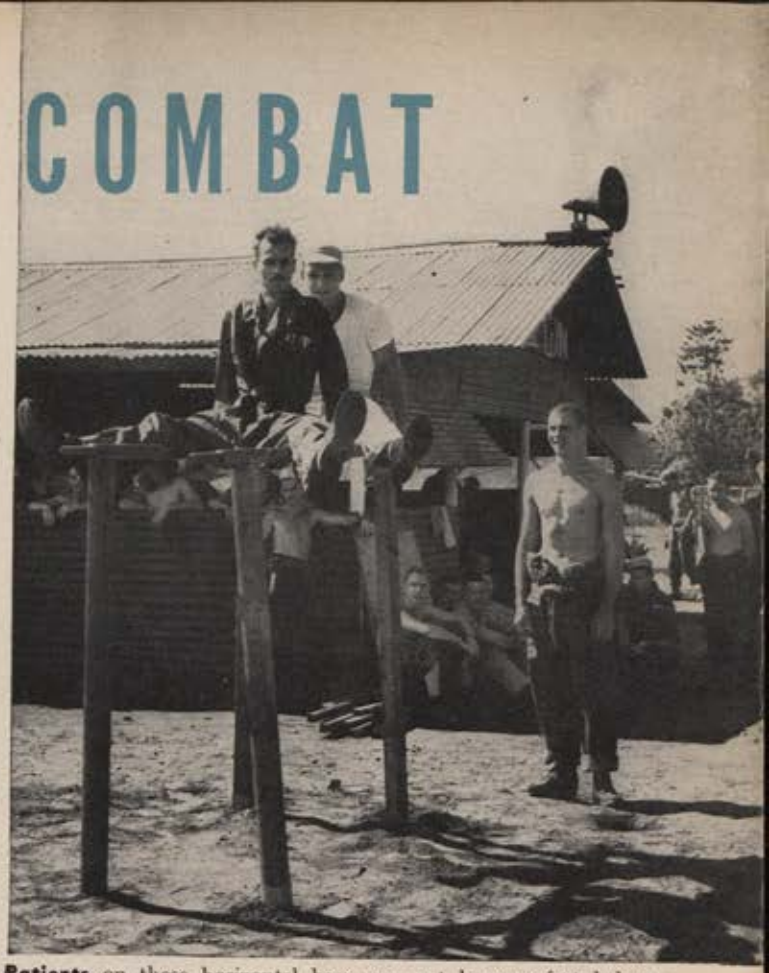
RETURN TO COMBAT

Refitting temporary casualties for further combat in the Far East Air Forces posed a serious problem. Medical care could cure physical ills, but there were neither facilities for recreation nor opportunities for reconditioning activities. Here's a solution

BY MAJ. HERBERT O. JOHANSEN

AIR FORCE Overseas Staff

Jungle Brook Golf Course at Hollandia AAF Convalescent Training program was one of the earliest installations in this project.



Patients on these horizontal bars may not have perfect balance when they get those GI shoes into air, but it is good exercise.

It was a tense moment at the last tee on the Jungle Brook Golf Course at Hollandia, Dutch New Guinea. An air force sergeant took careful aim, swung his club deliberately, followed the ball with intent eyes. It rolled up to the cup, teetered on the rim, dropped in.

"A hole in one!" shouted a dozen gleeful GIs wearing green fatigues marked with the distinctive "CT" of the AAF Convalescent Training Program. They were cheering not only because the sergeant had won the match, but in anticipation of the party that would be held in their ward that evening as a prize.

"See what I mean?" said the medical officer. "They've forgotten they're in the New Guinea jungle, in the midst of a war, far from home. And that means they're getting well fast."

The Far East Air Forces have learned through necessity to be thrifty, in planes, aircrews and ground personnel. On this principle of economy a program to conserve trained manpower, to rehabilitate casualties for return to combat, seemed highly advisable.

Inaugurated by Col. Keith Simpson, Air Surgeon of FEAF, this Convalescent Training Program is now in full operation in the Philippines. When it was established at Hollandia, Dutch New Guinea, it was the first such program to be initiated in any General Hospital in any theater of operations. When the 51st General Hospital was designated as a hospital for air force personnel, the Convalescent Training Program became an integral part of the setup. Although specifically designed for AAF needs in that theater, the program is open to patients from every branch of the service. This is an extension of the AAF Convalescent Program which has been operating in AAF hospitals in the U. S. for two and a half years.

As reconditioning of the body is one of the main objec-

Jungle Gym was created out of imagination and supplies at hand. The little guy seems to be portraying a human punching bag.

Look closely and find the chicken. This fowl is part of the now celebrated fried chicken and scrambled eggs program at hospital.

Enticed by a few worldly goods, the engineers at neighboring base brought over their bulldozer and scooped out a nice swimming pool.

tives of the program, a Jungle Gym was a high priority item. What had been completed as an empty building one night was almost miraculously filled with a variety of homemade gym apparatus the next day. Odds and ends made a rowing machine; tin cans filled with cement and attached to a length of pipe made weight lifts; the side bars of an ambulance litter furnished the essential parts of parallel bars; no one asked how fencing foils and a punching bag materialized in the jungle wilderness. The pride and joy of the Jungle Gym, however, is a stationary bicycle of a sturdy build. Into it went a Japanese bicycle frame, an Australian seat, one Japanese and one American pedal, English handlebars, the rear weighted wheel from the end of a signal corps wire drum, and the brake spring from an American spring door.

One of the first patients to participate in the program had been a designer and builder of miniature golf courses in civilian life. With the help of other patients and staff officers, he constructed the Jungle Brook Golf Course. When 24 Rhode Island Red chickens flown up from Australia in a C-54 were threatened with extinction due to climate and lack of expert care, another patient came to the fore and announced that he had been breeding and raising chickens since he was a boy. Thus was inaugurated the program's popular "Scrambled Eggs and Fried Chicken" project.

The presence of a former University of Iowa swimming instructor started a chain of events that terminated in the Jungle View Swimming Pool. A site was found where a stream of fresh water flowed into a slight hollow. At a nearby Replacement Depot was a battalion of aviation engineers. In exchange for certain trade goods that are the GI gold of New Guinea, these engineers brought their equipment, dug up roots and trees and created a pool.

Crafts shops are an important part of the program. The collecting of an assortment of crafts tools in New Guinea had all the earmarks of a superior sleight of hand trick. A close investigation would undoubtedly reveal that the technique by which the trick was performed included cajolery, bribery and a bit of midnight requisitioning. Once the tools were acquired, raw materials to work on became a problem. Among the sources were wrecked Jap planes, tin cans, and the natural hardwoods of the area.

Admittance to the Convalescent Training Program is strictly limited to casualties who can be reconditioned for return to active combat within a short time. These men, both officers and enlisted men, would go back to combat even if there were no such program. The difference is they go back more fit, mentally and physically, and quicker.

The Convalescent Training Program now in operation in the Philippines is divided into three parts:

1. Bed patients. Craft work such as making leather novelties and simple jewelry; games such as bingo; discussion groups. This phase of the program is greatly assisted by Red Cross personnel.
2. Ambulatory patients. Although these remain in the hospital proper, they are able to go to discussion groups, take light calisthenics and participate in mild sports. Craft work is done in the shops, and games such as horseshoe pitching are available.
3. Convalescents. Participation, voluntarily, in all activities of the project, physical, recreational and mental.

Patients are admitted to the third phase only with the approval of their ward physician. They are then moved to the special Convalescent Training wards, apart from the more seriously sick. Everything possible is done to get away from a hospital atmosphere. ☆

Flying the ZEKE 52

BY HERBERT RINGOLD
AIR FORCE *Staff*

Our test pilots say the Zeke is inferior to our fighters, but there are plenty of 'em left

The reputation of Japanese fighter planes is somewhat similar to the community standing of certain shady ladies: it all depends upon whom you ask. Talk to people who knew them in their youth and you'll get a good report; speak to those who have observed them recently and you get a different impression.

According to our Army and Navy pilots who have flown the Zeke 52—the latest of the "Zero" class tested and currently the standard Jap Navy fighter—both opinions are correct.

Col. J. M. Hayward, chief, Technical Data Laboratory at Wright Field, reports, "Against the original P-40, the Zeke had certain advantages. But compared with our P-38, 47 and 51, the Zeke is, frankly, a second rate airplane. I don't mean to imply that the Zeke won't cause us a lot of trouble. At altitudes, it can climb faster than our Lightning and Thunderbolt and nothing we have in combat can turn with it at slow speeds below 10,000 feet. But in every other category, the Zeke is badly outclassed."

Commander Fitzhugh L. Palmer, Assistant Tactical Test officer at Patuxent River Naval Air Station adds, "If you fight the Zeke right, it will be nothing but a turkey shoot. But remember that it takes only one bullet to kill you—and you're just as dead as if you were shot down by the best airplane in the world."

Both service reports agree on one important factor: the Japs have much better airplanes than the Zeke 52. But as yet there are no complete laboratory reports on any later models. Fragmentary information from the field, much of it still in the rumor stage, indicates that the Frank I has a speed close to 425 mph, and the Betty 22, a twin-engine

(Continued on Page 60)

Sky Scouts

By an AIR FORCE *Overseas Staff Correspondent*

The first box of more than 1,000 bombers is due over the heart of Berlin a few minutes past noon. At 1145, a tiny formation of Mustangs knifes across the city and circles the target area. Ignoring the initial salvos of antiaircraft fire, the fighters methodically inspect the sky and then the ground below.

At 1150, the flight leader of the Mustangs calls the commander of the lead bomb division which is still 50 miles west of the German capital.

"Seven-tenths cloud over the suburbs," he reports over the radio telephone. "There's a hole over the target. A front is moving in from the northeast at 18,000. First division probably can bomb visually. The hole may close before the second and third division get over the target. There are no bandits in sight—"

And as a puff of black just off the wing tip blasts his Mustang upwards 50 feet, an added precaution:

"Flak fairly heavy near the center of the town."

The Mustangs resume their watchful circling. The hole in the clouds is closing rapidly but at five minutes past twelve when the leading Fortresses and their fighter escort arrive it is still wide enough to enable the bombardiers to make a sighting.

Bomber pilots flying Mustangs form the backbone of the 8th Air Force's unique Scouting Force

While the bombs are cascading out of the bellies of the heavies, the pilots in the Mustangs make a quick appraisal of the Fortress formations and then swing about for the journey home.

They are just moving across the Dutch boundary when they spot a gaggle of bandits. Switching his R/T to the fighter channel, the flight leader warns the Thunderbolts that are shepherding the bombers back from Berlin:

"About 12 ME262s southeast of Enshede. We are going to bounce!"

Jockeying for position, the Mustangs roar down for the attack. But the twin-engined German jets have no taste for combat today.

Re-assembling, the Mustangs mournfully inform the Thunderbolts that the enemy has eluded them. They continue across the Dutch countryside and over the North Sea to England. As they near the East Anglian coast, the flight leader radios the bombers a final word about clouds and visibility and a few minutes later the Mustangs land.

Over doughnuts and coffee, the flight leader and his pilots pour out the details of the day's action to Intelligence. But this session with the interrogating officer is far different from the routine examination of combat personnel. There are many questions and many answers. For the pilots flying those Mustangs today are members of the 8th Air Force's newly-created Scouting Force, a small, select organization whose primary job is to assist in making American pinpoint bombing even more efficient and precise.

The Scouting Force hasn't been in existence very long with the 8th Air Force, although MAAF has had P-38 weather scouts operating for some time (see "Weather or Not" in the December 1944 AIR FORCE—Ed.) But already it has proved its value. The threat of hostile fighters, while still substantial, is not so great as in former days. But weather in the turbulent skies of Europe frequently refuses to conform to the promises of the forecasters. Targets that were visible from 30,000 feet at 1000 hours may be snugly blanketed beneath a 10/10ths overcast by noon. Weather fronts have a perverse habit of suddenly crossing the predetermined routes of the bombers, thereby necessitating time-consuming changes in course and altitude. The Allied weather reporting system, far-flung and efficient as it is, can't foretell what the atmospheric condition will be at all times over a given spot. The result has been many abortive missions involving a waste of energy and fuel and the unprofitable risk of many lives.

The idea for the Britain-based air scouts came from Col. Budd J. Peaslee, a wing commander, from Salinas, Calif. He had been thinking about the weather problem while leading his bombers in an attack against a target in Norway. On this particular day, his formations ran into an undercast while proceeding along the course they had been briefed to follow to the target. The undercast extended all the way to Norway and prevented the bombardiers from making a sighting. Peaslee noted that if they had come in from another direction his bombers would have passed over a few openings in the clouds and a successful first run over the target could have been made.

Peaslee's plan was simple. Accurate, up-to-the-minute reports on weather conditions over the target were urgently needed by the commanders controlling the formations in the bomber stream. In Peaslee's mind, there was only one way of obtaining the desired data. It must be done by an airplane, preferably a fighter or a fast intruder with sufficient range to fly to the target and back. This plane would check weather conditions along the routes and at the target

(Continued on Page 60)

JET THREAT

Our Technical Intelligence is keeping a wary eye on these fast Nazi fighters

BY CAPT. ERIC FRIEDHEIM

AIR FORCE Overseas Staff

In the drawing room of a Victorian mansion facing one of London's fashionable West End squares, an American colonel replaces the receiver of a scrambler telephone.

"A 9th Air Force PRU pilot just spotted more than 24 ME262s," the colonel remarks, scribbling a few notes on a memo pad. "They were tailing our bombers near Trier. They didn't attack us, but we're getting more reports of these German jets all the time."

Outside, the noonday traffic surges through the tree-lined street. The drawing room seems an incongruous setting for what goes on within its well-guarded doors. Desks and filing cases have supplanted the tea tables and tapestries, here high-ranking military and technical experts now wage a remote control battle against the latest weapons of the German Air Force. This room contains the nerve center of the American Technical Intelligence whose small but efficient staff keeps sharp watch over what enemy scientists and technicians are preparing to launch against our air forces.

In the early spring of 1945, the casual visitor might question the need of such activity. The Russians are just outside Berlin, and American and British armies are smashing forward from the west. Allied air superiority seems to remain unchallenged in the skies of Europe. Nazi V weapons have failed to throw our military program out of balance and all signs point to a victorious climax at an early date.

Yet the staff of Technical Intelligence feels the job is far from done. Nothing must be taken for granted where the Germans are concerned. Throughout the war, the enemy has demonstrated his ingenuity and resourcefulness by fashioning some new weapon or tactic designed to catch us off our guard. And, explains the colonel who just received word of the 24 or more ME262s over Trier, the Germans now have come up with an airplane that potentially is better than anything we have yet put into combat operations.

He is referring to the Messerschmidt 262 and the Arado 234, two of the Luftwaffe's latest jet-propelled aircraft, both of which have been in operation over the battlezones in recent months. The maximum speed of these planes is not yet known, but it is believed the twin-engined, rocket-nosed ME262 can knife through the air at better than 500 miles an hour. The AR234, also equipped with two jet propulsion units, is rated well above 450.

The U. S. Army Air Forces have not been idle and soon will have jet planes ready that will be as good, if not better, than anything the Luftwaffe has developed. "But," insists the colonel, "the Germans already have some of theirs in operation and quite a lot more are on the way."

That's why Technical Intelligence refuses to relax even though many believe the end of the European war is just around the corner. "We can't take it easy when we know the enemy has something good to throw at us," the colonel says, "Germany might be out of it any day but we are reasonably certain that the Japs will try to adopt most of the best German equipment, including the jet planes."

So far, the enemy's jets haven't given our bombers or fighters too much trouble. 8th Air Force fighter pilots have shot down some with comparative ease, as is testified by the combat report of 1st Lt. Dale E. Karger, who at 19 is believed to be the youngest fighter in the AAF.

"I've always wanted to bring down a jet plane and when my squadron commander and I spotted two of them we went after them," his report says. "They were circling slowly, far above us, so we had to start climbing. It seemed to take ages to get there. I was afraid they would run before we reached them, but they were still around when we levelled off.

"As soon as the two pilots saw us they split and ran. The squadron commander started chasing one and I followed the other. I thought I was out of luck at first because those jet jobs are pretty fast. He began drawing away, but I managed to stay within range after chasing him nearly 50 miles. Finally he began making a wide circle. That was just what I was hoping for. I started to turn inside him.

"I kept closing on him and when I had him in my sights, I fired a short burst and got strikes dead center in his cockpit. Nothing happened for a few seconds, then the pilot crawled out on the wing and slid off. The plane rolled over slowly and dived straight down."

The colonel places Karger's report back into a folder. "We have some more of these, but they don't prove that the jets will be pushovers for our fighters," he says.

Up to February, American fighters have shot down about two dozen German jet-propelled aircraft. The enemy jets, in turn, have bagged several American planes. Despite this superior combat score no one in Technical Intelligence or in the air forces operating in the ETO minimizes the potentialities of the jet fighter, particularly if the Germans decide to shoot the works and send them up in force.

The Luftwaffe's shortage of experienced pilots is reflected in the tactics of some of the jets that have battled with our fighters. As a general rule, the enemy jets have not been aggressive even though they have the advantage of speed. Nevertheless, as was the case with the robot bomb and the

V-2 rocket, the Germans definitely can claim another first with the combat appearance of the jet airplane.

According to the colonel, information at hand shows that the Germans started experiments with jet propulsion aircraft back in 1938 and made sufficient progress to put the Heinkel 280 into the air before the end of that year. For a number of reasons, they didn't do much with this plane. For one thing, Luftwaffe pilots at that time were being trained for the standard military types and those who could be spared for the jet experiments found the 280 difficult to manage.

Bugs also developed in the engines, and the Nazi High Command decided that the FW190 and the ME109 would be sufficient to see Germany through the war.

Last year, however, the Germans had a change of heart. The war was going badly and Allied aircraft were gradually increasing their superiority over the Luftwaffe types. Something had to be done and the Luftwaffe chiefs called a meeting in Berlin. They demanded the immediate production of jet fighters.

"But we learned that the German Fuel Control Board was against it," the colonel says. "They were having their hands full after our strategic air attacks on the oil industry. The Board told the Luftwaffe it had missed the boat and should have started building jets two years earlier."

By the spring of 1944, however, American and British air activity became so intense that the Luftwaffe chiefs won their point. Orders were issued for the immediate development of the jet industry.

Work was initiated on several types of engines—one known as the Leist ZTL and sponsored by Daimler Benz. Another was the Heinkel Hirth and a third was the Jumo 004. Apparently the Leist engine was abandoned.

The ME262 is formidably armed, being designed to carry four 30 mm guns. It can also carry bombs on the side of the fuselage. The AR234, being a larger plane, can load more fuel and thus has a substantially greater cruising range than the 262. While transporting bombs, its range is about half its potential.

Technical Intelligence works closely with the British in dissecting parts of German jet planes that have crashed or been shot down inside the Allied lines. "We also have a continuing interchange of information," the colonel adds. "This comes in from many sources and every little bit helps in determining the strength and performance of the Luftwaffe's jet force."

Best estimates available at present indicate that the harassed German production facilities will be unable to turn out jet aircraft in sufficient quantities to do much damage. On the bases of known production figures, it is unlikely that the Luftwaffe will have more than five percent of its front line aircraft converted to jet types by this spring. Jets normally require longer take-offs than standard fighters, although they can get into the air with the assistance of rocket take-off devices. With her territory diminishing daily, Germany does not have very many airfields suited for jet plane operations.

But like everyone else in Technical Intelligence, the colonel prefers to keep his fingers crossed.

"If we relax even for a couple of weeks the story may be different," he insists. "At present our fighters are holding their own against the superior speed of the jets. New equipment on our planes partly compensates for the speed differential. From what we know, the jet isn't quite as maneuverable as some of our fighters. But if the Germans threw jets at us in heavy force we'd have a tough fight on our hands." ☆

Above and right are silhouettes of the Messerschmidt 262.

Distressed ME262 has wheels down, later crashed in flames.

Guns and gun camera of P-51 caught this ME262.

Below and left are silhouettes of the Arado 234.

AIRLINE ACROSS AFRICA

An Air Force *Overseas Staff Correspondent*

ILLUSTRATED BY CPL. LOUIS S. GLANZMAN

Neither lions nor leopards, harboobs nor harmattans, prevent the planes of ATC's Central African Division from moving through on schedule

The new copilot of the C-46 shook his head as if there were a bee in the earphones and then looked at the man on his left. But the pilot's attention was fixed on the sky ahead of them. He did not seem to have heard the message. The copilot wondered if he had been hearing things.

"This is Abel 617," said the copilot, "Abel 617 calling Accra Tower. Will you repeat the weather?"

"This is Accra Tower calling Abel 617. Weather here is ceiling unlimited with visibility zero."

"Ceiling unlimited with visibility zero," the copilot echoed into the hand mike in a dazed voice.

The pilot nodded and grinned a not too happy smile as he swung the Air Transport Command plane onto a different course and headed for another field. It was one of the lessons in weather that pilots on CEAD (Central African Division of ATC) have to learn. For there is plenty of freak weather all over CEAD's route, which covers most of South Africa as well as Central Africa. Other airlines, knowing that in the afternoon in this area airmen encounter giant cumulus clouds and storms, do almost all their flying in the morning. But the ATC flies and has flown 24 hours a day, every day of the year.

One pilot who got caught in a typical late-afternoon storm fortunately had enough altitude. He dropped 3,000 feet like a stone in a vacuum. He pulled back on the stick. Then he hit a draft going in the opposite direction and shot up 5,000 feet. The jolt knocked off both wingtips but the pilot did not know that until he made a perfect landing at his destination and got out and looked at the plane. "I thought it flew a bit funny," he explained, "but only on the landing."

While such storms are daily occurrences, ceiling unlimited and visibility zero is a seasonal condition and is called a "harmattan." A harmattan occurs after a cold spell when the dust rising off the Great Sahara Desert blows south and west to meet the moisture-laden air of the African Atlantic coast. The moisture absorbs the dust and remains suspended at times to a height of 10,000 feet. Often it will last several days and extend 400 miles out to sea and far enough inland to cover half of the flying route.

There is even an African improvement on the harmattan. This is the "harboobs." As the colonel in charge of operations for CEAD described it, "When one is coming up you bolt the windows, lock the door, stuff rags and papers in the crevices, crawl into bed and pull the sheets and blankets over your head. That way you get only a half-inch of sand inside the sheets." For the harboobs is the same as the harmattan except that the wind is as strong as a local tornado and the grit so fine it seems to go right through walls.

Despite this and other things like 130° temperatures, CEAD set up a record that has not been surpassed by any other ATC division when it flew 13 months without a single fatal transport accident. According to the heads of this division, such an accomplishment is due to two things: the excellence of the pilots and the high morale of all the personnel, especially the ground men.

To make him good, every new pilot is given intensive training along the same lines as that given by commercial air lines in the U. S. although, of necessity, it is speeded up. Each man flies as copilot three to four months to learn routes, weather, etc., of his run. He will fly only his own run which may be anywhere from 1,600 to 2,500 miles. The older flyer is eager for the younger one to learn rapidly and thoroughly. Rapidly, because only by training replacements will the old pilots get home. Thoroughly, because imperfect knowledge in the pupil will be held against the instructor. After finishing his spell as copilot, the flyer goes to an intensive instrument finishing school at Accra for three weeks. During this period he gets a thorough refresher course in instruments and he puts on overalls to work in the line until he knows the plane as well as do the mechs he's working with. Every pilot, regardless of his previous experience, goes through this school.

Pet leopard likes his back scratched.

CEAD'S fine maintenance record is due primarily to morale —to the fact that all individuals have a personal and honest realization that each is an important part of every airplane flying the run. This attitude starts at the main depot at Accra, which supplies all of Africa and has the only complete engine rebuilding shop on the whole continent. Pride goes right down the line to the smaller stations such as the emergency field at Salalanin, Saudi Arabia, which is ruled by the Sultan of Muscat. The sul-

tan has rather fixed ideas about his sovereignty and refuses to let the Stars and Stripes fly from this post—probably the only U. S. base in the world that doesn't. At Masira Island, supplies can be shipped in only seven months a year due to the monsoons. At El Geneina in French Equatorial Africa, the nearest railhead is at El Obeid, some 765 miles over the desert on roads the rain washes away half the year.

This probably helps explain why the men at places like Maiduguri in Nigeria—368 miles by truck over one of the roughest roads in the world—went in for raising pet leopards. Even after the animals were full-grown they loved having their backs scratched, and the local sport was to have them enter a newcomer's quarters. The cost of repairing screened windows was high, but everyone thought it well worth while until a high official was forced to make a hasty exit when he saw two wild beasts bearing down on him for the kill. It did no good for the men to explain that those were purrs and not roars. . . . The leopards became skins.

The most difficult problems are the climate and the fact that there are no stations in the division where a man can be rotated to get a change and to see something of civilization. Even on ATC runs in the Central Pacific, men can be rotated from the coral atolls to Hawaii. But in CEAD the climatic conditions and amount of civilization vary only a few degrees. Even the fact the men can supplement their rations by hunting animals that millionaires used to travel thousands of miles to shoot, loses its interest. As one GI explained it "A zebra quickly becomes just a horse in a bathing suit and a lion is something you only want to see in a film announcing a Hedy Lamarr picture." For that reason a leave area was set up in Johannesburg, in the Union of South Africa. To this ultra-modern city, flying personnel, both officers and enlisted men, are supposed to go after six to eight months operational duty. Ground personnel get this privilege after 12 months. However it is generally twice as long before the men get the pleasure of standing on a corner watching street cars go by or being able to ride two miles without being in a jungle or desert. (It should be remembered that all of this applies not only to ATC personnel, but also to two organizations as vital to the run as the planes—the AACS and the Weather units.)

Men return refreshed to their work—work that covers everything on an airbase. Since there is no theater command, CEAD establishes, maintains and operates all of its bases from engineering to base maintenance, QM, PM, ordnance, signal, CW, messing, billeting, PX, etc. Where other ATC divisions can fall back on the theater when something goes wrong, CEAD must do it all. Of course they have natives to help, but for a while it appeared that none of the local citizens would work, no matter what the pay. For someone in Washington refused to pass on a small requisition which explained truthfully that the money was needed for native orchestras to play during the day. It had to be pointed out carefully to the official that the orchestra consisted of two one-stringed violins, two one-stringed guitars and a couple of gourds, and that the natives refuse to cut down elephant grass, repair runways or do any other mass work without being able to sing in time to their orchestras.

CEAD is an air route filled with typical "believe it or not's" as one pilot discovered when he had to fly instruments for two hours and make a blind landing on a day when the weather was CAVU. He had run into a cloud of locusts and the windshields were black.

Hop in bed, pull up the sheets when this harboob strikes.

Each station has something different about it. Aden is famous in Biblical history. At Aden, Noah is said to have built his ark. At the old Crater City are the large baths attributed to the bathing beauty of her day—the Queen of Sheba. At Kano, another station, a native blows an eight-foot horn—the type used at the walls of Jericho—before each plane lands or takes-off to warn the natives working on the field and, more important, to scare the birds on the runways.

All of this adds up to one of the most important links not only for ATC but for all of the air forces in CBI. Over this run, in addition to freight and passengers, CEAD has handled more than 4,000 combat planes of all types. In the territory that made Stanley and Livingstone famous, the men of CEAD are doing a job and building a lifeline that will play a large part in the final defeat of Japan. ☆

Line shows main ATC routes. CEAD flies from Accra to Asmara, then east.

The whole business of fighting a war goes through his typewriter before a shot is fired—but he wins no medals and little thanks

BY MAJ. LUTHER DAVIS

AIR FORCE *Staff*

The bar was noisy with a variety of servicemen arguing heatedly about things that had happened to them overseas. One corporal had a lot to say about his personal battle with Von Rundstedt and an Air Force sergeant told all hands about a day over Regensburg. The corporal's refrain, "So I threw a hand grenade and waited," kept getting mixed up with the sergeant's tag-line: "FW-190s! FW-190s everywhere you could see!"

Alone in the midst of all this reminiscence stood one sandy-haired young sergeant who just sipped his beer and listened. On his sleeve were hashmarks indicating two and a half years overseas, but on his chest all he wore was the Asiatic Theater ribbon. Perhaps he was thinking:

"St. Mere Eglise, eh? No, I wasn't there. Guadalcanal, Leyte, the first Tokyo raid—no, I wasn't there either. Chairborne, that's me. They carried me to Australia and sat me at a typewriter. Every second week I got a day off and went for long walks. But most of the time I sat. Sat and typed. Reply by indorsement. Approved. Attention is invited. The following secret documents are transmitted herewith. Me, I was at a headquarters all the time. I'm lucky. Two and a half years over there and no one ever shot at me. And I never shot at anybody else. Hell, I wasn't really in the war."

In the AAF there are 337,000 men assigned specifically to administrative work, and a great many more who actually do it. Many of these men must think somewhat along the lines of the sergeant alone in the bar. They are the men who've fought their war with Typewriters, Desk, Standard, wondering if what they're doing affects the war at all. Lots of them have been bombed and strafed. Some have been killed. But even when they experience enemy action they have to sit there and take it. They rarely get a chance to fight back.

The papers slide over their desks in posts smack on the equator where they have to put talcum powder on their hands and arms to keep from rubbing all the ink off the papers; in underground shelters north of Nome they work through the arctic twilight with feet on top of kerosene stoves and fingers blue from cold. They realize that the inconvenience they endure is nothing compared to the violent hardships of combat troops—they keep telling themselves that, but all the time there's the boredom and monotony of the carefully trite official correspondence—and a guilty feeling that they're not contributing to the war.

Well, without them we could give up now. Without the steady clack clack of thousands of typewriters there'd be no spare parts and no replacement airplanes; no rotation policy, no troop movements, no pay, no courts martial, no uniforms, no gasoline; there'd be no duty rosters and no overnight passes, no PXs and no .50 caliber ammunition—or guns. There'd be no promotion on either side of the ocean, no food, no war—no victory.

They've made the AAF one of the most efficiently administered organizations in the world, even though they didn't always know what their work proved. By diligence, application, sweat, and the peculiar kind of guts that keep a man doing a hated chore until he's ready to vomit, they've laid the groundwork for the bombing of Berlin and Tokyo. This they've done and continue to do that others may fight.

They're guys who stood next to you at induction center and felt the same emotions you did—were just as ready as you to take whatever came, combat or kitchen police. They're good soldiers who do what they're told knowing they're lucky in lots of ways, but who, for the most part, devoutly wish they weren't. ☆

The Beard...

. . . will be neatly trimmed and the hair kept short.

Par. 7, AR 40-205.

The Hair Force Special
Pfc. L. W. Clemmons, Marianas.

The Bushwacker
M/Sgt. C. B. Phillips, Munda.

The Lunatic Fringe
S/Sgt. D. Blakeslee, Australia.

The Yukon Grow One Too
Cpl. C. Popoff, Alaska.

The Eager Beaver's Beaver
Pvt. M. W. Payne, Kwajalein.

The Wac Scratcher
M/Sgt. G. E. Green, Solomons.

The Wirehaired Terror
Maj. Lou Kittel, Guadalcanal.

The road back to

By the time the Army Air Forces had completed the job, Clark Field, once the aerial pearl of the Orient, was little more than a shambles.

AAF heavy bombers first struck Clark Field December 22.

Hangars were twisted skeletons, planes wrecked, runways shell cratered.

Clark Field

The 5th Air Force has come home.
—home after a three-year aerial odyssey of 8,000 miles
—home via the long hard road of Moresby, the Battle of the Coral Sea, Buna, Gona, Lae and the Battle of the Bismarck Sea, Hollandia, Biak, Morotai, Leyte
—home to CLARK FIELD.

Clark Air Center, 50 miles into the rolling plains of Central Luzon, north of Manila, was the U. S. fortress for the air defense of the Philippines. It fell into Jap hands in December 1941.

It wasn't until December three years later that the first bombs of the 5th Air Force heavies fell on the Japs at Clark, the first installment of a debt they had vowed to pay in blood and destruction.

During their occupation of Clark Air Center, the Japs had developed it as the strongest link in a chain of airbases from Japan deep into the Pacific and Netherland East Indies. The Air Center comprised 6 airdromes and 13 runways.

Despite heavy attacks by Naval carrier planes coordinated with the Leyte landings in October, 1944, mid-December still found Clark Air Center the hub of Jap air operations.

The first attack by our land-based aircraft against Clark came on December 22 . . . From that date, until January 9, when our troops landed at Lingayen, in northern Luzon, Clark Air Center was under almost daily attack by heavies of the 5th Air Force, escorted by fighters and joined by low flying A-20s and B-25s. In these operations 139 out of 203 enemy interceptors were shot down, a minimum of 228 Jap planes was destroyed on the ground; our losses were seven fighters and eleven bombers.

One of the main objectives of our forces that landed at Lingayen was a march south down the Central Luzon Plains to Clark Air Center and Manila. It was important to the success of this operation that the strong Japanese forces in southern Luzon be isolated and that supplies be cut off from moving northward. This job was done with a vengeance by an Assault Air Task Force of the 5th Air Force.

Using A-20s, B-25s, plus almost every type of fighter and fighter bomber type in the AAF, the Third Air Assault Task Force strafed and bombed this strategic area daily from dawn till dusk. During a period of two weeks this force destroyed or rendered useless 330 trucks, 51 staff cars, 196 railroad cars, 11 locomotives, 13 tanks, 4 half tracks and miscellaneous artillery pieces, motorcycles and other vehicles.

The war against the Jap isn't over, there is still fierce fighting in the Philippines, but today the 5th Air Force is fighting from its home ground. Its slate has been wiped clean and from now on the 5th will see to it that the score is kept one-sided. ☆

More than 400 Jap planes were caught on the ground and destroyed. Clark's 13 landing strips were being readied for U. S. use even before Manila was liberated.

Prior to taking Clark Field, 5th Air Force planes struck at Luzon communications daily.

Filipinos directed low-flying pilots to juicy Jap targets.

Strafing and bombing missions were at times carried out at altitudes so low that several of our attacking airplanes were destroyed by Japanese land mines.

FOXHOLE MEDICS

By an AIR FORCE *Overseas Staff Correspondent*

Operating under fire, AAF portable hospitals save lives by fast action on the battlefront

ILLUSTRATION BY T/SGT. DON BROCKELL

A medical officer assisted by two enlisted medical technicians was performing an operation in a flood-lighted tent. Less than 1,000 yards away an advanced airfield of the 5th Air Force was under enemy air attack.

Suddenly a plane swooped low over the tent, there was the familiar and ominous "whoosh" as bombs dropped. The medics dropped into their foxholes next to the operating table. The earth shook and bomb fragments filled the air. Both the doctor and his two assistants were injured. The patient was bounced off the table, but was uninjured; when he came out of the anesthesia he didn't even know what had happened.

"It's a funny thing," commented Maj. Wilfred F. Ruggiero, MC, "but we've had several cases where the condition of a patient under treatment did not permit removing him to a foxhole. I can't recall a single case of injury to the patient under such circumstances.

"Our experience has been that it is best to halt an operation when bombs start to drop. If the surgeon were to be injured or knocked out while continuing the operation, the result probably would be disastrous. Precautions, of course, are taken to assure that the patient is all right from a medical standpoint during the seconds or minutes of actual attack."

Major Ruggiero is commanding officer of the 29th Air Force Portable Surgical Hospital, one of five attached to the 5th Air Force in the Southwest Pacific. They are tailor-made to meet the unique hospital requirements of Lt. Gen. George C. Kenney's lightning-like aerial leap-frogging operations.

Due to the fact that the Southwest Pacific air war is fought from bases in the most advanced areas, where no permanent or even semi-permanent medical facilities are available, and in jungle country prohibiting immediate evacuation of seriously wounded, the need arose for a new kind of field hospital. Several specifications were set forth for a hospital that would become an integral part of the advancing Air Forces:

1. It must be highly mobile.
2. It must be capable of being set up to function within a few hours.
3. It must be able to perform routine medical services as well as all types of major surgery.
4. It must be self-sufficient for a period of at least 30 days.

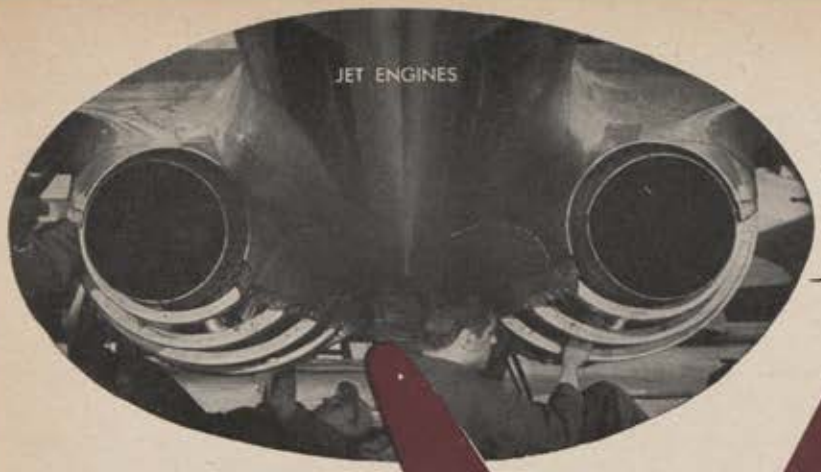
Fortunately a hospital unit existed within the Medical Corps that lent itself to modification for this purpose. These were the portable surgical hospitals originally designed for infantry needs at the front lines, which were used as the prototype for the new type air force field hospital.

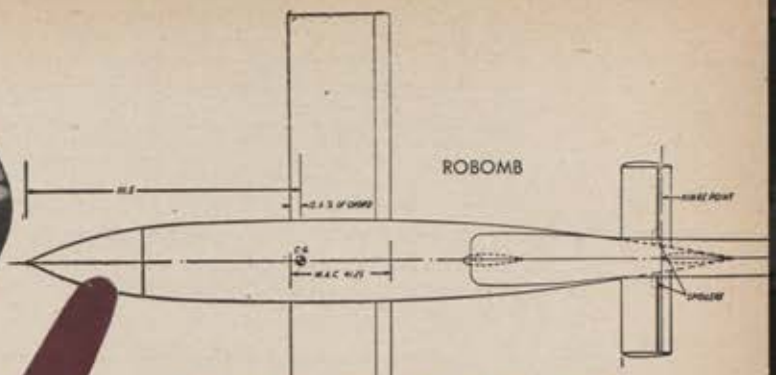
These have moved right in with every air advance from Buna to the Philippines. Often they come in before an airstrip is completed, ahead of the major complement of combat air units. As the terrain rarely permits adequate wheeled transportation, they are usually located 1,000 yards or less from the airstrip.

At Cape Gloucester, for instance, the air force portable hospital was located directly behind the Marine unit holding a precarious perimeter against the Jap. One morning the hospital staff discovered that the Marines had pulled back during the night and left them to hold the perimeter, with nothing but empty gun positions and barbed wire between the hospital and the enemy. For cases such as this, the hospital, in accordance with the Geneva Convention, carries enough small arms and ammunition to defend itself and its patients. The hospital carries no Red Cross identification of sufficient prominence to reveal its location to the enemy, as it operates with combat units; it expects no mercy from Jap bombing or sniping, both of which they have been subjected to on numerous occasions.

The commanding officer of an air force portable hospital

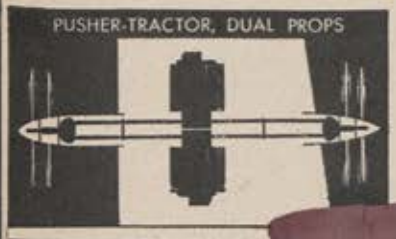
(*Continued on Page 57*)

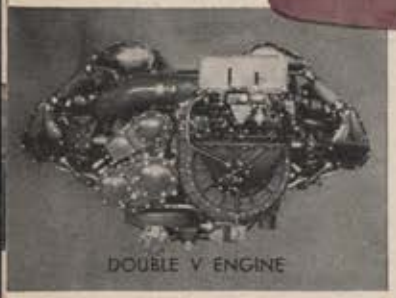


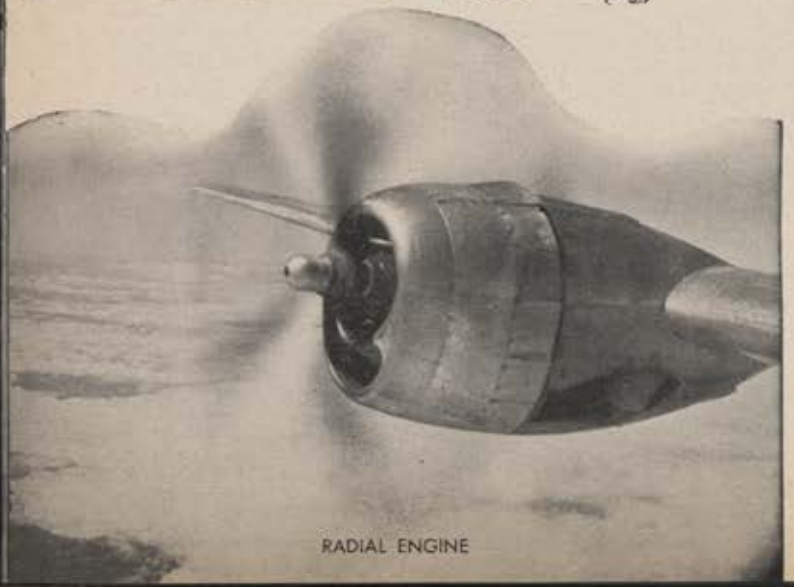


DESIGN:

Key to air superiority—part 2







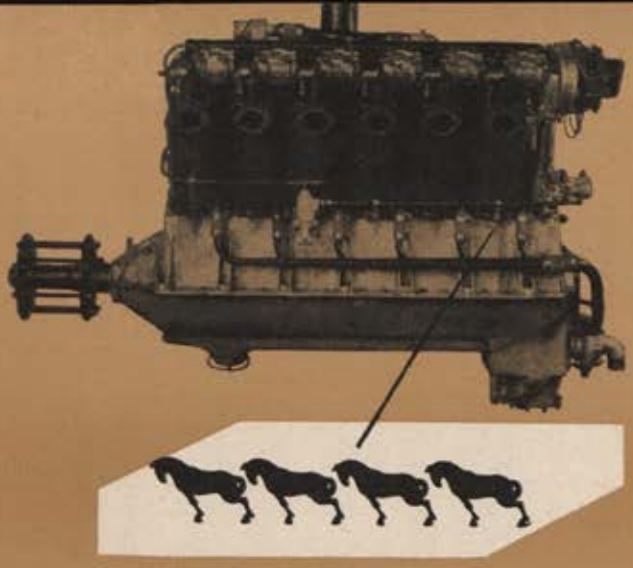
Design of military aircraft is influenced greatly by the powerplant required for the forward thrust that keeps a plane in the air. Because engines are not shaped like airfoils, the perfect aerodynamic design traditionally has had to be compromised to fit around a power unit.

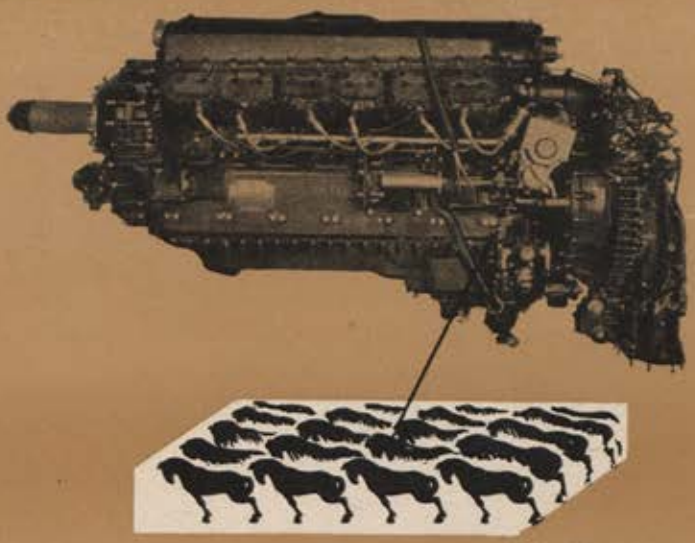
Particularly on multi-engine aircraft, powerplants have been sore thumbs sticking out into the airstream, creating large drag forces. Although not in direct proportion, engine size has increased as horsepower has been stepped up; this has necessitated constant effort further to decrease drag area. In an effort to solve this problem, designers have constructed flat-type engines that can be buried inside of a wing section. They have hooked four radial engines together in banks further to limit frontal area. They have spliced two inline-engines together to form a W. Some new aircraft are being built around these types of engines, but the future of burying the conventional engine inside the wing section does not appear very promising except in large flying wing designs.

Most promising aircraft powerplant is the gas turbine engine—not complicated by hundreds of reciprocating parts and relatively free of cooling problems. One type of gas turbine drives a propeller to obtain primary thrust while another type gets its thrust from jet reaction, eliminating the propeller. Such engines are greatly influencing design.

With application of the gas turbine, the outlook is brighter for tailoring engine installations to the needs of aircraft design instead of tailoring aircraft design to the shape of the conventional type powerplant. This should mean development of better aerodynamically designed aircraft.

Propellers, the other integral component of conventional powerplants, have been redesigned to absorb the power of larger engines and thus to produce greater thrust and have been geared to extension shafts from buried engines. Such development has seen the evolution from the single two-bladed prop to twin three-bladed dual-rotation props driven by conventional reciprocating engines. Although generally regarded as impractical for supersonic speeds and stratosphere flights, propellers will continue to be utilized for aircraft operating at subsonic speeds. Another type of propeller development is evident in the helicopter rotor blades which produce both lift and horizontal thrust.





Principal objective in power plant design is maximum horsepower with minimum displacement in cubic inches. Modern inline engine at right is approximately the same size as the old-type Liberty "12" (above) but is able to furnish about four times as much horsepower.

DESIGN

Accessibility for maintenance work, as in the A-26, is important design factor.

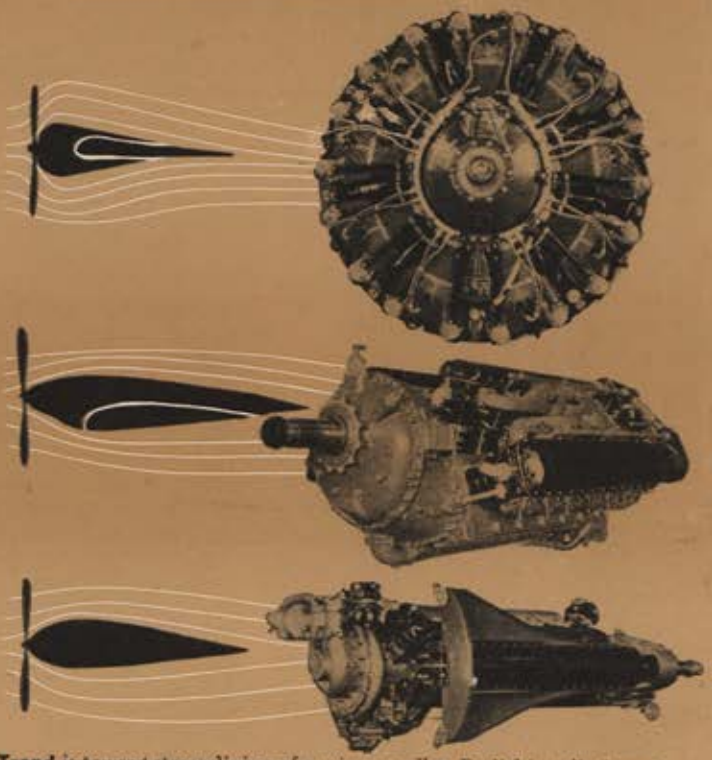
In measuring progress of conventional aircraft engine design between World War I and II, it is impressive to compare the Liberty V-12 with the Packard Merlin 12 cylinder engine. Both are the same size, having a displacement of 1650 cubic inches, but the Merlin produces four times as much power. By the weight yardstick, although the Merlin is twice as heavy as the Liberty, there is more than 100 percent increase in power output per pound. The Liberty had a ratio of more than two pounds of engine per horsepower; the Merlin less than a pound per horsepower.

Despite progress in consolidating more power into smaller and lighter units, advances in wing-loading and thin wing development still are ahead of reduction in powerplant size.

Experimental engines in the 2,000 to 4,000 horsepower range have been built in many strange forms—corn-cob, X-shaped, and H-shaped—to facilitate their installation in planes and to present a minimum of frontal area to the airstream. One corn-cob type has 42 cylinders but is only 38 inches in diameter.

In addition to the drag problems involved in powerplant design and installation, present aircraft must be provided with quick-change powerplants that also assure ready accessibility for maintenance. Such provisions exert an influence on overall design, especially in the location of equipment.

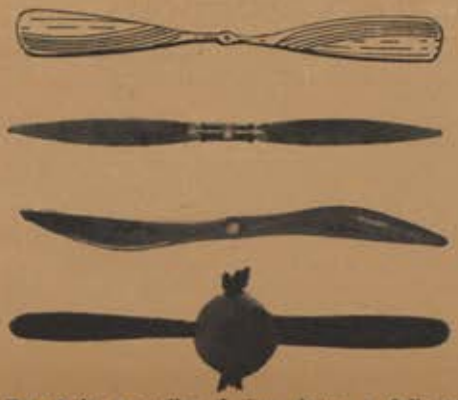
Another major drag problem that is being tackled by designers in their attempts to increase performance efficiency is the proper handling of airflow internally. For example, inlet and outlet air ducts are being redesigned to receive, circulate and exhaust air with the least possible disturbance of airflow around the plane and with a minimum of accessory cooling equipment.



Trend is toward streamlining of engine nacelles. Radial installation at top has more drag than inline engine (center) while flat type shown at bottom has been completely incorporated in the airfoil of the wing.

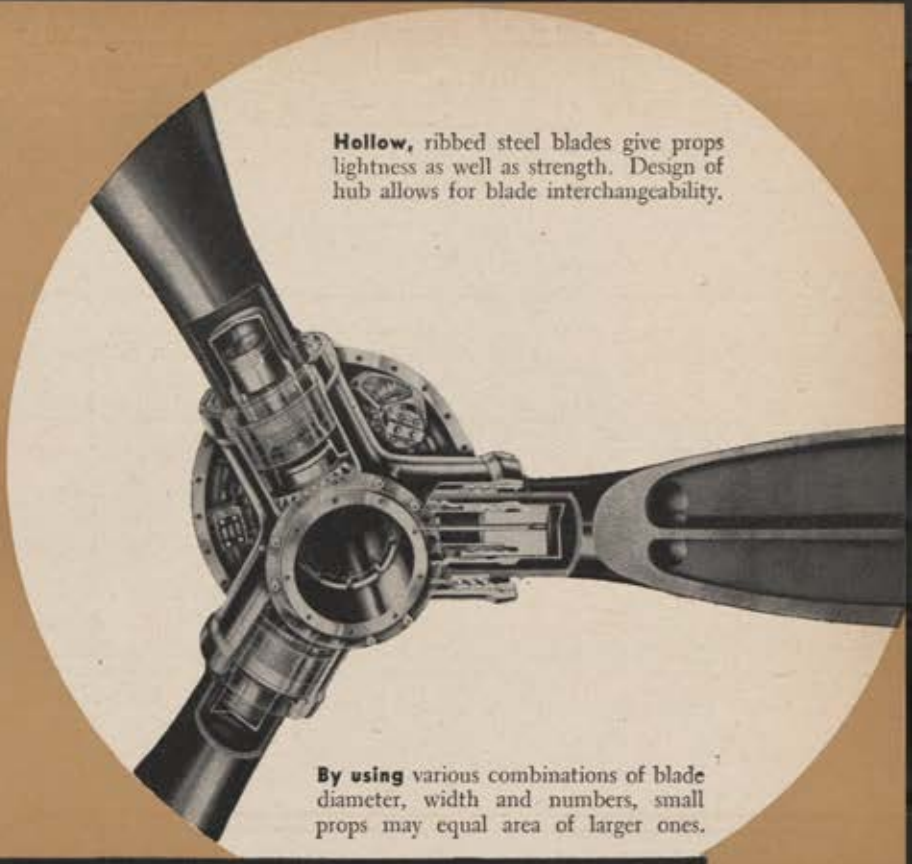
Engine of B-29 (enlarged) has a diameter greatly exceeding wing thickness.

In attempts to improve internal air handling, some ducting systems have been arranged so the exhausting air imparts a small jet thrust. Careful design of the exhaust stacks on the Merlin engine, for example, has enabled planes to pick up as much as 35 mph from the jet-like reaction imparted by ejected exhaust gases. Exhaust blasts from the supercharger of a P-38 eject at right angles to the course of flight so the jet thrust is not used and consequently speed is not increased. Installation of a turbo hood to align the exhaust blast with the airstream was tested and found to give the P-38 an auxiliary forward thrust. This test later led to the angular installation of the P-47 turbo-supercharger so that the exhaust blast could add some jet thrust.



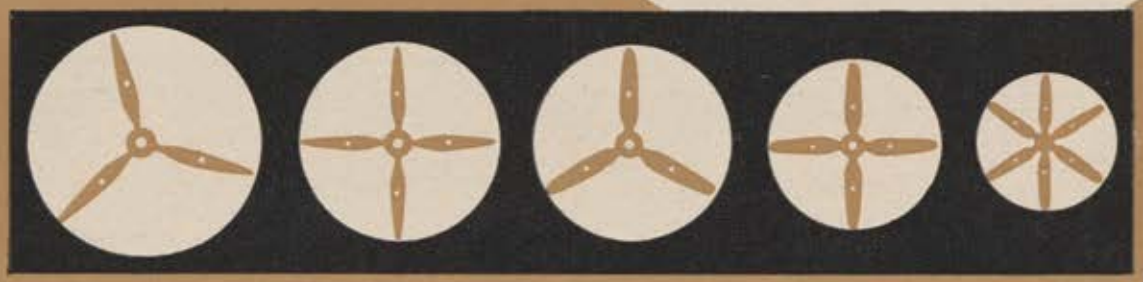
Trend in propeller design shows a full cycle. Broad tips of early wooden prop (top) are again in style on P-51 (bottom) after long disfavor.

Blade angle of a prop varies along length of blade to give most efficiency in providing forward thrust.



Hollow, ribbed steel blades give props lightness as well as strength. Design of hub allows for blade interchangeability.

By using various combinations of blade diameter, width and numbers, small props may equal area of larger ones.



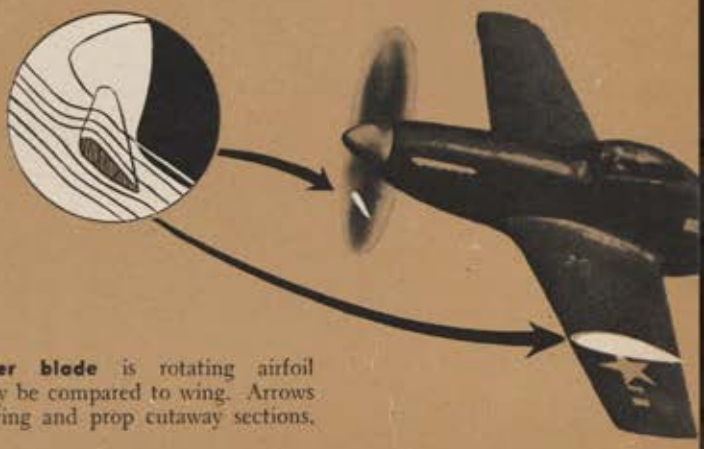
As more horsepower has been built into engines, larger and larger propellers have been developed to convert this power into thrust. But there are limits to the diameter of a propeller that can be mounted on an aircraft. Instead of extending blade diameter, the width and number of blades can be increased to give the propeller more total blade area.

Today, our high-performance propellers have four blades. Some British props are five bladed. Dual-rotation props have six and eight blades. Such combinations increase total blade area but do not increase diameter of the propeller and can be used on planes with relatively short landing gears.

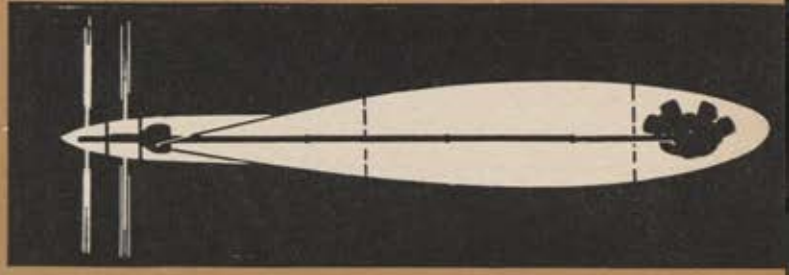
A further trend in propeller design has been to the stubby-end paddle blade, which provides additional blade area. This change has increased the power-converting ability of our propellers.

With development of the gas turbine engine for aircraft, basic design problems of the conventional propeller have not been greatly affected. To transmit the power from a gas turbine unit into the propeller, a reduction gear system is required, but the shapes and numbers of blades still are determined by the amount of power to be harnessed and the speeds and altitude of operation to be encountered. This turbine-propeller powerplant not only eliminates the internal combustion engine, but retains the advantages of short take-off runs.

If the gas turbine ejects its exhausts directly into the air, instead of transmitting its power to a propeller, the airplane becomes jet propelled. This type of installation eliminates propeller and reduction gears as well as the internal combustion engine. At very high speeds, where propeller efficiency falls off, jet engines become more efficient.



Propeller blade is rotating airfoil and may be compared to wing. Arrows show wing and prop cutaway sections.



With shaft, dual pusher props can be driven by engine placed forward.

Artist's conception of a helicopter propelled by jet has air impeller at top, the combustion chambers in rotors and exhausts at blade tips.

One of the earliest demonstrations of jet principle was Hero's aeolipile, which converted steam pressure into mechanical force in days of Alexandrian culture.

DESIGN

XR-1 Platt-LePage helicopter has rotors which operate from central power plant situated in fuselage.

Jet engine on P-59, below, has simplified the work of maintenance personnel as well as plane designers. Props and reciprocating engine parts are eliminated.

A different adaptation of propeller design is that for helicopter rotor blades. These blades are rotating wings that can be tilted to provide forward thrust as well as vertical lift. Current rotor development tends toward a more efficient rotor blade system that can lift heavier aircraft and propel them faster.

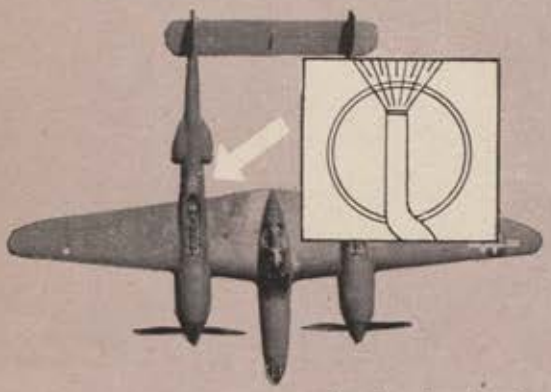
Essentially, the helicopter obtains both lift and forward thrust from its rotor—a series of airfoils. However, instead of relying on forward speed to obtain lift from these wing surfaces, it rotates them at sufficient speed to obtain vertical lift without forward motion. Then, to fly in any given direction, the rotor is tilted in that direction, thus producing thrust as a propeller and producing lift as a wing.

In contrast to this method of flight, the autogyro uses a conventional propeller-engine combination for forward speed and utilizes its rotating wings for lift only.

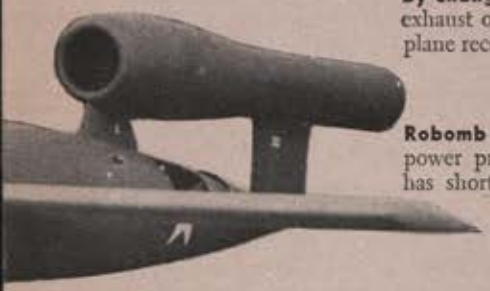
With the trend to larger helicopters, new types of rotor designs are being developed to provide the maximum lift and forward thrust with a minimum of interference with stability. Dual rotation rotors may be mounted on the same drive shaft. Single rotors may be supported on long arms like those of the R-1, or at the front and rear of the aircraft. They can be intermeshed at an angle like an egg beater or in the same plane as a set of gears.

Adaptation of the principles of jet propulsion to the helicopter may increase its efficiency. By ducting hot gases from a gas turbine engine out of the tip of a rotor blade, the blade could be turned by jet propulsion.

P-59 was first AAF jet plane, now is being put in the trainer class by the new P-80. At left, Airacomet has twin jet engines hugging fuselage.



By changing direction of supercharger exhaust on P-38 from side to rear, the plane receives an added forward thrust.



Robomb is modern application of power produced by jet. This model has shortened, stubby wing surfaces.

With development of the P-80 jet-propelled airplane, the AAF has hurdled the 500-mile an hour barrier where efficiency of present conventional engine-propeller combinations had begun to restrict airplane performance. Now we are at the bottom rung of a new section of a ladder that starts at 30,000 feet and 500 miles an hour.

Practical application of the gas turbine—one of the first engines invented by man—to the airplane is a product of World War II's race for higher performance aircraft. Although much remains to be learned about the capabilities of turbine-powered aircraft under all tactical operating conditions, tests to date are more than satisfying.

The AAF's P-80 and P-59 are propellerless aircraft driven by a gas turbine that ejects a gas blast rearward; this reaction gives the forward thrust. Another adaptation of the gas turbine to aircraft, previously mentioned, operates on the same mechanical drive principle as the water wheel, turning a shaft that is geared to a conventional propeller.

Although aircraft powered by turbine-driven propellers will cruise at speeds of about 300 mph more economically than turbo jet (gas blast) aircraft and will have shorter take-off runs, they will not be able to attain the very high speeds of turbo jet types.

Jet-propelled planes of the future will require thinner and new high speed wings to reduce the high drag that develops due to the compressibility shock waves encountered at near-sonic and supersonic speeds. They will also have to be aerodynamically clean—no exposed rivet heads, no external projections such as antennae and pitot tubes.

Landing gears, if used, probably will continue to be of the tricycle type with a steerable nose wheel; otherwise, steering such planes on the ground, in the absence of a propeller blast on the rudder, would be extremely difficult.

Since jet engines are not necessarily located in the nose, some methods of maintaining balance of single-engine aircraft usually is required. This is obtained at present by moving the pilot and some equipment farther forward, which provides better vision, and by concentrating the armament in the nose, which reduces gunfire dispersion.

Lack of vibration in jet planes is expected materially to reduce maintenance problems.

Although the turbo-jet engine installation is lighter than that of a conventional powerplant, this weight advantage is partially offset by the requirement for additional fuel. At high speed the jet plane operates at optimum fuel consumption in contrast with conventional fighters whose best fuel economy is secured at reduced power and speed.

With development of very-high speed jet planes with small wings, rocket-assist take-off devices may be used to get them into the air within the limits of present runway lengths. Jet propulsion also can be adopted as an auxiliary power boost during combat.

Further application of the jet propulsion principle is evident in the development of specialized aerial weapons. The Nazi's V-1 bomb illustrates one type of such craft. While long-range research explores the potentialities of future aerial weapons, the immediate requirements of combat will continue to influence aircraft development until the war is won. ☆

(Continued from Page 8)

but because it reveals that the bomb run has begun. Besides, it decreases the airplane's speed and maneuverability. To speed up the action of the bomb bay doors the operation was changed from electric to pneumatic.

Similarly, the landing gear in the early model was operated on two electric circuits. One of these was for normal operation and the other for emergency. It was quickly decided that if the electric system failed even the emergency landing gear would not work. A change was made to a mechanical system which is operated by hand.

None of the above changes would have been accomplished in so short a time if the combat crews had not been superbly trained in the ground work and maintenance required for their plane. They were the only ones left to train, for the ground men left early due to the long sea voyage to India. At the time of their departure, there were not enough Superforts available for the ground crews to gain much practical experience on them. The combat crews were given all of the training in maintenance that the ground echelon ordinarily would have received. This was essential for they would be landing overseas on bases where no one would be familiar with this new type plane. It was originally thought that certain planes might be stationed at far-flung bases to operate as independent units with the combat crew aiding in the heavy ground work.

At all of the groups of the 20th Bomber Command, in the first few months after their arrival, it was no uncommon sight to see the flyers, including pilots, navigators and bombardiers, hard at work until 0300 hours, servicing and maintaining their own craft. At the same time they instructed the ground men, who by virtue of being highly trained in other airplanes, quickly picked it up and took over. For a long while the combat crew of one B-29 held the record for making the fastest engine change. And up in China where there was a shortage of ground personnel due to the many scattered bases, the combat crews pitched in and worked all of the time.

This practical knowledge paid off on many missions. On one strike against Palembang, Sumatra, over 3,600 miles round trip, Maj. Ira Mathews and his crew went over the target on three engines. They lost another on the way back. The men jettisoned everything movable, including their parachutes, to maintain altitude. When they had thrown over everything that was loose they turned to the rest of the craft. Their knowledge of the plane was so good that by the time they arrived at base, the B-29 was stripped of gun turrets and everything else that would unbolt and unscrew. The crew chief refused to believe that it was possible to do such a job while flying. However, the ground boys felt some small compensation, for it simplified their work of converting the almost naked plane into a tanker to fly the Hump.

Originally, it was thought that a good deal of work would have to be done by the service squadrons and depot groups because of the size of the plane. But the ground crews took over so well that it only necessitated additional equipment such as crows' nests to work on rudders and stabilizers, before they were doing as much on the Superforts as they used to do on the B-24s and B-17s. The maintenance equipment of the ground crews was immediately supplemented 100 percent.

No engine on any aircraft in the world gets the attention that the Wright does on the B-29. By now, the ground crews and engineering officers know where the trouble is before it occurs and like the fabulous doctors of fiction and screen—but not of real life—they can diagnose weaknesses before they begin and correct them with unfailing accuracy and professional aplomb.

Cylinder compression checks are made generally every 50 hours. Valve adjustment is critical. In some groups the engineering officer has this checked after every mission. Valve guides are inspected every ten hours after the first 100 hours. And before installation, no matter in what condition it is supposedly in, every new engine has the valve clearances measured thoroughly.

Although the life between engine overhaul was supposed to be 400 hours—doubtless it soon will be—the average engine time of the B-29 in combat is 152 hours. Then the engine is pulled and sent back for rebuilding. Engine changes occupy the maintenance crews day and night. Under the best conditions, with the accessories already in place and everything built up, it takes two crews about 24 hours to install a new engine.

Superficially all of this may appear to be a list of troubles. It most decidedly is not. It is merely the story of the most rapid transition of any new plane from what was practically an experimental or "X" model to the accepted or "B" phase of a bomber in operation. And an example of the excellence of the theoretical side of engineering is the amazing gunnery system that has exceeded all claims. On a solo photo mission a Superfort piloted by Maj. (then captain) John C. Eigenmann was jumped by more than 90 fighters over Japan. In a running hour-long battle, these men of the 20th Bomber Command shot down seven enemy fighters and got two probables, and landed at its base without sustaining even minor scratches—emphatic tribute to central fire control.

To know how good the Superfortress really is you have only to ask the men of the 20th Bomber Command who have done most of this pioneering work the hard way. They will probably tell you to keep watching the newspapers to see what they and the 21st Bomber Command are doing. Or they might mention Capt. Charles Joyce who brought his B-29 in to a perfect dead stick landing on his home field when he ran out of gas at 10,000 feet after a mission. But in all probability, they will just refer you to the Japs. The Japs know more about the rapid improvement of the B-29 than anybody else. ☆

THE FLYING WHALES

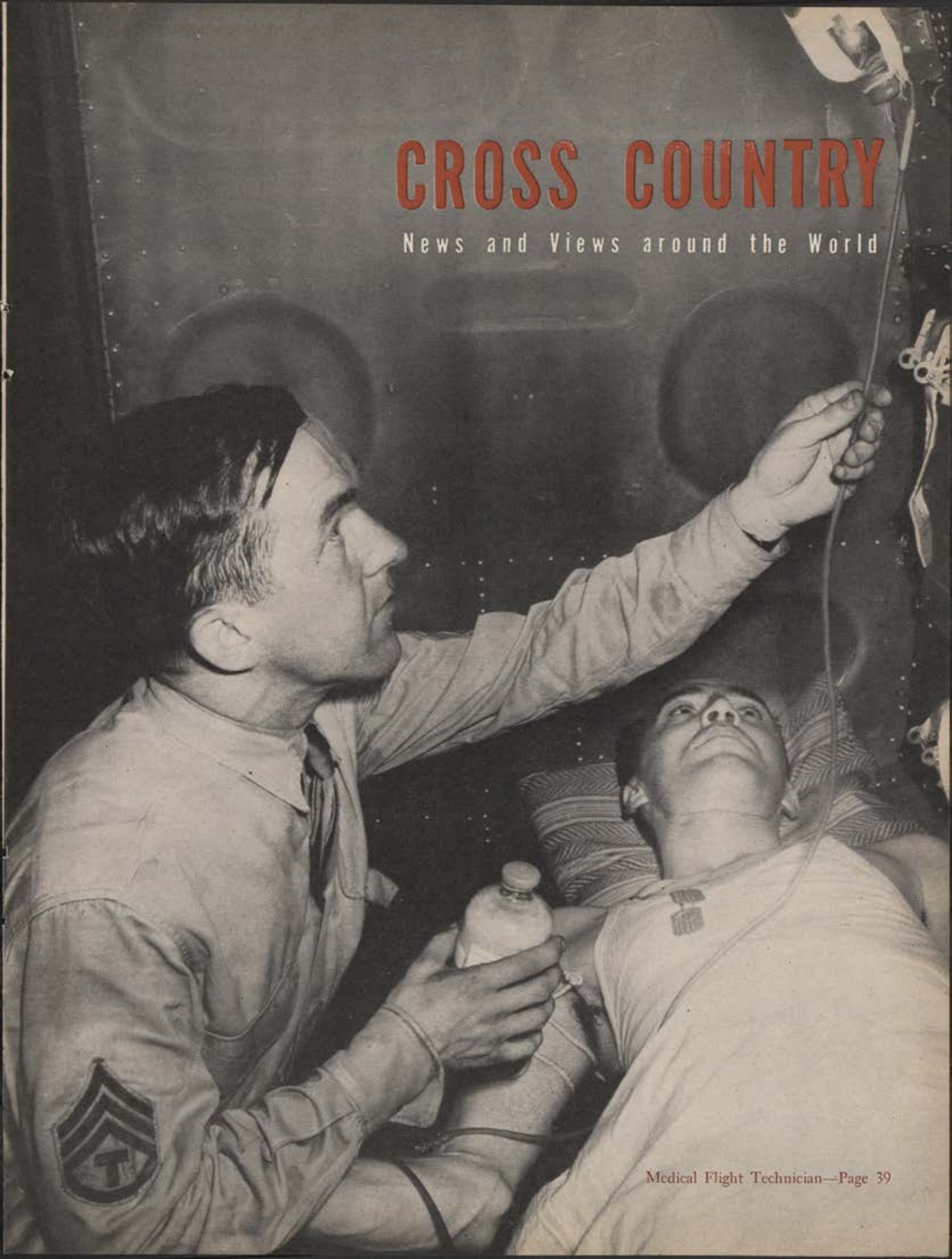
Here are new creatures for your bestiary:
These strange steel fish that swarm the seas of space
In strict protective shoal, slow-witted, wary
Behemoths moving with a monster grace.
Clouds are their coral and the land that lies
Five thousand fathoms down and drowned in mist
Is but the lost Atlantis of the skies,
A poisoned plain of pearl and amethyst.

Their giant hearts will not survive a spring
Too temperate for such primeval rage.
Yet men of some millennium may sing
Of golden legends in an armored age
And chronicle, when cataclysms cease,
These prehistoric harbingers of peace.

—Capt. David F. Parry, AAF

CROSS COUNTRY

News and Views around the World



Medical Flight Technician—Page 39

Balkan Rescues

Word comes from MAAF that their Air Crew Rescue Unit, set up last July by Lt. Gen. Ira C. Eaker for the purpose of saving Allied aircrews shot down in the Balkans and central Europe, really has been going great guns. From July to December, 1944, the ACRU rescued a total of 3,200 men from Romania, Bulgaria, Greece, Albania, northern Italy and Czechoslovakia.

Back from the Balkans in blankets

The ACRU is headed by a 53-year old pilot who was a member of the Yugoslav Air Force during the first world war and who has a thorough knowledge of the Balkans and the people who are hiding and caring for the hundreds of Allied airmen who have parachuted from flak-riddled planes or crash-landed on meadows and wheat fields. To locate these men, collect them at pre-determined landing areas, and build strips on which the rescue planes could land, "field teams" were organized and dropped by parachute. Many times these field teams had to fight their way out of traps the Nazis set for them. Members of the underground, Partisans, and people of the villages fed the team members, housed them, helped them build the necessary landing strips.

When rescue missions have to be delayed, ACRU sustains the evacuees by dropping food, clothing, and medical supplies to them, and, when possible, cigarettes, insect powder, candy, radios, and even anti-tank guns are parachuted. Long underwear drawers are loaded with sugar in one leg, salt in the other, and dropped, but sometimes the sugar and salt get mixed up en-route.

Although the ACRU staff consists only of one lieutenant and a staff sergeant for administrative work, two pilots, one navigator, two radio operators, and two plane engineers, other air force people are called in for assistance when needed. Fighter escorts are borrowed regularly from the 15th Air Force, troop carriers from the Balkan Air Force, language experts from other outfits. For example, 1st Lt. Nickolas A. Lalich was borrowed from another outfit because he spoke Serbian, Croatian, and Slovenian, and there was a particular job to do that required knowledge of these languages. Lieutenant Lalich was dropped into Yugoslav territory on a mission that was to take three days. He stayed four months. He lived and worked with Gen. Draja Mihailovich and succeeded in arranging four day and four night evacuations. Although he had to travel all the way across Serbia and Bosnia to do it, he accounted for the evacuation of 426 men.

Then they took a powder

Similar arrangements have been made with Marshal Tito and his Partisans, and it appears that political and factional differences have not affected the evacuations. When the Germans made their big bid last May to capture Tito and wipe out his Partisan army, members of the ACRU were in his headquarters making evacuation arrangements. The Air Crew Rescue men escaped from the Nazi paratroopers, found a British "puddle jumper" on a little airstrip, and got back to their base in Italy. The information they brought back set the pattern for the subsequent attacks by the 15th Air Force which helped Tito out of this critical situation.

Although the ACRU's main task is to bring back American crewmen, they also have rescued Englishmen, New Zealanders, South Africans, Frenchmen, Poles, Czechs, Yugoslavs, Russians and Italians. Naturally, the rescued men are always jubilant over their good luck and they bring back with them fur hats and bright-colored blankets and ceremonial aprons and odd-shaped jugs of wine. When their rescue planes are about to take off, many of them toss their shoes to the people who have hidden them and cared for them. It's the most concrete expression of gratitude they can think of.

Variety of Combat

A B-17 made an emergency landing in German minefields right in the middle of a battle. Most of the crew members froze where they were until American sappers escorted them back to comparatively safe ground. Then for two days the Fortress crew learned the delights of ground combat —they were strafed by FW-190s while a Nazi railway gun blasted at the building in which they were billeted. Returned to their base, all members of this crew are frequently to be heard singing "The Air Corps Song" with great gusto.

Sawmill

In the past year, each week has seen a fatal or near-fatal accident in the Continental United States, caused by personnel walking into turning propellers. Of the 53 accidents tabulated in a recent report by the Office of Flying Safety, 34 were fatal, 17 resulted in major injury and only two

allowed the prop-walkers to get away with minor injuries.

Although in most cases the victims actually walked into the propellers from fore or aft, one case is reported of a crew chief who, instead of using a service ladder, descended from the wing of a B-25 by sliding down a propeller blade. The engine was hot, fired, and the propellers turned, killing the man.

In another case, the bombardier of a B-24 attempted to sidle between the fuselage and the propeller while carrying camera equipment. He was struck by No. 3 propeller and killed instantly.

P-51 Rumble Seat

Probably the first case of hitch-hiking in a P-51 occurred during the early stages of the Allied drive across Normandy.

Returning from a sweep over the French hedgerows, Lt. Col. Bert Marshall, CO of the 355th Fighter Group, was forced down on a rolling potato field. As excited peasants began to swarm the plane, another P-51 pilot, Lieutenant Perry, came over and decided to risk a rescue. After making a successful landing and finding Colonel Marshall unhurt but a little chagrined, 6' 4" Lieutenant Perry, sitting on the lap of his CO, effected a successful but bumpy take-off.

Medical Flight Technicians

He wears aircrew wings, yet he has never been on a combat mission against the enemy. He is subject to air attack, but he cannot fight back. Some months he logs more flying time than many pilots. The cargo entrusted to his care carries the highest available priority. He is an enlisted man whose immediate superior is a woman. He is a medical flight technician assigned to Air Evacuation, either in the Air Transport or Troop Carrier commands.

Air Evacuation planes come right into the battle zones, collect casualties, and fly them to base hospitals and later to hospitals in the States. They also move patients between hospitals. Ordinarily, in each aircraft a flight nurse and a medical flight technician team up to attend the patients. But with the increased number of wounded, and the shortage of nurses, the tech often has been separated from his teammate and assigned to a plane to handle the job alone. The low fatality rate of patients evacuated by air—5 per 100,000 flights—attests to his ability.

A medical tech is a doctor, nurse, orderly, and morale builder combined. He feeds the wounded, changes dressings, gives plasma, administers drugs, manipulates bed pans, takes temperatures and gives advice to the sick and injured who need sympathetic attention as well as medical care. The abilities required of him are among the most unusual in the AAF, for he must be able to provide medical attention, play checkers and cards, and be acquainted with the latest Stateside gossip. And there are times when an enlisted man must inform the pilot of necessary changes in the flight schedule.

QUESTIONS
on Policy and Procedure

Q. May a husband and wife use their combined rights under the "GI Bill of Rights" in obtaining a guaranty of a loan from the Veterans Administration?

A. *Yes. Ex-Marine Pfc. Herbert J. Pugh and his wife, ex-Marine Cpl. Florence S. Pugh, were the first to use their combined rights. They purchased a house for $8,000, and the Veterans Administration guaranteed $2,000 for each of the veterans, making a total guaranty of $4,000, which is the maximum of 50 percent permitted under the law.*

Q. Are War Department Technical Manuals directive in nature?

A. *The Adjutant General advises that "Technical Manuals are normally issued 'for information and guidance.' As such, they are not directives in themselves, but present a correct procedure which should be followed except where unusual circumstances make deviations advisable. In some instances directives have been issued requiring compliance with some or all the provisions of a particular manual, such as AR 345-125 (18 Nov 1944) which directs that Service Records be maintained in accordance with TM 12-230."*

Q. May the oversea service bar be worn on the summer shirt?

A. *Yes. Sec. II, Cir. 298, WD, 1944, states that the oversea service bar will be worn on the service coat (or the jacket, field, wool, where issued in lieu of the service coat) and on shirts, winter and summer. (Note: Some personnel have been noted with oversea bars on their overcoats. There is no authority for such wearing of the bars.)*

Q. Is the family allowance made to the dependents of enlisted men exempt from Federal income tax?

A. *The entire amount of the family allowance is exempt from tax on the part of the beneficiary. The portion contributed by the Government is considered to be a gift, but the amount withheld from the pay of the enlisted man is part of his taxable income.*

Q. Can school and college credit be obtained for military training, service experience, and off-duty training?

A. *Yes. However, personnel on active duty should apply for school or college credit only for the purposes of meeting requirements for admission to courses, schools, or other educational institutions; qualifying for higher military ratings; planning their further military or civilian education. Evaluation of educational achievement should be requested by use of U. S. Armed Forces Institute Form 47 (revised September 1944), subject, "Application for Credit for Educational Achievement During Military Service." When properly filled out it should be mailed to the civilian school or college, not to USAFI. Additional information is contained in AAF Ltrs 34-14 and 34-9.*

Q. What is the authorized shade of battle jackets for officers?

A. *After present stocks of the dark shade battle jackets are exhausted, all officers purchasing this item are required to confine themselves to the purchase of regulation jacket, wool, serge, shade 33 (same as for enlisted men). Sec. IV, Cir 1, WD, 1945, indicates that this policy will permit conservation of elastique, barathea and whipcord, o.d. shade 51 (dark shade). Officers who have purchased the dark shade battle jackets are permitted to wear them until they are worn out. The battle jacket is an optional item for officers within the United States.*

Q. Is it necessary to forward Service Records by registered mail?

A. *No. In order to conserve manpower incident to processing registered mail, the practice of forwarding Service Records and other routine matter by such means will be discontinued and ordinary mail facilities will be utilized. (Sec VI, Cir 32, WD, 1945).*

Q. Where is the authority for an individual to wear oversea service bars recorded?

A. *Under "Remarks—Administrative" in the Service Record of enlisted personnel, and on Officer's and Warrant Officer's Qualification Cards (WD AGO Form 66-1 or 66-2, as the case may be) for officers and warrant officers. (Par. 6, Cir 268, WD, 1944).*

Q. When are bank statements obtained and made part of the voucher file for unit and similar funds?

A. *At the end of each month, upon change of custodians, upon change of station, and when the account is closed out.*

PREPARED BY THE OFFICE OF THE AIR INSPECTOR

Out of the hat

It is dangerous to fly too high when carrying patients who suffer from certain wounds. Head injuries, neuro-psychiatric cases, abdominal wounds, and lung injuries may be adversely affected by high altitude flying. On one mission from Bermuda to Miami, the medical tech discovered that one of his patients was having breathing difficulties. A quick check of the patient's card revealed that he was suffering from a lung ailment. The tech requested the pilot to bring the plane down low over the water. They flew the rest of the way between 100 and 600 feet and the patient arrived in Miami safely.

Evacuation planes are not marked with the Red Cross insignia because they fly war cargo into the battle zones. Consequently, they are fair game to the enemy at all times, and often have fighter escort during part of their flight. Several techs have been killed when their unarmed planes were attacked.

Surgical technicians are trained at the School of Aviation Medicine, Randolph Field, Texas. To be eligible, they must be graduates of a recognized Army medical or surgical school and must—because of the danger and hardships involved—be volunteers. They take the same courses required of flight nurses and are put through rigid basic training, drill, bivouacs, and mock warfare, in addition to classes in air evacuation.

They rank as technicians third grade, and are equivalent in grade to staff sergeants. Their base pay of $96 is augmented by an additional $60 per month flying pay, 20 percent for foreign service, and in the U. S. a travel expense allowance for air time. They are another example of the important, dangerous, exacting, unsung work being done by AAF personnel all over the world.

Rotation Policy

One service squadron of the 13th Air Force has been overseas 29 months, enjoying the character-building attributes of jungle life, being shelled, strafed and bombed. Recently they received a quota enabling seven of them to return to the States for furlough reassignment. They drew straws for the chance, although the poker players among them had other ideas.

Obituary

In the February issue of AIR FORCE appeared an article called "Shock Waves at 600 MPH." It described Wright Field's recent experiments in compressibility at high speeds and reported the achievements of Maj. Frederic A. Borsodi, who, while diving a P-51D from 40,000 feet, was the first man ever to see a compressibility shock wave on an aircraft wing—and who later installed a camera in his plane and became the first man to photograph such a phenomenon.

Major Borsodi

On January 31, 1945, Major Borsodi was killed while testing a combat plane in England. He was 28 years old, and, at his death, was Chief of the Fighter Branch, Flight Section, Air Technical Service Command, Wright Field. Formerly employed as a test pilot by the Pratt & Whitney Division of the United Aircraft Corporation, Major Borsodi entered the service August, 1942. He served for a year in North Africa, making 130 missions as a fighter pilot, before being assigned to Wright Field.

Drama

Arriving at an 8th Air Force Bomber Station to visit his son, whom he hadn't seen for two years, Col. Samuel Greason was one of the first to learn that the B-17 piloted by his son was the only one of the 457th Group's formation that failed to return from the 1,000-bomber assault on Berlin, February 3.

Colonel Greason, an officer on General Eisenhower's staff, was in the control tower when the group's Fortresses returned. One by one the bombers were accounted for and the name of the pilots checked off until only one remained—2nd Lt. Craig P. Greason.

Visibly affected, Colonel Greason nevertheless accepted the disheartening news stoically, buoyed up by veteran combat men's assurances that his son might have made an emergency landing at another base.

The following morning he was attending services in the base chapel when he was notified that his son was safe, having landed a damaged Fortress safely in friendly territory on the continent. Several hours later, the entire crew was brought back to their station in an Army transport plane, and Colonel Greason was the first to greet his son.

Big Toe Bombsight

When the CO of a 9th Air Force B-26 group put out a call for enlisted men to act as bomb-togglers, T/Sgt. Miller C. Petersen volunteered. He flew his first mission on D-day for Normandy and became very proficient at releasing his bombs when he saw the lead plane of his formation drop its load. But one day he was riding in the nose of a B-26 called "Booger Red," piloted by 1st Lt. John Sivert, and they had a lot of engine trouble. Unable to keep up with the formation they fell behind but continued to the target, even though they were too short of power to take evasive action. As a result flak got one engine before they went into their bomb run.

When they came over the target after the rest of the formation had bombed, Petersen saw that the bridge they were to destroy was still standing. With no bombsight he took a deep sigh, guessed, and toggled.

Precision guessing

He hit the bridge and destroyed it, navigated the wounded Marauder back to base, and accepted the DFC. Only one thing bothers him—people accuse him of bombing off his big toe. "It was precision," he says. "Precision bombing."

Survivor

Behind the injuries which cut short the combat career of S/Sgt. Frederick O. Walsh, engineer and top-turret gunner, is one of the most dramatic escapes from death ever experienced by an 8th Air Force airman. Walsh, formerly an aircraft mechanic and instructor at Brookley Field in Mobile, was one of four men who escaped when two bombers collided in mid-air near

London, taking 14 flyers to their death.

"I was checking my gun turret as our formation swung in a wide arc across the sky near London and headed for the continent," Walsh explained. "Our bomb bay was filled with heavy explosives for a German target. Suddenly I glanced up. Another bomber was slipping wildly down on us. There was only time to shout a warning into the interphone before the other plane pancaked onto us with a grinding roar. Almost immediately, there was a sharp explosion and I lost consciousness.

"When I came to, I was lying at the base of my turret," he went on. "The whole cockpit was ablaze. I could see the skipper and copilot slumped in their seats, their bodies burned almost black. I thought of getting out, but at once discovered that my chute was gone.

"It was a terrible realization. I glanced at the escape door, leading into the bomb bay, and found myself looking into the sky. The plane had been blown in half by the explosion and the wind was whistling through the opening.

"Then I saw my parachute dangling in space and held only by part of the harness which caught on a jagged edge of metal a few feet from me.

"I was almost afraid to reach for it, for fear it might slip out of my grasp. Finally I grabbed it and slipped it on. The whole cockpit was flaming as I stepped out the escape door. My chute opened when I was only a few feet above tree-tops and I landed on the ground with a rough jolt, too stunned and exhausted to move. Villagers from a nearby English town gathered around me and helped me up."

Handy Heater

Sometimes the nights are chill in the Mediterranean area, and that's when Pvt. Charles Stafford is in greatest demand. A tractor operator at a chemical depot of the 15th Air Force Service Command, Private Stafford is also an accomplished fire eater. He's an ex-circus performer but now his shows are mainly for the benefit of his buddies whom he entertains at the drop of a match.

Deicer de luxe

PLANE BONERS

Analyzed by Veteran Pilots

WILL ROGERS FIELD, OKLA.—The pilot of a P-38F had started his take-off run. Upon reaching the first intersection, the tail booms began dragging, indicating that the landing gear had started to retract. About 1,000 feet further along, the props began digging in the runway. The airplane was seen to leave the runway, gain an altitude of about 20 feet. Then the left wing dropped, the nose of the plane struck the ground and the plane cartwheeled 180 degrees to the left.

Comment: This eager pilot was obviously ready to leave the ground before his airplane. Before you start retracting your gear, it's a good idea to be sure that your airplane is airborne.

SIOUX CITY, IOWA—The copilot of a B-17F made a landing and, at the end of the landing roll, requested that the tailwheel be unlocked. After doing this the pilot—acting as copilot—mistook the landing gear switch for the flap switch and retracted the landing gear.

Comment: This is the type of man who may some day release his bombs without opening the bomb bay doors.

DOVER, DEL.—After landing, the pilot of a P-47D taxied along behind a FOLLOW ME truck to the parking area. The driver of the truck drove through a space between an oil truck and another airplane. The space was not wide enough for the P-47 to follow with safety, and when the pilot saw that he was about to hit the oil truck, he applied his brakes and nosed over.

Comment: A FOLLOW ME truck should not be followed just because the words are nicely painted on the back. If you don't think you have adequate room in which to taxi, you should stop your airplane long before danger of collision becomes imminent, and demand a safer path.

ABILENE, TEXAS—As he approached his home town, the leader of a two-plane flight of P-47Ds started a gradual dive. When he was down to 500 feet, his wingman decided to pull up. The leader joined him, but again flew low over the town while his wingman stayed at 2,500 feet. The next thing seen by the wingman was a puff of smoke north of the town which his leader was buzzing. According to a witness, the pilot of the lead plane executed a slow roll on his last pass over the town at about 200 feet. He started into another, lost altitude, and crashed into a pasture. The airplane was a total wreck and the pilot was killed.

Comment: The pay-off for the grandstand pilot who violates regulations against low flying is always a severe fine and sometimes more. In this case the pay off was an untimely death. The pilot had also chalked up another strike against himself by violating TO 01-65b-87 which prohibits slow rolls in P-47s equipped with bubble canopies.

PUEBLO, COLO.—While awaiting the signal from the tower for the take-off, the pilot of a B-24J noticed smoke in the cockpit. He informed the tower, and fire equipment was immediately dispatched to the plane. Approaching the airplane on the fire truck, a civilian fireman jumped off, pulling the hose with him, and headed for the propeller near the front bomb bay section. He walked straight into No. 3 propeller and was instantly killed.

Comment: This is another of those tragedies which result from thoughtlessly approaching turning props, but in this case the pilot's failure to stop all engines upon the arrival of emergency equipment is partly to blame.

TONAPAH, NEV.—On the cease firing order of an instructor pilot, the pilot of a B-24J pulled up to go around during a gunnery mission. The armorer who was feeding the ammunition belt into the left waist gun lost his balance as the airplane pulled up and bumped the left waist gunner. This gunner grabbed at the gun for support and in doing so fired two bursts which plugged 15 holes into the left wing and disconnected the aileron.

Comment: If the left waist gunner had been wearing his safety belt, he would not have had to grab at his gun, or anything else, for support. Safety belts are common sense.

PIERRE, S. D.—Because of a rough engine, the pilot of a P-40N decided to return to the line where he attempted to clear the engine by running it up. He used excessive power in the runup, and while checking instruments failed to observe the position of the airplane in the relation to the ground. He nosed over.

Comment: The action of this pilot in returning to the line was commendable but he spoiled it all by allowing himself to become so engrossed in clearing up the trouble, that he overlooked the simple precaution of holding his stick back during the runup.

PREPARED BY THE OFFICE OF FLYING SAFETY.

NEW BOOKS
On Aviation Subjects

AT WAR

HELLDIVER SQUADRON. *Robert Olds.* Story of Carrier Bombing Squadron 17 in the Pacific. N. Y., DODD, MEAD, 1944.

NO TUMULT, NO SHOUTING: THE STORY OF THE PBY. *Lois* and *Don Thorburn.* An account of the people who make and fly Catalina patrol bombers. N. Y., HOLT, 1945.

THE STORY OF THE U. S. ARMY AIR FORCES. *Jim Ray.* Men and machines that make up the aerial fighting force of the U. S. Army. GARDEN CITY, N. Y., GARDEN CITY PUBLISHING CO., 1945.

POSTWAR

THE VETERAN COMES BACK. *Williard Waller.* A comprehensive discussion of the returning veteran's problems. N. Y., DRYDEN PRESS, 1944.

TECHNICAL

AIRCRAFT ARMAMENT. *Louis Bruchiss.* The history and development of aerial firepower. N. Y., AEROSPHERE, 1945.

AIRCRAFT MECHANICAL DRAWING. *D. J. Davis* and *C. H. Goen.* The essential principles and skills required for a knowledge of practical aircraft drafting. N. Y., MC GRAW-HILL, 1944.

INTERMEDIATE AERODYNAMICS. *R. W. Truitt.* Facts and theories for aerodynamic applications with descriptive material and mathematical explanations. N. Y., PITMAN, 1944.

MANUAL OF PHOTOGRAMMETRY. *American Society of Photogrammetry.* A thorough treatise dealing with all aspects of the subject. N. Y., PITMAN, 1944.

ROCKETS, DYNAMOTORS, JET MOTORS. *A. L. Murphy.* Questions and answers on the rocket and jet propulsion principles in motors. LOS ANGELES, WETZEL PUBLISHING CO., 1944.

YEARBOOKS AND HANDBOOKS

ENGLISH-SPANISH AND SPANISH-ENGLISH DICTIONARY OF AVIATION TERMS. *Juan Klein Serralles.* Dictionary key to the aviation terminology of Latin America. N. Y., MC GRAW-HILL, 1944.

THE LANGUAGE OF WORLD WAR II. *A. M. Taylor.* Abbreviations, captions, quotations, slogans, titles, other terms and phrases. N. Y., H. W. WILSON, 1944.

THE SOLDIER AND HIS FAMILY; FEDERAL BENEFITS AND HOW TO GET THEM. A comprehensive compilation based on official sources. HARRISBURG, PA., MILITARY SERVICE PUBLISHING CO., 1944.

SURVIVAL: LAND, SEA, JUNGLE, ARCTIC. *Airlines War Training Institute.* A manual for aircraft crews and others forced down, adrift, or getting back to help in all parts of the world. WASHINGTON, INFANTRY JOURNAL, 1944.

These books are available to AAF personnel through the AAF Field Technical Library Service, which provides for technical libraries at all major installations. For personal copies contact the publishers or retail bookstores. List compiled by AAF Headquarters Library.

Command Changes

Recent changes in AAF command and assignments:

Maj. Gen. Hubert R. Harmon, from Commander, Personnel Distribution Command, to Assistant Chief of Air Staff, Personnel.

Brig. Gen. Frederic H. Smith, Jr., from Deputy Chief of Air Staff, to commander, 5th Fighter Command.

Brig. Gen. Reuben C. Hood, Jr., from Deputy Chief of Staff for Operations and Training, Continental Air Forces, to Deputy Chief of Air Staff.

Start of the long pull

Arctic Rescue

An ATC C-47 crashed amid the glaciers of the Alaska range of mountains. 11th Air Force and ATC planes spotted the wreckage, lying near the top of a nameless peak of the McKinley Group—in the middle of an area marked on the map as "Unsurveyed."

The condition of the wreckage made it clear that the 19 men aboard the plane—crew of three plus 16 men who were returning to the United States on furlough—could not possibly have lived, but it was decided to send an expedition to the scene of the disaster for the purpose of evolving a technique of land rescue in "impossible terrain," to recover the bodies, and to determine the cause of the crash.

A 44-man party led by Grant Pearson, veteran mountain climber and Chief Ranger of McKinley Park, set out to make the attempt in mid-winter. With equipment valued at nearly a million dollars they successfully reached the wreckage and returned to base without a casualty. Food and supplies were dropped to them by Troop Carrier aircraft, communications maintained by radio.

Alaskans count it the most hazardous such expedition ever attempted, and certainly the largest and most elaborate. From it a plan of procedure that will be used in future land rescue work has been evolved.

Free Entry

Ingenious ASC soldiers in ETO solved their Christmas shopping problems and beat Parisian prices at the same time.

From an abandoned Jerry warehouse, they gathered 1,000 pairs of real wooden shoes, branded "Paris, 1944" on the toes and then coated each shoe with a high glaze.

"I wouldn't be surprised if the girls back home wore 'em," commented one GI. "They wore 'wedgies' didn't they?"

Getting Well with Music

The tinkling strains of many an old familiar song now are heard in AAF hospitals as the latest wrinkle in convalescent training comes into use. A poster series and an Air Forces Manual combine to invoke

the possibilities of music as an immensely successful healer for both body and mind.

The poster series, "Make and Play Your Own Musical Instrument," first of all shows the patient how to make a "Xylette," or miniature piano, in a hospital workshop. Once the piano is constructed, the patient takes up AF Manual No. 29 (Book I), called "Sit Down and Play," and learns how to play the instrument by a simple, direct piano-course method.

Both the construction of the piano and the music practice relieve the problems of too little exercise and too much boredom usually confronting the patient. He has the thrill of building a workable device and then learning to utilize it. Especially is the process valuable in the case of injured hand and arm muscles.

Both poster series and manual, copyrighted by Harold B. Rhodes, formerly of the Air Forces, have been published by the Training Aids Division, Office of Assistant Chief of Air Staff, Training. Copies of both may be procured through channels from the Office of the Air Surgeon.

Wedding

At 9th Air Force Headquarters in France, romance is rampant. Recently there was a double all-GI wedding with Sgt. Francis P. Flynn marrying Wac Cpl. Alma C. Winn. As soon as the Flynns were Flynns they acted as attendants for the marriage of Sgt. George Morris and Wac Pfc. Emma Lou Smythe.

Crash in Burma

Sometimes liaison pilots are not so lucky. Taking off from short runways with heavy loads, they run into trouble. A couple of photographs so dramatic that they look like movie stills came into this office recently. They show what happened when a liaison plane piloted by Sgt. W. H. Latta of Rochester, N. Y., crashed into a tree. Latta suffered a fractured leg and lacerations of the face.

His passengers, three wounded infantrymen of the Mars Task Force being evacuated from the jungle battlefield, were rescued with ladders, ropes, and pulleys, and treated for additional shock.

The plane was out on a limb—but the pilot came out alive

Battle Honors

Ten more AAF units have been awarded Distinguished Unit Citations since the listing (complete to Jan. 1, 1945) published in the March issue of AIR FORCE. They are presented below in the chronological sequence of the actions for which they were cited, together with a digest of the citation as printed in General Orders of the War Department.

47th Bombardment Group (L) Feb. 22, '43

Profoundly influenced the course of the war in the North African Theater after the German breakthrough at Kasserine Pass. On February 21, when the enemy breakthrough threatened to become an Allied disaster, our air forces received urgent orders to give all possible cooperation in stopping their advance. In the 11 missions flown on the next day, the 47th Bombardment Group attacked the advancing enemy armor with such devastating effect that before nightfall they had been driven back in full retreat.

95th Bombardment Group (H) Mar. 4, '44

Brought to a successful conclusion our country's first daylight combat operation over the capital of Germany, despite treacherous cloud conditions and inadequate fighter escort. Though the energies of the entire 8th Air Force were devoted to this vital operation, only the 95th Bombardment Group (plus 12 planes of another group) got through to the primary target of Berlin to bomb it for the first time by daylight.

May 6-20, '44

10th Photographic Group (Reconnaissance)

Executed missions of highest priority in photographing the beaches of the continent prior to the assault by our ground forces on D-day. In order to obtain oblique photos of the requisite clarity and detail, the pilots of this group flew their unarmed P-38s as low as 25 feet in the face of fire from some of the strongest antiaircraft installations in western Europe. By the successful

TRAINING AIDS

Newly Standardized for Field Use

FILMS

TF 1-3457, AAF Instructional Methods As Demonstrated in a Flexible Gunnery School—Expounds proper teaching methods, shows common teaching mistakes. Principles apply equally well to instructors in any field, although specific examples are drawn from flexible gunnery classrooms and firing range. Running time: 21 minutes.

TF 1-3458, Making a Gunner—Story of typical gunner, showing how he is trained and stressing importance of his part in a combat bomber team. Designed to orient prospective gunners. Running time: 18 minutes.

TF 1-3452, Operation of the K-10 and K-11 Compensating Gun Sights—Using animated character "Trigger Joe," explains simplified theory on which K-10 and K-11 sights work, plus easily understood physical breakdown of their working parts. Running time: 10 minutes.

TF 1-3438, Tactical Use of the Glider Pick-Up—Demonstrates principles and methods of tactical use of glider delivery and pick-up by tugplanes. Running time: 12 minutes.

TF 1-3455, Loading the C-47—Shows how to load the C-47 with men and equipment quickly and well, then unload it, ready for action. Running time: 7 minutes.

TF 1-3454, B-17 Troop Carriers—How Fortress, converted, can be used as a troop carrier. Running time: 7 minutes.

TF 1-3668, Assembly and Rigging of the P-63 Airplane. Running time: 25 minutes.

TF 1-3688, Preflight and Daily Inspection of the P-63. Running time: 19 minutes.

FS 1-2094, Improvised Sanitary Devices from AAF Salvage Material—Describes construction, from salvage, of many efficient devices to increase comfort and to protect health of personnel.

PUBLICATIONS

First Aid in Flight (AF Manual No. 45)—Pocket-size booklet briefing lifesaving during flight.

Syllabus for Bombing Trainer, Type A-7—General suggestions for instructor and outline of trainer course.

Camouflage Principles—A report of AAF Board concerned with complex theories of camouflage of aircraft in flight.

Radio Operator's Information File—Comprehensive coverage on all procedures and problems of airborne radio operators. Distribution to all airborne radio operators now being made.

Lecture A-III: The Arctic, Survival—Concisely itemized information on Arctic Survival, with drawings.

Appendix to Arctic, Desert, Tropic School Lectures—Separate publication that is a digest of incidents of survival in the Arctic, Desert and Tropics.

(Copies of both lectures above are available from Arctic, Desert and Tropic Branch, AAF Tactical Center, Orlando, Fla.)

Let's Walk (AF Manual No. 49)—Highly important non-technical publication showing directly and simply how maimed soldiers can rebuild lives by rebuilding their bodies and learning valuable techniques of getting around.

DEVICES

Supplement No. 2 to Training Aids Catalog, Part I, Training Devices—Illustrations, descriptions and applicable technical data for 11 newly standardized devices.

GRAPHICS

Ground Safety Posters—Three new posters in the ground safety series, these depicting the misadventures of a cartoon character called "Pvt. Wilbie Hoitz." Distributed on planned basis and additional copies not available.

RECOGNITION

Recognition Films—TF 1-3712, U. S. Navy Aircraft Recognition Test No. 5 (U. S. Army, U. S. Navy, British and Jap Aircraft).

TF 1-3713—U. S. Navy Aircraft Recognition Test No. 7 (Pacific Theater).

TF 1-3714—U. S. Navy Aircraft Recognition Test No. 9 (All Theaters).

TF 1-3715—U. S. Navy Aircraft Recognition Test No. 10 (All Theaters).

Information on the availability of training aids listed in this column, unless otherwise indicated, may be obtained from the chief, Training Aids Division, Army Air Forces, One Park Avenue, New York 16, N. Y., upon request through channels.

accomplishment of the assigned task, the group obtained excellent photos of the enemy's coastal defenses, from which our assault troops were briefed.

352nd Fighter Group (S) May 8, 1944

Broke the enemy's attempt to frustrate a bomber operation against Brunswick, Germany, by engaging a numerically superior force of FW-190s and ME-109s in an hour-long battle. During and after the initial flight to the deck from 20,000 feet, an unprecedented aerial battle took place with pilots of this unit attacking without regard to the position and strength of the opposing forces. The tactical skill and aggressiveness of the 352nd Fighter Group are reflected in the fact that only one pilot and aircraft was lost in this action, to 27 enemy aircraft shot down.

June 6-14, '44

819th Engineer Aviation Battalion (9th AF)

Completed an emergency landing strip by nightfall of D-day in Normandy after advance elements landed at H plus three hours. In the next seven days the members of this battalion advanced inland to construct a refueling and rearming strip that was operational on the date originally scheduled, thereby greatly facilitating aerial operations in northern France during a critical phase of the combat.

June 6-July 16, '44

834th Engineer Aviation Battalion (9th AF)

Built an emergency landing strip in 16 hours on a site reconnoitered in the field, when the terrain previously selected for the strip still remained in enemy hands on D plus 1. Within 24 hours the runway had been lengthened to 3,400 feet, permitting its use by transports evacuating the wounded from the Normandy battlefront. Moving up behind the advanced infantry elements, the battalion took over the area originally scheduled and by June 14, converted it into an operational airfield, despite enemy snipers and mines.

376th Bombardment Group (H) June 16, '44

Accurately bombed an oil refinery at Bratislava, Czechoslovakia, despite persistent enemy opposition lasting for more than half an hour. Bombs were concentrated in the target area, inflicting grave damage to vital installations and supplies.

HOMER

AIR FORCE MAGAZINE

"I see the old man's had his TO increased again. Now maybe we can get a rating."

455th Bombardment Group (H) June 26, '44

Inflicted heavy damage on an oil refinery at Moosbierbaum, Austria, after surviving attacks by nearly 150 enemy fighters enroute to the target. The spirit of the attack was typified by two bombers set aflame by enemy fire, which nevertheless completed the bombing run and then exploded in mid-air. The gunners of the group are credited with destroying 34 enemy aircraft. Ten bombers of the group did not return.

Sept. 23, '44

340th Bombardment Group (M)

Demonstrated unsurpassed teamwork of maintenance, operations, intelligence and flying personnel in executing an attack by B-25s on the Italian light cruiser Taranto which the enemy planned to scuttle in the mouth of La Spezia Harbor. Despite intense antiaircraft fire, the first three flights covered the bow, beam and stern of the ship with so many hits that it capsized before the final flight could release its bombs. This culminated a long and unbroken series of flawlessly executed attacks by this group on pinpoint and area targets.

Dec. 23-26,'44

391st Bombardment Group (M)

Contributed vital assistance to the ground forces at a most critical time by bombing railway viaducts, bridges and other communication targets in Germany behind the Ardennes battleground. These included the railroad viaduct at Ahrweiler and the bridge at Kons Karthaus, destroyed in the face of fierce enemy aerial and ground defense.

Pick-a-Back

After an escort mission over Germany some P-51s of the 55th Fighter Group went down through clouds to hit the deck. When they broke through they saw five odd-looking enemy planes flying at about 500 feet. "At first I thought they were buzz-bomb equipped bombers," said Lt. Col. Elwyn G. Righetti, who was leading the Mustangs. "Then I broke left and got on the tail of the middle Jerry of the lead flight. A long burst from my guns scored hits and the double plane blazed up and went down in a steep dive. A few seconds later I saw an explosion.

"I turned on the second unit, still not knowing what I was attacking, and opened fire from 500 yards. Then I discovered that the "buzz-bomb" was actually an FW-190 with props turning riding atop a twin-engined bomber, which I later learned from my combat films was a JU-88. At my first burst the JU-88 evidently jettisoned, went into a shallow dive and crashed in a small village.

"The FW, relieved of the bomber, tried evasive action but I managed to shoot it down."

All five of the pick-a-back planes were shot down. Interrogation of the other pilots revealed that the two aircraft were held together by two steel tripods, with the FW controlling flight and both planes contributing power for the combination to stay in the air.

AIR FORCE MAGAZINE

"Delighted to see you. We've been getting such inferior grades of meat lately."

February Blitz

Now that the returns are all in, the figures show that the greatest sustained aerial attack in history was mounted by the AAF in mid-February, before Allied ground forces pushed off for the Rhine on the 23rd, and across the Oder from the East shortly after. Between February 14 and 28, 76,000 tons of bombs were dropped on German targets, making the famed "Big Week" of 1944 (strikingly enough, on the five days from Feb. 20 to 24) seem like a baby blitz. The AAF's February average this year was a massive 5,000 tons a day, more than 3½ times the 1944 average.

Much of the total was directed against targets on the Eastern Front, now within striking range of planes from England, France and Italy. Sorties totalled 66,577, with fighters flying 33,094, heavies 25,273 and mediums 8,210. Little wonder that Nazi spokesman described the weight of air blows as "well nigh intolerable." ☆

HOW SHARP ARE YOU?

QUESTIONS

1. What are the men doing?
2. How many men are standing on the wrecker?
3. How many men are standing on the crew chief's stand?
4. How many hub caps can be seen on the wrecker?
5. What are the numbers on the back of the wrecker?
6. There is a searchlight on the top of the wrecker that is faced toward the airplane engine. True or false?
7. Is the hook of the C-3 wrecker hanging free?
8. Of the six men in the photo, how many are hatless?
9. Is it a radial or inline engine?
10. How many men are stripped to the waist?

ANSWERS ON PAGE 60

PARACHUTES LOST

2308B	42-192520P	42-453553I
694344K	42-196159U	42-461771K
38- 2068C	42-196160U	42-466169C
40- 5357A	42-196165U	42-467367F
41- 952C	42-210298P	42-572319E
41- 6781C	42-214069C	42-572352E
41- 1052C	42-220847F	42-648713C
41- 16910S	42-221925K	42-659852K
41- 40252P	42-230985J	42-659860K
41- 63102C	42-236063T	42-659864K
42- 910D	42-264018F	42-660059K
42- 5707Q	42-270662K	42-672851I
42- 5968G	42-275567I	42-734320C
42- 7500Q	42-297823J	42-781235F
42- 8343C	42-333200F	42-1036946I
42- 22784F	42-387495Y	43- 5288E
42- 43207X	42-392642I	43- 6798E
42- 46261V	42-416564F	43- 8023E
42- 65417K	42-420580I	43- 8521E
42- 67918C	42-426446H	43- 8687E
42- 85226F	42-447989I	43- 16795O
42-146582N	42-450631J	43- 54314H
42-147974L		43-759541W

Return to field indicated by letter after number as keyed below

A—Coffeyville Army Air Field, Coffeyville, Kan.
B—Box 1303, Tulsa, Okla.
C—Dale Mabry Field, Tallahassee, Fla.
D—Shaw Field, Sumter, S. C.
E—Hobbs Army Air Field, Hobbs, N. M.
F—Wendover Field, Utah
G—Cochran Field, Macon, Ga.
H—Orange Country Army Air Field, Santa Ana, Calif.
I—Alliance Army Air Field, Alliance, Neb.
J—Lafayette Army Air Field, Lafayette, La.
K—Malden Army Air Field, Malden, Mo.
L—Army Air Base, Abilene, Texas
N—Harlingen Army Air Field, Harlingen, Texas
O—McCook Army Air Field, Neb.
P—Selman Field, Monroe, La.
Q—La Guardia Field, New York
R—West Annex, Porter Bldg., Kansas City 2, Mo.
S—Luke Field, Phoenix, Ariz.
T—Gunter Field, Ala.
U—Army Air Field, Lake Charles, La.
V—Perrin Field, Sherman, Texas
W—451st AAF Base Unit, Salinas, Calif.
X—APO No. 831, c/o PM, New Orleans, La.
Y—306 Guaranty Bldg., 6331 Hollywood Blvd., Hollywood 28, Calif.

FOUND

42-204671

HELD BY: Coffeyville Army Air Field, Coffeyville, Kan.

Rendezvous

(Continued from Page 3)

the navigator's position on the B-29 is probably more cramped and generally unsatisfactory than in any other type of bombardment aircraft.

If the article, "The B-29 and You," was in any way an attempt to let navigators who will eventually be assigned to the B-29s know what is in store for them, it is very much in error.

Maj. H. C. McAuliff, Washington, D. C.

Our Wright Field Office offers the following explanation:

"In the opinion of ATSC's Instrument and Navigation Branch, Equipment Laboratory, Engineering Division, the navigator's compartments on B-29s having four-gun turret installations are cramped. Remedial action is being taken to move the navigator's compartment slightly forward of the turret in late models of the Superfortress. The requirement for increased armament, however, necessitated the reduction of space available in the navigator's section until the relocation of his equipment could be made on production models of the B-29." Major Davis evidently had the improved model in mind, but he should have said so.—Ed.

Midnight Sardines

Dear Editor:

While sitting here on the midnight shift, munching crackers and sardines (very good) I happened to pick up the November issue of AIR FORCE and started to read it. . . .

When I came to your article "Lifeline to the USSR" I noticed the map on Page 25. Perhaps some one has already told you about the mistake on this map. If not, you are being told now.

Since Northway is rather a small station on the ferry route we don't get on many maps. When we do get the pleasure of seeing Northway on the map we are overjoyed. However it sort of riles us to see that we have been put on the wrong spot on the map. If you will check a military map that has us listed I believe you will find that we are in Alaska and not in Canada. . . .

Seriously, we aren't kicking too much about the mistake on the map. There isn't too much to do since this is an outpost so we do whatever we can to make the time pass. This little incident gave me something to do for a few minutes. So long and you have a swell magazine.

Cpl. C. K. Charles, APO 976

Correct: Northway is located between Fairbanks and Whitehorse in the eastern section of Alaska.—Ed.

Twenty-Four Years Ago

Dear Editor:

I have before me here in Italy a copy of your December issue. On "The Album" page the reading material under one picture says in part, "1911. Lt. M. D. Crissy, with blockbuster in hand, was the first man to toss a bomb from an airplane."

In 1911 the Honorable Ben Johnson,

(Continued on Page 57)

AAF QUIZ

WHAT'S 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. Membership in The Blister Club is composed of
- A. *Blister gunners*
- B. *B-29 crews*
- C. *Escapees who walked into neutral territory*
- D. *AAF personnel assigned to the Infantry*

2. The A-26 is a modified version of the
- A. *B-25*
- B. *A-20*
- C. *B-26*
- D. *B-24*

3. "Droop-Snooting" refers to
- A. *Intruder aircraft*
- B. *A type of bombing*
- C. *Map making*
- D. *Photo-reconnaissance*

4. Attacking targets on Borneo and the Celebes was the principal assignment of the
- A. *13th Air Force*
- B. *12th Air Force*
- C. *7th Air Force*
- D. *11th Air Force*

5. The term "little fat friends" usually refers to
- A. *Ball turret gunners*
- B. *K-rations*
- C. *B-24s*
- D. *P-47s*

6. Personnel returned from overseas may continue to wear the shoulder sleeve insignia of their former air force after they are reassigned
- A. *True*
- B. *False*

7. In 1944, the Air Transport Command evacuated approximately how many casualties from the war theaters to the United States?
- A. *3,000*
- B. *60,000*
- C. *30,000*
- D. *10,000*

8. The initials CAF stand for
- A. *Canadian Air Force*
- B. *Calling all frequencies*
- C. *Continental Air Forces*
- D. *China Air Force*

9. The speed of sound is
- A. *650 feet per second*
- B. *2,200 feet per second*
- C. *845 feet per second*
- D. *1,100 feet per second*

10. Balikpapan is located in
- A. *New Guinea*
- B. *China*
- C. *Borneo*
- D. *The Philippines*

11. The American 90 mm antiaircraft gun can fire how many 42-pound shells a minute?
- A. *5*
- B. *20*
- C. *10*
- D. *15*

12. The C-109 is a
- A. *Modified version of the C-78*
- B. *New six-engine transport plane*
- C. *B-29 used as a fuel carrier*
- D. *B-17 used to evacuate wounded*

13. In radio parlance, CW stands for
- A. *Current wire*
- B. *Communication watt*
- C. *Channel wavelength*
- D. *Continuous wave*

14. The B-29 prop is how many feet in length?
- A. *16*
- B. *10*
- C. *22*
- D. *13*

15. The Irving II is a Jap
- A. *Twin-engine bomber*
- B. *Night fighter*
- C. *Transport*
- D. *Four-engine bomber*

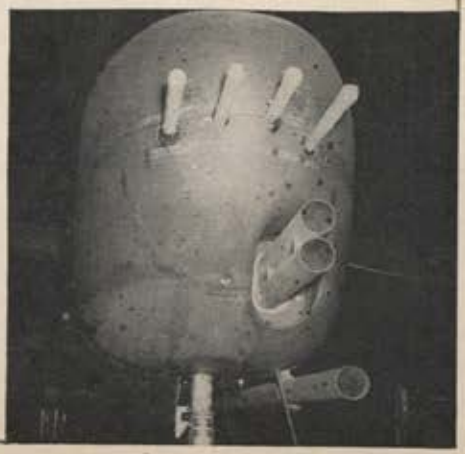
16. The term "bogies" refers to
- A. *Enemy bombers*
- B. *Unidentified aircraft*
- C. *Enemy fighters*
- D. *Antiaircraft guns*

17. Isley Field is located on
- A. *Saipan*
- B. *Luzon*
- C. *Guam*
- D. *Morotai*

18. If, on a combat mission, you are instructed to observe radio silence, you should turn off the VHF command set
- A. *Yes*
- B. *No*

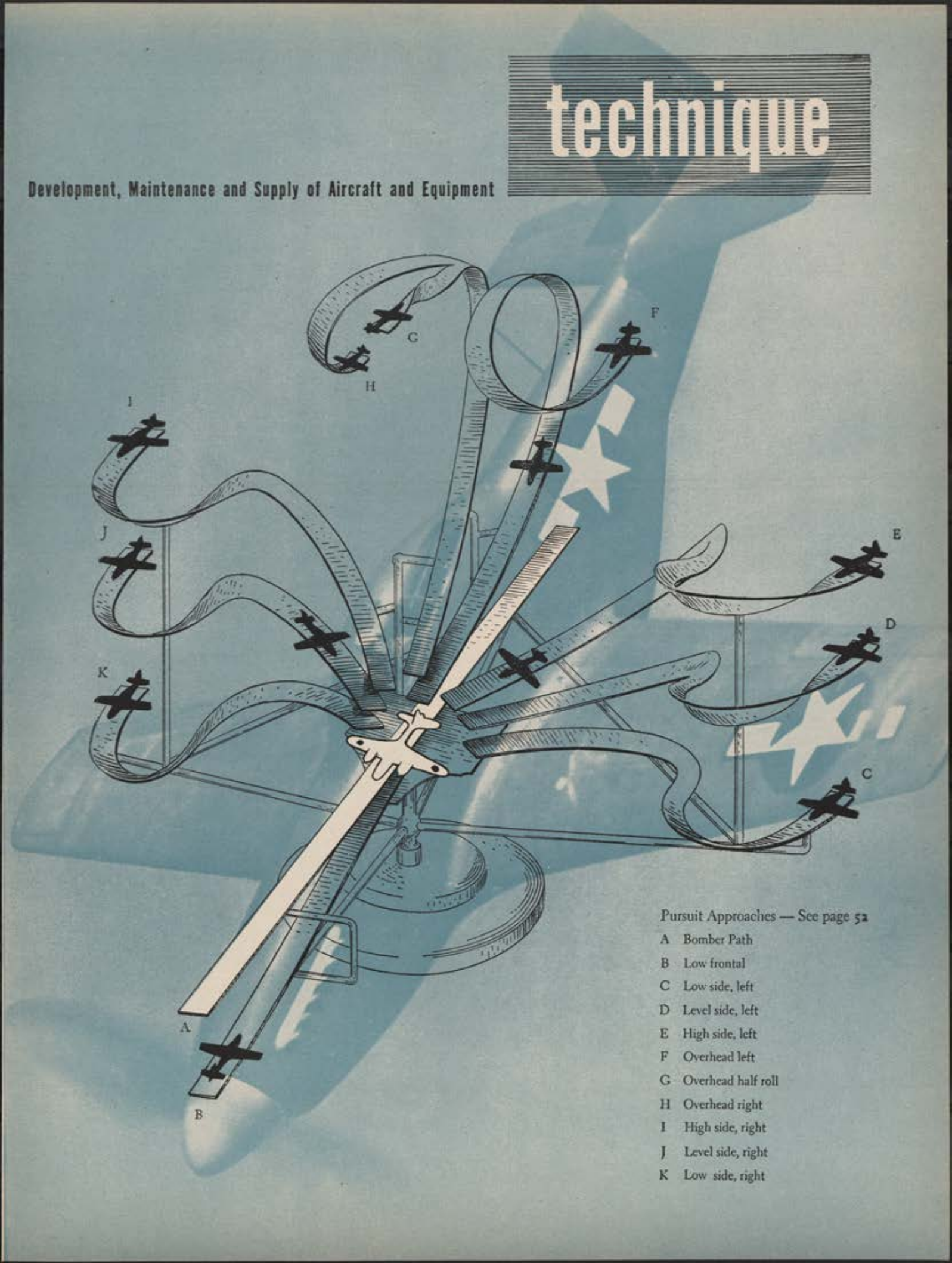
19. Here are the locations of three Redistribution Centers. Name the fourth
- A. *Santa Monica, Calif.*
- B. *Atlantic City, N. J.*
- C. *Miami, Fla.*
- D.

20. Identify this plane ↓



technique

Development, Maintenance and Supply of Aircraft and Equipment



Pursuit Approaches — See page 52

A Bomber Path
B Low frontal
C Low side, left
D Level side, left
E High side, left
F Overhead left
G Overhead half roll
H Overhead right
I High side, right
J Level side, right
K Low side, right

Frangible Bullets

In a new gunnery training program, plastic frangible bullets are fired at specially armored and equipped P-63s so that gunners in bombing planes may improve their marksmanship by shooting at "live" targets.

With gunners blazing away at them —just as they would against attacking enemy fighters—pilots of these Kingcobras make daring passes from every angle. When bullets hit the plane's armor-plated skin, the plastic pellets splatter harmlessly and a large light in the nose blinks on for two seconds and then off again, like a pinball machine, telling the gunner that his aim has been accurate. Approximately 110 microphone pick-ups located under the dural deflector plates on the fighter transmit electrical impulses for the signal, while an additional automatic recorder in the P-63 cockpit tabulates all hits so each gunner can be radioed his score.

The shatterable bullet which makes this superior type of gunnery training possible, represents two years of tests and study by AAFTC, National Defense Research Committee and ATSC engineers, as well as ballistic experts and laboraticians at Michigan, Duke and Princeton universities. The perfected result is a lead-plastic composition bullet molded and baked like a clay marble which is tough enough to withstand the rugged treatment of a machine gun, yet so brittle that it pulverizes upon impact. It can be inserted in a .30 caliber shell casing with a minimum powder charge, and despite a muzzle velocity of 1,360 feet per second, will not puncture a piece of thick glass beyond 200 yards.

The first air-to-air firing with these frangible bullets was against an armored A-20 called the "Alclad Nag" in the late spring of 1944 at Fort Myers, Fla. After the test, the pilot reported, "The bullets sounded like rain-drops and did no more damage than water"

As a target plane, however, the A-20 was too slow and could not execute high-speed fighter tactics. Use of the P-63 for this purpose seemed indicated, since its thin, bullet-shaped nose had minimum frontal exposure and its engine and cooling ducts afforded built-in protection. Armor plate modifications increased its normal weight to 10,000 pounds gross, cut about 50 mph off its top speed and reduced its maneuverability. But at 25,000 feet—the selected firing altitude—the Kingcobra still presented a fast, difficult target.

During a recent practice session against new P-63s, hit recorders showed that gunners in a B-17 using standard training sight equipment and flexible .30 caliber guns firing frangible bullets, scored approximately 100 hits during 10 to 12 attacks by the Kingcobras.

Our New Aerial Armament

More guns, faster shooting, greater sighting accuracy, precision gunlaying and remote turret control are only a few of the elements of greater firepower now packed into the armament of AAF bombing planes and fighters. 75 mm cannon have been converted from hand loading to automatic, some gunnery stations mount four instead of two .50 caliber machine guns, and fighters can carry four extra guns in droppable containers. In addition, rocket-firing devices have been improved, armor protection has been increased, bomb racks, releases and bomb control systems have been redesigned and bombsights have been perfected to drop the right number of bombs at the right instant with the right bombing angle on the right target. New electronic devices which permit bombing by precision instrument through overcast have also been developed. And more destructive weapons are on the way.

High on the list of armament im-

Target plane used for frangible bullet gunnery training. Nose bulb goes on when hits are recorded. At left is slug showing pulverization of composition tip.

Nose on latest model B-25 bristles with increased armament. Four machine guns are mounted above three fixed rocket launchers.

provements is the remote gunnery control system, first announced on the B-29 and now adapted for use in other planes, including the A-26 and P-61. By remote sighting and operation, a gunner is able to lash out at enemy planes without being blinded by the muzzle blasts of his own guns, without exposing himself in a plexiglas turret and with no fear of hitting parts of his own plane. The turrets of the B-29 can be manned from interior sighting stations individually, or, if need be, shifted to another station by the flick of a switch, so that one gunner may control several guns from any position. A brainlike computing mechanism instantly determines where the enemy plane and bullet will meet, and corrects the pointing of the guns.

Experiments are being conducted with computing sights for fighters which provide compensation for both lead and gravity deflection. Already in combat is the K-14 compensating sight installed in P-47s and P-51s of the 8th Air Force. Altitude and airspeed settings are transmitted by manually operated potentiometers while ranging is accomplished by manipulating a small knob in the throttle.

At high altitudes and speeds, increasing pressures and pull loads on machine guns spurred the development of more efficient ammunition boosters to feed guns properly. Improved ejection systems and five flexible feed chutes now eliminate the difficulties encountered, and give the .50 caliber machine gun a substantial increase in its cyclic rate of fire. And when two such guns are contained in a compact package and slung under a wing like a droppable fuel tank, the plane's slugging capacity is considerably augmented.

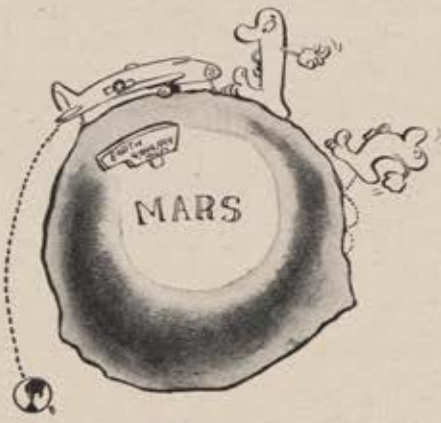
These package guns are self-sufficient

tech topics . . . about aircraft and equipment

AAF's newest gliders are the XCG-10A and the XCG-16—both boom-tailed designs. The former can carry very heavy field equipment. Under consideration for production, the CG-10 has undergone extensive tactical tests by the AAF Board, Orlando, Fla., first glider to be tested so thoroughly.

Detailed study of complete evacuation equipment with new litter installations and their placement in aircraft is being carried out with a 1/20th exact scale model of a C-54. . . . Rubber and rope fiber mats have been tested for non-skid flooring in ambulance planes where it is essential that attendants have secure footing to care for the wounded. . . . Part of every evacuation squadron's equipment is a new type of thermos jug, electrically heated.

Altitude range of some new planes is so high that altimeters in use cannot record the height. Later instruments now being perfected have dial ranges from 1,000 to 60,000 feet. . . . A new combination instrument incorporates features of the radio compass and the fluxgate compass, automatically providing the navigator with an indication of true bearing through one pointer. The device is a great aid in main-



taining track and obtaining drift readings. . . . A bank and turn indicator has been modified as a dive-bombsight computer. . . . Rigid mounts for magnesyn compass transmitters in P-51 fighters eliminate erratic indications found when vibrating insulating mounts were used.

Camera clicks: A forward shooting oblique strip camera has been installed in the nose of the photographic version of the B-25. . . . A warning light for cameras shows when shutters are malfunctioning. . . . The L-5B observation plane now is fitted with special mounts for K-20 cameras which are in a vertical position, more easily operated by the observer. . . . Experimental camera installation for low-altitude, high-speed night aerial photo work is a teardrop shaped housing unit, for external application to aircraft, which contains four miniature cameras and related equipment. It can take pictures from horizon-to-horizon in the direction of flight and 60 degrees crosswise to the line of flight.

Both Douglas and Curtiss-Wright, builders of the largest in-service cargo planes, have improved models soon to appear. The

new planes incorporate special loading and paratroop doors plus other features dictated by combat experience.

Large knives for cutting away escape holes in fuselage skin are being placed in some bombers. . . . Ditching belts which help hold crewmen in safe positions during water landings are being made available for B-24s. . . . Experimental jungle emergency kits have a lightweight hammock made of fiberglass plastic.

A small auxiliary power plant for electrical supply—the first to operate successfully between sea-level and 30,000 feet—has been perfected for use on B-29s. Another Superfortress addition is the cabin airflow indicator, an instrument which reveals the condition of the air inside the pressurized cabin at all times.

A new hydraulic windshield wiper which has less tubing, weighs less and is easier to install and maintain than former types will soon go into all heavy and very heavy bombers.

A huge climatic hangar that will simulate weather extremes to minus 70° is being constructed at Eglin Field, Fla. Cold weather studies once common only to Ladd Field, Alaska, and Watertown, North Dakota, AAF test bases will be duplicated on the shores of Florida.

Aluminum cargo loading ramps with trackways for permitting vehicles to be driven aboard transport planes have been designed to replace the conventional wooden ramps which are weakened by termites and fungus growths, especially in the Southwest Pacific.

A crash protector for glider noses looks like a steel bird-cage, fits over the forward end of the glider and has deflecting effect when the glider slams into hard ground, tree stumps, rocks or other obstacles. It is used in addition to glider skids.

maintenance tips . . .

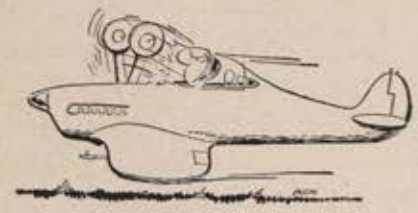
from the crew chief's stand

Some mechs' idea of hell is an abundancy of grease and no airplane tires to wipe it on. Keep oily hands away from landing wheels; if grease is spread on and allowed to remain for any length of time, rubber deterioration will result. When oiling parts of landing gear, too, care should be taken not to spill lubricants on tires. Accidents *will* happen, however, so be prepared to clean tires off immediately with naphtha or some other harmless solvent.

Know all, see all, hear all—but above all, *tell* all. That's the all-important recommendation passed on to you from Wright Field engineers when you fill out and send in Unsatisfactory Reports. Detailed information on a difficulty or modification will save planes and lives.

This is straight from the shoulder—but use it a little higher up. Fire hazard caused by gasoline leakage around the filler neck of B-24 fuel cells can be eliminated by replacing old-style gas caps with new type VA-2944-A. New Consolidated contoured gasket between wing skin and tank cap adapter, and Ford serrated gasket below the tank cap adapter, also should be used to replace the old flat-type gaskets that did not seal tightly to curved wing contours, allowing gas leakage and siphoning. The new Ford gasket is made under the same part number as the old, so later type should be specified when ordering.

Ever hear of the power of mind over motor? If you switch a G. E. for an Eclipse landing gear motor, or vice versa, without remembering to change the stenciled instructions, your pilot may be cranking his landing gear the wrong way when coming in for a landing. "Up" on one installation is "down" on the other, so be sure to check the type of motor installed and then paint a bright arrow around the crank and label it properly.



By standardizing the size of patches needed to repair flak holes, Sgt. Chester Malkowich of the 15th Air Service Command in Italy has simplified and speeded up the renovation of damaged aircraft. Using four patch sizes, Sgt. Malkowich files the flak hole to the nearest standard size, places the patch on the underside of the skin, drills and rivets it in place. Each patch has a "filler" piece of metal which fills out the hole so the entire surface is flush with the airplane skin after repair.

The pre-fabricated patches and the procedure for using them are now standard with mobile repair crews, and a similar system has been worked out for the 8th Air Force flak kit. A maintenance kit, incorporating this method, may be requested from TSMAC6, ATSC, Wright Field, Dayton, Ohio.

It takes jacks or better to open an emergency door sometimes, and when pilots have to bail out in a hurry they haven't got time to look around for something to bang against the hinge pin so that it loosens up. As a safeguard, the hinge pin holes should be enlarged slightly and oiled well on all aircraft. When an escape is to be made, the door latch should be disengaged before pulling the emergency release. An appropriate warning should be stenciled near the release at each emergency door to facilitate egress.

Keeping your nose clean has a specific reference to A-26 nose wheels, since an accumulation of ice or mud will jam the down lock and prevent retraction. Also, to avoid breaking side braces of the nose gear, make sure the nose wheel is straight during engine run-ups. Due to 90-degree rotation during retraction, adjustments must be very exact, and clearance between striking pad on the door down latch release lever and the nose gear strut is to be 3/16".

One of the chief reasons for failure of B-26 main landing gear axles is the strain imposed by "crabbing" on landing because of crosswind drift. Another factor is unequal adjustment of inner and outer brakes, while still another consideration is the size of the radius of the outboard brake fillet. This last is 1/16" on old struts and will be 3/8" on new ones.

Careful inspection of these items at 400 hours and at each 50-hour inspection thereafter, should reveal any cracks that may exist. Remedy is immediate replacement of the strut half-fork.

Interior sighting station at blister of a B-29—one of five such gunnery positions coordinated by central fire control system.

units weighing 500 pounds each, including their streamlined aluminum housing, and are hung from a standard two-lug bomb rack. They operate along with the normal complement of guns from the trigger switch and are jettisonable in an emergency.

To increase the punch of cannon in aircraft, a new 20 mm gun uses more powerful ammunition, including armor-piercing shells, tracers, incendiaries and HE shells with matched trajectories. Rockets, too, have been employed with devastating effect as offensive weapons, and launching devices now are able to hurl a 4.5-inch projectile having the explosive effect of a 105 mm howitzer.

The latest type bombsight for high altitude visual bombing is the Norden M-9, a gyro-stabilized optical sight that enables the bombardier to peer through a two-power telescope and see a motionless terrain below. The bombardier draws a sightline on the target with the cross-hairs in the telescope and with a series of knobs, dials and levers sets necessary ballistics, drift, altitude and airspeed data into the sight's synchronous computer mechanism, which automatically determines the proper bomb release point. The C-1 autopilot is controlled by two knobs on the sight to maintain the plane on the proper approach line to the target.

New Airspeed Indicator

To warn a pilot when his plane approaches critical speeds that are a threat to control and structural limitations, the Equipment Laboratory of ATSC's Engineering Division has developed a new airspeed indicator for high performance aircraft which encounter compressibil-

ity effects at certain speeds and altitudes. Designated type F-4, the instrument has two pointers—a white one showing the plane's indicated airspeed and a red one that compensates for altitude variations to indicate the maximum safe speed at which the plane can be flown without encountering compressibility. When the white needle approaches the red one it indicates that the aircraft is entering a dangerous speed range.

The instrument is pressure-operated and combines the mechanical functions of a conventional IAS indicator and a barometric altimeter. It weighs approximately one pound—about three ounces more than an ordinary IAS meter—and is enclosed in an aluminum case mounted on the instrument panel.

The face of the dial has numerical readings from 50 mph to 700 mph. A small sub-dial built into the instrument permits manual setting in of the plane's Mach Number—the highest percentage of the speed of sound at which any aircraft can fly and still maintain balanced

In new type airspeed indicator, red dial varies with altitude to give warning when the plane is approaching a critical speed.

control. This Mach Number can be adjusted to suit any plane, thus permitting the instrument's use on all types.

All Glass Airplanes

A new resin-impregnated glass cloth now permits the AAF to mold and bake whole fuselage and wing sections like pottery—eliminating rivets and structural members, improving aerodynamic performance and surpassing the durability of metal aircraft. A honeycombed glass core sandwiched between layers of glass-fiber cloth forms this unusual material, simplifying construction methods and allowing for soundproofing, quick repair and smooth exterior finishes. Bonding is achieved by a special resin which laminates the glass fibers and glues them to the core in a single operation, while coloring may be added to the resin to make painting unnecessary. Baking requires only a few minutes and is done under vacuum pressure.

Fuselage of this Vultee BT-15 is made up of new glass-plastic fabricating material. Experts claim advantages over metal, wood.

While still in its infancy, the glass-plastic may provide many of the answers to high-speed flight in the compressibility range. The new molding method also may supplant many time-consuming fabrication processes now necessary for wood and metal aircraft.

Although use of impregnated plastics for aircraft parts is not entirely new, fabricating basic structures with this material has been hitherto impractical because the fibers tested did not have the required strength. Cotton, linen, rayon and silk were all tried, but they did not have the high impact resistance and low moisture absorption of glass fibers. Now, however, the process being developed offers the possibility of greater plane speeds with less buffeting and vibration. The glass-smooth surface provides undisturbed airflow—an essential factor in high speeds that even flush-riveting in conventional all-metal construction has not fully attained. Drag is reduced, and excess noise and oscillations are absorbed by the porous core material. Also, radar equipment—which requires non-metallic housings—can be readily accommodated without installing protruding domes.

According to engineers of the ATSC Aircraft Laboratory, who initiated experiments with the all-glass plane, the new material is more rugged than either metal or wood. Comparative strength-weight figures show that it is 70 percent tougher than wood and 50 percent stronger than metal. A further advantage is that unlike wood the glass laminate does not expand or contract under specific moisture conditions and therefore may be used in any climate. In addition, it has no variation in grain or density—a variable in wood—and assures uniformity in strength and weight.

Under gunfire tests, .50 caliber bullets pierced the half-inch thick glass without shattering it. The slugs leave clean holes which can be easily patched in the same way that a tire is vulcanized, with the laminate in a semi-flexible state being used to fill the hole and then hardened to proper form under a sun lamp. Because the material does not present a hard, brittle surface, high explosive shells pass right through it without detonating.

Semi-Rigid Litter

A semi-rigid litter that is wrapped splint-like around a wounded airman, maintains head-to-hip and hip-to-toe stiffness and enables a casualty to be removed from cramped quarters in bombers and loaded into a specially-equipped L-5 evacuation plane. The new litter is made of canvas and is strengthened by strips of hard wood. It bends at the hips to facilitate a patient's passage through hatchways, while binding straps prevent movements that might aggravate injuries.

New litter aids in the comfortable removal of casualty through hatch.

Airborne Refrigerator

Paratroopers and airborne Infantrymen, who must carry their own mess units, now can be supplied by air with cold storage units that keep perishable foods fresh until ready for use. The portable-by-air Type A-1 "butcher's box" developed by the ATSC Equipment Laboratory, manufactures 48 pounds of ice every 24 hours and maintains cold-room temperatures even in the hottest climates.

The box-like cabinet weighs about 800 pounds and has sufficient capacity to store food for 100 men for four days. Six fungus-resistant wood panels are insulated by vapor seal to keep out vermin and rodents.

The unit can be operated in the air up to 10,000 feet, as well as on the ground under tropical or desert conditions. When knocked down into three crates for air shipment, it can be set up again in 45 minutes.

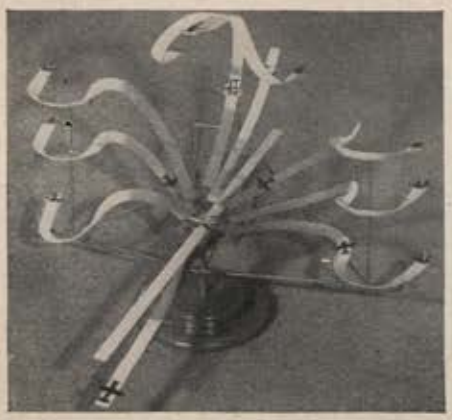
Remote-control Weather Reports

From an isolated ice-cap in Greenland, miles away from any Army installation and with no observers in attendance, weather reports are received daily by a central AAF weather station, and data on wind speed and direction, pressure, temperature, humidity and rainfall are regularly reported.

The units are automatic meteorological outposts that are set up to operate continuously as long as the fuel supply for furnishing power holds out. Improved models with extended transmitting ranges already are being developed.

Pursuit Curve Demonstrator

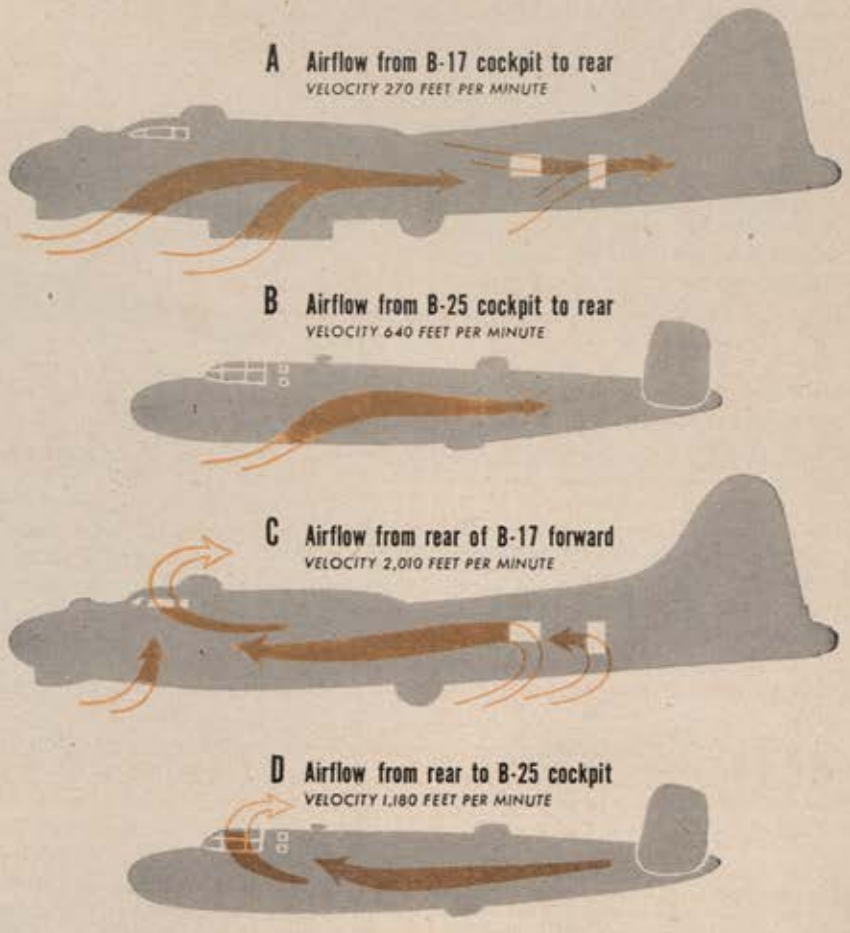
Development and distribution of a simple device of tested valve in the training of fighter pilots and bomber gunners has recently been completed by Training Aids Division, Office of Assistant Chief of Air Staff, Training, and ATSC. (See TECHNIQUE cover.)



Device graphically demonstrates to fighter pilots and bomber gunners how conventional pursuit approaches are made in air combat.

Officially known as the Trainer, Demonstrator, Type Q-10 (Fighter Approach), the apparatus consists of ten model fighters and one model bomber, each moved manually along ribbon-like individual patterns, to illustrate various types of pursuit curve attacks for a fighter intercepting a bomber flying a straight and level course. These include high side approach, left and right; level side approach, left and right; low side approach, left and right; overhead approach, left, right and half-roll; low frontal approach.

The trainer's application in flexible gunnery consists of demonstrating to gunners the types of attack to expect and the relationship of bomber and fighter during the course of aerial combat.



Diagrams show direction of airflow when proper and when improper hatches are opened to blow fire from cockpit. A. Lower nose hatch, bomb bay, waist windows and main door are open while pilots' windows are closed. B. Only lower forward hatch is open. C. Lower nose hatch, waist windows, main door and pilots' windows are open; bomb bay doors are closed. D. Only top hatch is open. Upper two sketches indicate correct combination of openings, lower two illustrate forward sweep of flames from other parts of plane.

Fire-fighting with Hatches

One of the principal hazards in flight is the sucking of flames and smoke into cockpits from fires in other parts of the plane, thus forcing pilots away from controls and making bail-outs necessary. Even minor fires, when not properly controlled, can result in abandonment of a plane.

To determine the best way of controlling interior fires, Wright Field's test engineers have conducted an extensive series of flight tests on B-17s, B-24s, B-25s and B-26s, with hatches, windows and bomb bays open and closed in various combinations.

Tests proved that ordinarily air currents are from the forward part of the plane to the rear, even when bottom and rear hatches are open. However, as soon as a cockpit window or a forward top hatch is opened, the airflow re-

verses and sweeps forward at speeds of 12 to 26 mph, blowing fire into the cabin from wings, nacelles and fuselage.

When any part of a plane is afire, drafts can be held to a minimum by keeping all hatches and windows closed and allowing normal airflow to help keep the cockpit free of smoke. However, when a fire is beyond control, crews should bail out of bottom openings only, if possible.

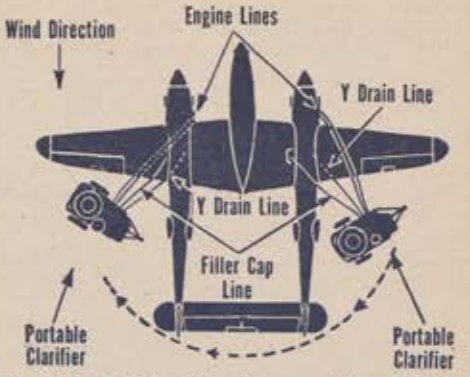
With fire in wings, nacelles or fuselage in front of the bomb bay, escape should be made through bottom hatches and wheel doors. When fire breaks out in the bomb bay, every effort should be made to extinguish the flame before jettisoning the load, since opening of bomb bay doors creates so much turbulence that burning materials will be scattered around in the plane. Fire behind the bomb bay can be controlled best by keeping all hatches closed. As fires are extinguished, rear hatches may be opened to let the smoke out of the fuselage.

New Life for Engines

When Flying Fortresses can get 1,300 hours from their R-1820 engines and Mustangs can get more than 900 hours from their V-1650s without an oil change, then something new has been added to conventional maintenance procedures. Responsible for these records—soon to be commonplace—is regular use of the AAF's new MC-3 oil filtering and clarifying unit which can increase engine life more than 33 percent, save oil by eliminating oil change periods and greatly reduce engine wear in dusty areas. Not to be confused with re-refining processes, the mobile clarifier flushes oil systems with clean, hot oil and filters all oil in the lines and tanks, removing sludge, gums, resins and abrasive particles of all kinds.

The unit consists of a 120-gallon tank with filtering elements, a gasoline heater and an engine-driven pump. Lubricant in the MC-3 is heated to temperatures of 90 to 110 degrees C and pumped through the airplane's engine and oil system, while oil to be filtered and cleaned is drawn into the clarifying tank and forced through baked fuller's earth filter blocks. If used at the specified 25-hour engine periods, only 15 minutes' operation is required for the entire engine system.

The filtering elements will de-sludge a maximum of 50 engines under the above conditions without having to be changed. A new type of non-corroding core is part of the refill holding assembly, and after cleaning periodically with P-S-661 solvent, can be re-used indefinitely. A pressure drop of 20 psi through the clarifier is the warning that the filter is ready to be changed.



Location of clarifiers when servicing a P-38. With engines running, plane is headed into wind, burners are at rear for safety.

When the engine is not running, the unit's suction hose is attached to the plane's Y drain and the pressure hose is placed down in the oil tank to agitate the oil and stir up any deposits present. With engine turning over between 1,200 and 1,850 rpm, the pressure hose is connected to the Y drain and the suction hose to the oil tank filler neck,

what's wrong with this picture?

Rise and shine is the order of the day for bombers and their plastic panels, but it's perfectly clear that not one of these linemen knows the "no's" of a plexiglas nose. Yes, it's easy to see through the errors they are committing, but before turning to page 56 for an unobstructed view of their mistakes, polish up your information by reading TO AN01-1A-12, dated 25 October, 1944, replacing AN23-20-1, dated 10 March, 1944, which tells you all you need to know about maintenance and repair of transparent plastics. The man astride the bombardier's compartment says that there are eight malpractices being demonstrated, but if he wiped his spectacles he'd probably find more. Proving the point are T/Sgt. Emmet Plummer, Cpl. Richard Braun and Pvt. Earl Lephart, all of the 4000th AAFBU, Wright Field, Dayton, Ohio.

making use of reverse oil flow through the system. When filtering with the engine running, careful check must be made to see that sufficient oil is delivered to prevent starvation of the engine, since the clarifier is feeding back clean oil through the Y drain to the airplane's oil pump. The crew chief should stop the engine if oil pressure does not come up inside of 30 seconds.

On Pratt and Whitney engines, the blower clutch should be operated once every three minutes. With Hamilton Standard hydromatic propellers, the prop control should be operated every two minutes, and the feathering mechanism set in motion once during the filtering process without permitting the prop to drop below 800 rpm.

To purge turbo-superchargers lubricated by engine oil systems, as in the B-24, operate the turbo with the waste gate closed for five minutes, taking care not to exceed safe manifold pressures.

Acquaintance of all engineering and maintenance personnel with this process and assignment of capable mechanics to use and care for the unit can be expected nearly to double engine life while saving thousands of gallons of oil.

New Summer Flying Suit

A new light-weight birdcloth summer flying suit, standardized in December and being issued to CBI personnel at present, is replacing the cotton twill flying coverall. The new suit (Type K-1) has six zipper pockets and two open side pockets, a front zipper and a pleated back with adjustable waist tabs. The material is porous, yet windproof and insect proof, with ankle and sleeve gussets to give added protection to airmen who have to bail out over swampland and tropical jungles. Because of the cloth's porosity and thinness, airmen are kept cooler as body moisture and heat readily pass through the suit.

Latest Model Fighter Planes

An unremitting research and improvement program has kept the P-38 and P-47 fighters abreast of all late developments.

The model "L" P-38 is generally considered to be one of the world's most formidable all-around warplanes. It has been effective in all departments of air warfare—fighting, intercepting, ground strafing, dive bombing, reconnaissance, photography, laying smoke screens, long-range bomber escort, rocket firing, low level skip bombing, tank busting, torpedo launching and towing troop and cargo gliders.

The new version has a gross weight in excess of 18,000 pounds and skims above 40,000 feet at better than 425 mph, while installation of additional fuel tanks in the wings provide a maximum ferrying range, with drop tanks, of approximately 3,000 miles. As a bomb-toting fighter, the latest Lightning can go into action with all guns and cannon blazing while carrying 4,000 pounds of bombs.

The phenomenon of air compressibility (see AIR FORCE, February, 1945) was one of the most baffling problems of high speed flying until special compressibility wing flaps were added to the P-38 to make possible recovery from dives at speeds heretofore unrealized. These "dive" flaps are operated by electric motors and are controlled by a button on the pilot's wheel. They regulate airflow under the wings and do away with air turbulence at high speed.

P-38L features compressibility flaps, new supercharger devices and a cockpit heating system.

Squared-off wing tips, greater span and added aileron area give P-47N superiority over P-47D.

The new P-47N is faster than any other Thunderbolt now being built, and its tactical radius of 1,000 miles gives it the greatest combat range of any fighter now in use by the AAF. Having a maximum gross weight of over 20,000 pounds, the plane gets its super-range from gas carried in new integral tanks and auxiliaries slung externally under wings and belly. Additional horsepower from an improved P&W engine and turbo-supercharger combination gives it higher speed, while greater wheel and tire size support the added weight.

Seven-Cylinder Cyclone Engine

The Wright Cyclone 18-cylinder twin-bank radial engine, which powers the B-29 and its cargo version, the C-97, now has a little brother. Latest addition to the family is a 7-cylinder,

aircooled radial power plant burning inexpensive low-octane fuel and developing 700 hp for short-haul cargo planes.

A two-speed supercharger drive is a feature of the engine, which also makes use of forged cylinder heads to provide greater ruggedness. These new cylinder assemblies embody longer valve guides, greater cooling fin area and a self-aligning exhaust valve seat to insure proper alignment of the valve. External oil tubes contribute to longer valve life and reduce cylinder maintenance, while oil jets in the crankcase improve lubrication within the engine.

Improved 'Jump Bottle'

A redesigned oxygen bottle assembly, recently approved by the Air Forces Board in Orlando, Fla., allows crew members to bail out from altitudes as high as 40,000 feet with the assurance of a reliable oxygen source to breathe from on the way down.

Tests performed at AFTAC and at Eglin Field, Fla., prove that the H-2 Bail Out Assembly has eliminated many of the drawbacks that made former jump bottles untrustworthy and even dangerous. Breathing from the earlier H-1 was accomplished through a tube held between the teeth, and when a man's parachute popped open there was a strong possibility that the tube would be jerked out of his mouth by the sudden jolt.

A further defect of the H-1 was that it could become a dangerous fragmentation grenade if a .50 caliber armor-piercing slug were to puncture the oxygen cylinder. In comparative demonstrations, both the old and new types were shot at with .50 caliber bullets. The H-1 exploded and flew fifty feet, while the later model's thicker skin held

H-2 Bail-out Assembly plugs right into a standard oxygen mask, saves vital moments.

On the line

with mechs around the world

Large-scale welding repairs call for a lot of acetylene, not always available in sufficient quantities. With foresight and enterprise, however, Sgt. Kenneth Doebbling, Ness City, Kansas, provided a home-made acetylene generator for the 38th Service Group of the 15th Air Force in Italy. Using the base of a German parachute container, Doebbling constructed a carbide-water acetylene generator incorporating a fuel pressure gauge and a rubber diaphragm. With slight modifications, the unit has proved so efficient that it is being duplicated elsewhere, solving supply shortages.

Time and Tape wait for no man, and when wing ejection chute openings have to be covered, these two commodities are not always at hand. As an expedient substitute, T/Sgt. Ronald Beaulieu and Sgt. Clyde Carlisle of the 461st Subdepot, 8th Air Force England, designed a one-piece metal strip cover for P-47s. Although not intended as a circumvention of TO 11-1-12, the cover effectively protects chute openings from dust while the planes are on the ground, saves valuable minutes in installation and fills the bill when tape supplies are depleted. Material is .040-inch thick, 24ST aluminum, with steel springs for adjustment into chutes. Felt strips can be fastened to the gadget to prevent it from scratching wing surfaces, while a red warning cloth may be hung on each cover to remind ground crewmen to remove it before flight.

An aircraft engine heater is adapted to warm up evacuation plane before loading wounded. L. to R. are Sgt. Frank Curtis, Plainfield, N. J. and F/O E. I. Mesnick of Youngstown, Ohio. Locale is Mitchel Field, New York.

At a 9th Air Force Service Command unit in France, orders were received to install a water injection system on the carburetor of all models of P-47s, but it was found that during the process of this modification, the power enrichment valves in the fuel economizer were thrown off, requiring a time-consuming readjustment. To solve this problem, S/Sgt. John P. Griffen, Oakwood, Mo., experimented for a few weeks and finally came up with a piece of equipment that eliminated trial-and-error methods and cut down the time needed for the job from four hours to only 30 minutes. Sgt. Griffen's device was made out of a fuel control unit reclaimed from a scrap carburetor. All the holes and bleeds were welded, with the exception of the original hole for the economizer and two air bleeds leading to the bottom side of the diaphragm. The chamber for the economizer stem was also left open, and two holes were drilled through the side of the chamber in order to prevent the formation of a vacuum. An Ames Dial Indicator, mounted on top of the economizer, and a water manometer, give readings when the spring tension is overcome by pressure from the air valve on the flow bench, so that corrections may be made accordingly.

Busiest little air depot we've heard of was an emergency field in North Africa set up to service a group of transport planes assigned to special work. It was just a temporary detail for the six GIs who arrived from their parent base with two weeks' supplies—but five months later they were still there, ready to pitch in as needed. M/Sgt. Richard Brazzeal, Macon, Ga., headed the miniature depot, which included S/Sgt. Morton Vance, Evanston, Ill., prop specialist; Sgt. John Urbanek, Buffalo, N. Y., dope and fabric expert; Sgts. Bankston Cannon, Chiefland, Fla., and Joseph Moulin, Auburn, Md., electricians, and flight crew chief Sgt. Donald Hoover, Theresa, N. Y. Sgt. Hoover checked overhauled planes in the air and also participated in a 10,000- mile, 12-day round trip to Russia with a load of belly tanks for the first B-17 shuttle bombing over the Balkans.

To save time and manpower filling orders for B-29 props, and to convey them safely over crude Indian roads over which low-strung telephone wires constantly menaced the propeller's 16-foot, 7-inch blade radius, men at a 20th Bomber Command Air Depot in the CBI have adapted an ordinary bomb dolly for use as a propeller carrier. The redesigned vehicle is smaller and lower than a trailer, yet can stand as much weight—carrying four completely assembled props. The supporting framework is composed of angle iron reclaimed from local scrap piles, while padded braces hold the blades in place. After props are mounted, the front cone assemblies are securely bolted down.

M/Sgt. Walter Eberhard, Bellevue, Ohio, conceived the idea, while Sgt. Frank Nick, Pasadena, Calif., and Pvt. Eric Bresee, Gouverneur, N. Y., drew up the plans for the conversion job.

it together and let the gas escape more slowly.

Use of the H-2 assembly is quicker and easier. It plugs right into the regular oxygen mask used on all altitude flights, enabling crewmen to protect their faces against frostbite. There is no screw valve to freeze up and stick at crucial moments and no tube to hold in the mouth. And best of all, its capacity has been increased from 20 to 22 cubic inches—an important extra margin when AAF personnel tread on thin air.

WHAT'S WRONG with the picture on Page 53

1. Let's get to the bottom of things with that can of gas the man on the crew chief's stand is tilting. Gasoline is strictly verboten for cleaning plastics, since it causes cloudiness and discoloration, especially if leaded. A clean rag and plain soap and water is best.

2. The stand is rubbing noses with the plane in a manner that will certainly result in cuts and bruises. Always watch clearances when setting up working platforms.

3. See the light? Someone has carelessly left a lamp burning inside the compartment and if it isn't put out in a hurry, the plastic will be melted and ruined.

4. "Right on the nose" may describe the GI on top, but that screwdriver in his right hand will describe some fancy scratches on the plexiglas surface. Sharp tools of any kind have no place here, so leave them behind in jobs of this type.

5. And while we're giving him the once over lightly, notice the obviously dry rag he's using to wipe off the dirty panel. Again, soap and water is the proper solution—or at least water—to loosen up the dirt and sluice it off without abrasion.

6. Gun mounts were never meant to be footrests. And that's not the 'sole' extent of the mis-step either, because a man's heel grinding against that gunner's forward sighting panel is bound to impair visibility at a position where it has to be perfect.

7. The surface of the navigator's astrodome is only as clean as the material used in wiping it, and the filthy rag being employed by the maintenance man will blur the navigator's vision when he must serve as the eyes of the entire crew.

8. What's that he's got in his other hand? Can it be sandpaper? Don't ever sand out scratches in an astrodome, because no matter how you buff and polish it afterward, the optical properties of the dome will be changed, causing additional refractive error in the navigator's sighting. Read TO AN 01-1A-12 for proper treatment.

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 most important factor in maintaining your morale while you were overseas?

S/Sgt. Joseph G. Saravia, criminal investigator, Europe: "The thought that some day I would return to the States and spend a long rest with my family was the thing which kept me in good spirits. Beyond that I looked forward to the end of the war when the whole mess would be over and I'd be a civilian again. I might say that my 21 days with my family was the happiest time of my life. Should I be sent back overseas, as I expect, my morale will be maintained by the fact that the war is rapidly drawing to a victorious conclusion for us."

S/Sgt. Morton Wasserman, flying control, France: "Come to think of it that is a hell of a hard question to answer without some deep thought. A man's morale changes with his mood and in my particular case sometimes a beer would help, and then again it might take two or three. Often it would be a letter from my wife which did me much more good than anything else. The first rumors about the rotation system did a good job of lifting the morale of men in my outfit. But usually mine came from my wife who writes an excellent letter."

T/5 Frank M. Whiteley, Signals, Southwest Pacific: "Every month down on the island my name was put in a hat, along with about a hundred others, and we had a drawing. The lucky guys got to go home. That was the way they handled the rotation system since there was a whole stack of us fellows who had the same number of months overseas. There was no other way to decide who went home, and who had to stay a few extra months. Another morale builder was the arrival of a load of fresh meat. That put new spirit in the chow line."

Sgt. Arend Timmer, clerk, England: "Morale overseas depends most upon what kind of officers you happen to have. If you have a CO who punishes the guys who cause the trouble, and doesn't make the whole bunch suffer just to get the guilty ones, then your morale is high. I had no trouble with my morale so long as the officers showed proper consideration for their men. I especially disliked the way some of them had of making the men listen to a reading of the Articles of War and have their medical shots on their off-duty hours."

Lt. John E. McCarthy, Jr., fighter pilot, Aleutians: "The morale in my outfit jumped up at least 100 percent the day beer rationing came in. We got about a case a month and it was up to us to make it last. We could drink it all at one sitting, or take the long view and have a bottle or two every day until it was gone. At least I heard nobody complain that his beer was warm, not up there. In fact, it was so bleak up there in the Aleutians that the slightest little pleasure of any kind at any time was an important morale builder for all of us."

T/Sgt. Leo Walker, crew chief, MTO: "A B-26 Marauder gets the credit for keeping me in good spirits. Naturally, I think it was the best aircraft in the theater and it probably was. The name of the plane was Zero-4 and it went through several crews and I saw them go home in almost record time. Zero-4, that was the battle number, made 148 missions in 18 months and was the lead ship of the group and squadron. She was full of holes, but no man ever got a scratch. I had no problem with my morale while stationed overseas."

Rendezvous

(Continued from Page 46)

Representative from the Fourth District of Kentucky 1907-27, went to the Washington army airfield and asked to be taken up. His request was refused because of bad weather. He returned a few days later and got the same answer. A young lieutenant said that he was game enough to be the pilot if Representative Johnson was game enough to be the passenger. General of the Army Henry H. Arnold was the lieutenant of 1911. Representative Johnson was the first member of Congress to fly and the story of the flight made the front page of the Washington papers the next day. I think that it was the "Washington Post" that carried on its front page a Berryman cartoon of Johnson, Arnold and the plane.

Pvt. John W. Muir, Sr., APO 761-R.

Virginia Belle

Dear Editor:

I have just been reading your February 1945 issue of AIR FORCE.

I was interested especially in the column "On the Line" which told of a Mustang Fighter which flew 125 combat missions.

I spent thirteen months in the North African Theater as a fighter pilot, flying a P-39 Airacobra Fighter in the North African Coastal Command. The Virginia Belle, as I named my kite, flew about 210 missions over the battle-scarred hills of Tunisia.

I personally flew this ship on more than 160 missions, and it was on about 40 other missions by my fellow pilots. My group later left the African Theater and moved to CBI. The "Virginia Belle" was transferred to the 99th Ftr. Sq., and the last news I had of the "Virginia Belle" she was flying patrol missions over Anzio Beach.

I feel that the Virginia Belle has proven herself worthy of the name I gave her.

1st Lt. William H. Sheppard, Sarasota, Fla.

FOXHOLE MEDICS

(Continued from Page 30)

works closely with the Air Force operations. In constant communication with the intelligence office, he is advised of enemy air activity and is usually warned well in advance of the number and location of approaching Jap planes. When he receives an alert, all bed patients are removed to bomb shelters that have been constructed by the hospital staff. If an operation is underway, however, the CO keeps his ears attuned to the sky; only when he hears the drone of enemy planes overhead does he give the alarm to take cover. In no case does any member of the hospital personnel take shelter until all patients have been adequately protected.

As the hospital works under constant threat of aerial attack, facilities are available for performing operations in a completely blacked-out tent. One night in the Philippines, a red alert was sounded at 2330 and continued straight through until 0700 the following morning. The Jap planes made 35 separate air attacks or runs over the target, principally the nearby Tacloban strip. During the night more than 30 seriously injured patients were brought to the air force portable hospital. The doctors and their staff worked steadily for some 36 hours, performing operations ranging from minor surgical injuries to major abdominal surgery.

Because of the nature of injuries sustained by air force personnel in combat, the availability of the most complete surgical and X-ray facilities are of prime importance.

Other facilities of these hospitals include a refrigeration system, blood bank and plasma, sulfa compounds, an oxygen supply, equipment for administering general and local anesthesia and means of diagnosing tropical diseases.

During the Wakde campaign, one hospital served approximately 7,000 air force personnel and in addition cared for some 3,000 ground troops for which no adequate hospital facilities were available.

Portable is the right word for these air force hospitals. The entire hospital with all its equipment and service facilities, including four medical officers and 33 enlisted men, can be moved, if necessary, by air in 10 C-47 transport planes. An advanced echelon, capable of full operation for a week, can be accommodated in four C-47s. Where the tactical situation does not require air priority, the unit is transported from a rear to an advanced base in an LST. This was the case in the Philippines operation, where the hospital landed on the beach on A plus two; was set up and functioning on A plus four, or one day before the airstrip was ready to receive combat planes.

Once the portable hospital unit is ashore, it can be ready to handle patients within two hours, be completely operational within 24. During the Wakde show, a bomb dump was hit near the hospital, which was completely leveled, fortunately with no personal injuries. Twelve hours later the hospital was again handling patients. Twenty-four hours later surgical equipment that had been destroyed was replaced by air shipment of the highest priority.

When serving with an Air Task Force, as the portable hospitals have in most cases, there are three phases of activity:

1. Handling of all types of combat and operational casualties, 80 percent of which are surgical. This usually lasts for the first three to six weeks.

2. Stabilizing period of about six weeks, handling mostly routine medical cases and surgical cases incident to operations rather than enemy action.

3. Terminating period of from two to four weeks during which the hospital staff rests and prepares for next forward move.

Good food has been found an important adjunct to medical treatment under severe combat conditions. An eggnog made of dehydrated eggs and milk, with a ration of brandy added, has worked wonders to give patients confidence during air attacks.

Medical officers assigned to air force portable surgical hospitals are among the best obtainable and specially qualified. Enlisted technicians are highly trained and all are volunteers. All must be general service, under 35, and hardened to the toughest type of jungle warfare. In cases where the terrain permits no other means, essential equipment is carried in on back packs.

The staff, both officers and enlisted men, consider themselves a part of the Army Air Forces, sweating out missions with the intensity of ground crews.

The one mission of the air force portable hospital is to bring to front line air force personnel the very best in medical and surgical care. Since their inception in early 1943, they definitely have lowered the mortality rate among the seriously injured and cut considerably complications in cases of minor injuries. ☆

MAIL CALL

AIR FORCE Magazine is written for the AAF. It's your magazine and if you don't like it, tell us about it. Direct communication with the AIR FORCE Editorial Office, One Park Avenue, New York 16, is authorized on editorial and distribution matters.

While you're writing us, why not throw in an item or two for Shooting the Breeze (See Page 64 of this issue)? Here's a regular feature crying for gags, jokes, anecdotes —real or tall. If a story amuses you, we'd like to see it. Send us the raw material and we'll give you a byline.

Unit Public Relations Officers are invited to contribute to this feature. Where security prohibits them from identifying their unit, they can include the CO's name or the nickname of the outfit. We'll try to preserve such identification for the edification and amusement of all concerned.

If there's some way we can help you in your job—by running an article on a neglected subject, or by printing and answering your letter in Rendezvous (See Page 1 of this issue)—tell us about it. We'll do the best we can.

Death of a Great Flyer

ILLUSTRATED BY T/SGT. DON BROCKELL

Officially, the major's death was due to "the operational failure of his aircraft." Actually, he died in an effort to save a friend. He was killed in a heroic violation of three rules of combat flying in a P-38; rules he himself believed in and taught to his men.

Maj. Thomas B. McGuire, Jr., was no novice. He had 38 planes to his credit, just two less than Maj. Richard I. Bong. He had 720 combat hours and 240 missions. His awards included nine Air Medals, five DFCs, the DSC, two Silver Stars, two Unit Citations, and the Purple Heart.

The 5th Fighter Command published his tips on combat tactics and used them as a bible for new pilots. Certainly, he knew what to do—and, more important, what not to do. He had written: *Don't get overeager. Don't try the impossible. Don't try to outmaneuver Jap fighters.* But when a friend called for help, McGuire forgot his own words, threw away his own book, and went to the rescue.

Who is to say why pilots—good sound pilots—suddenly disregard the rules? Unquestionably, his only idea was to save the life of another pilot. He acted on an involuntary impulse and was lost doing the things he had taught other men not to do.

Major McGuire was leading a flight of four Lightnings over a Jap-held airfield at 2,000 feet in the hope of catching some Nip planes while they were taking off. A lone Jap jumped them from out of the clouds and McGuire quickly led his flight into a tight Lufbery, snaring the Jap inside. The Jap made sharp turns in a frantic effort to break out of the trap, but the P-38s kept with him all the way down to 200 feet. There, the formation scattered, the Jap made a characteristically precise turn, and maneuvered into position right on the tail of one of the Lightnings. The attacked pilot called for help and McGuire tried to respond. His plane fell off and crashed into the ground.

McGuire had neglected his own lessons. *Never attempt combat at low altitudes.* He made his attempted attack at 200 feet. *Never let your speed fall below 300 mph while flying combat in a P-38.* He was going 180 mph when he tried a roll over. *Never keep your extra gas tanks in a fight.* His tanks were not released.

Of his death, Lt. Gen. George C. Kenney, commanding general Far East Air Forces, wrote, "Major McGuire was one of the most capable fighter pilots I have ever known. We will find it more difficult to carry on without him." ☆

THE SHOOTING STAR

(Continued from Page 9)

rated in the 13 service test YP 80As, the first of which was flown on September 13, 1944.

For some time, General of the Army Arnold had furthered experiments with jet-propelled planes for the AAF. Conventional fighters had just about reached the limits of performance by engine-driven propellers. A new principle of propulsion was required. The jet engine—its output best indicated in pounds of thrust rather than horsepower—was the answer. The P-80's engine, weighing only about one-half what a conventional engine developing comparable power would weigh, is the best evidence of how effective that answer may prove to be.

Once it has been started, the jet engine requires no ignition system. A small metal plug protruding into the combustion chamber heats red hot in the first few seconds of operation. It serves to ignite the mixture of air and fuel as they are introduced into the combustion chamber, from which the hot gases pass rearward through a gas turbine. This turbine turns very rapidly under the impact of the expanding gases. A shaft connects the turbine to the compressor fan in front of the engine, supplying the power necessary for intake and compression of air. After passing through the turbine, further expansion of the gas in the venturi-tail pipe system provides the forward thrust which propels the airplane. Essentially, this is the operation which has received the attention of every belligerent in this war.

The real problem in developing jet engines lay in the turbine. Alloys had to be developed for the turbine blades that could stand terrific temperatures and still rotate at velocities up to 10,000 rpm. The engine fuel is kerosene, preferable to gasoline because it provides more energy per gallon. Thus, the dangers of handling high octane gas are eliminated. Absence of the propeller eliminates another hazard to personnel on the ground near the plane. Hot gases issuing from the tail are dangerous to anyone standing immediately behind the jet, of course; but these gases cool rapidly and 100 feet away only a strong blast of wind can be felt.

The ascendancy of the AAF as a power in the air does not require some kind of marvel to be pulled out of the hangar this year in order to assure ultimate victory in the air. As the war continues, however, the P-80's contribution is likely to be closely connected with Colonel Holloway's cheerful assurance, "It's really fast, and a cinch to fly." ☆

PICTURE CREDITS

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ALL THE ANSWERS

(Continued from Page 4)

hopped a plane for England to show ETO airmen how Eglin had done it. From that time on our airmen began to knock out robomb sites.

Back in the States, the men of Brig. Gen. Grandison Gardner's Proving Ground Command grinned when they learned they had found the right solution to that problem. There was no time for back-slapping, however. Proof-testing new AAF weapons and tactics on simulated missions is a full time job. There were B-29 missions to be "flown," Tokyo to be "bombed."

Fifty miles from the nearest town, and surrounded by scrub oak and sand, aircrews and groundcrews, many of them overseas veterans, and engineers are fighting their quiet little war of dress-rehearsals against the enemy with little public notice; flying missions that pave the way for our combat airmen overseas who will be flying similar missions a month or two from now against real, not simulated, enemy targets.

Center of activities of the Proving Ground Command is Eglin Field, Fla., with a 50-mile stretch of desolate coastline on the Gulf of Mexico, 11 auxiliary flying fields and 53 gunnery and bombing ranges. Here the AAF proof-tests its equipment for combat, builds duplicates of enemy targets and learns how to destroy them most effectively.

Our Superforts already were in India when Eglin Field's Proof Division got its assignment to simulate a flight from the Calcutta area of India to Bangkok and return, with as many bombs as possible. The second phase then was to fly a similar raid that would provide information on operational performance to be expected in a flight from Chengtu, China to Yawata, Japan.

Duplicating bomb load, altitude requirements, distance and engine operation for a real mission, test pilots and engineers compiled all of their operational flight data and sent it through the 20th Air Force to the 20th Bomber Command, which used it for basic planning of the actual missions. Although Superfort pilots flying almost 1,600 miles from Eglin only saw Puerto Rico when their navigation charts had showed Yawata, Japan, they knew that their mission had helped men of the 20th to deliver more bombs on Nippon's war industries.

Development of new flight techniques is just one of scores of assignments tackled by the Proving Ground Command. Guns and cannon have to be tested on ground firing ranges as well as from the air against all types of ground and water targets. Bombs, too, must be evaluated as to their effectiveness against different types of targets. Eglin Field officers must answer such questions as: What type of bomb will knock out a steel truss-top German factory? Should demolition and incendiaries be dropped together over Tokyo? How many butterfly fragmentation bombs are needed to immobilize dispersed aircraft and trucks? What is the ultimate military utility of the V-1 robot bomb?

Answers to these questions don't pop up out of tickler files. They have to be extricated from wreckage of dummy targets and bomb-pocked ranges, and from the bottom of the Gulf of Mexico where Army-trained deep sea divers retrieve torpedoes, robombs and other types of bombs for examination. Even an Army fleet of 25 boats cruises over the Gulf to evaluate aerial target runs at sea. What the answers are must in most cases remain a secret for reasons of military security.

As soon as one project is buttoned up, the Proving Ground Command plunges ahead testing newer weapons and tactics to hurl against the enemy.

Over Burma we had learned that many types of bombs are ineffective against frail wood structures for they are too light to detonate bomb fuzes. Yet, our airmen were to be confronted by this kind of target over many parts of Japan and Japanese-occupied territory.

Eglin's proof-testers solved the problem very simply. They built three little Tokyos on one of the bombing ranges. These wood villages had alleys, narrow streets and wide streets. Some buildings were joined in block-long rows, others were laid out as individual hutments. Bucket-brigades and modern fire-fighting equipment surrounded the areas. Tests were made with various types and combinations of bombs and Eglin passed its findings along to the men who were to drop their eggs on Honshu Island's Big Tokyo.

Not all work of AFPGC is on combat equipment, however. The armor-plated P-63 is being piloted as a target plane for aerial gunnery practice. Danger to the pilot was eliminated by development of a lead plastic frangible bullet that shatters on impact (see Technique, Page 48). Extensive tests now are being made for the Training Command. To evaluate various types of gunsights under simulated combat conditions, a motion picture method using seven cameras for one gun position in a B-17 has been developed to determine the comparative accuracy of several types of gunsights when used against different types of targets under all operational conditions.

From the AAF Board at Orlando and from the Air Technical Service Command at Wright Field, AFPGC receives most of its projects and new equipment items for proof-testing. Purpose of the Command is not to develop new aircraft, accessories, supplies and equipment, but to determine the performance characteristics and capabilities of these combat tools of the AAF. At Eglin Field they are subjected to gruelling tests with the single purpose of proving their practicability for tactical uses and of demonstrating how they may be employed with maximum effectiveness.

Variety of projects handled is unlimited; B-29 windshield wipers, bomb lift trailers, airborne refrigerators, emergency control cable repair kits, carbon monoxide warning devices, fitting of pressure oxygen masks. A Stellite line gun barrel, which hardens as heat increases, will permit gunners to fire longer bursts with less dispersion. To compute depth of coastal water, which must be known before carrying out amphibious operations, a new technique of aerial shadow photography has been developed in which two airplane shadows—water surface shadow and bottom shadow—determine the depth. The flight section flies the latest planes as well as captured Japanese and German aircraft.

On the scattered land and water ranges of the huge reservation, an average of 240 projects constantly are undergoing proof tests. One range is littered with worn out trucks and aircraft that have been riddled by many types of fragmentation bombs during tests to determine most effective fuze settings. Remote controlled tanks crawl across the scrub of another range until rocket firing fighters sweep in to destroy them.

After each test mission, survey crews swarm over the ranges to measure actual dispersion and spacing of bomb strikes. To save hundreds of man hours of "bomb-hunting" after each trial, one of these ranges is instrumented to locate automatically bomb hits instantaneously through seismographic devices.

Then there are the shops where land and water targets are constructed, only to be destroyed as soon as they are set up. Keeping these ranges in operating condition and full of the right kind of targets is a 24-hour a day job for several hundred men since many of the proof missions are flown at night to test bomb sighting systems.

Detachments of AFPGC constantly work with other branches of the service at Edgewood and Huntsville Arsenals, and Aberdeen, Jefferson, Dugway and Southwestern proving grounds. Cold weather detachments carry on their work at Watertown, S. D., and Alaska.

Eglin Field, named after Col. Frederick J. Eglin, was little more than a pile of sand and a couple of poor light-plane strips when the 450,000 acre reservation was established as the proving ground of the AAF. Today, the Air Force Proving Ground Command has won its wings. Since the last week of December, 1944, it has been carried on the roster as a permanent component of the AAF; no longer is it a temporary war-baby for the duration and six. ☆

Answers to Quiz on Page 46

1. (C) Escapees who walked into neutral territory
2. (B) A-20
3. (B) A type of bombing
4. (A) 13th Air Force
5. (D) P-47s
6. (B) False
7. (C) 30,000
8. (C) Continental Air Forces
9. (D) 1,100 feet per second
10. (C) Borneo
11. (B) 20
12. (C) B-29 used as a fuel carrier
13. (D) Continuous wave
14. (A) 16
15. (B) Night fighter
16. (B) Unidentified aircraft
17. (A) Saipan
18. (B) No
19. Santa Ana, Calif.
20. B-25.

SKY SCOUTS

(Continued from Page 21)

and pick up any other information that the bombers could use.

Peaslee sold his idea to 8th Air Force headquarters which gave him permission to organize a force of scouts for its 1st Bomb Division.

Attaching himself to a fighter group and borrowing a few clerks and mechanics, he activated his first unit in June 1944. Peaslee's first thought was to use Mosquitos because they were fast and able to protect themselves. While he was experimenting with the Mosquito he was the only combat flyer as yet assigned to the scouting force. Eager to test his plan, Peaslee induced 8th Fighter Command to employ the frontal elements of their regular fighter escorts to act as scouts for the bombers. But this proved to be impractical. The primary mission of a fighter escort is to destroy enemy intercepters. Fighter pilots also were accustomed to different problems and had not been trained to recognize and interpret weather from the bomber standpoint.

It was finally decided that half of the projected scouting force should be composed of bomber pilots who had completed their tour of missions. The other half of the force would be made up of fighter pilots who would serve as wingmen and act as aerial bodyguards in case of attack.

When word of Peaslee's organization spread around the bomber bases he was besieged with volunteers. Carefully, he winnowed the applications and accepted a nucleus of veteran bomber pilots who had flown their bombardment tours during the fall, winter or spring months on the theory that these men had a better knowledge of European weather than those who flew only in the summer. Peaslee then discarded the Mosquito and adopted the Mustang as the plane his force would fly. The men he selected were given a thorough transitional training course in fighter operations and when they had passed a stiff test on weather reporting and navigation they were given the status of scout leaders. For fighter pilots, Peaslee simply requisitioned sufficient men from one of the combat groups.

For his ground staff, Peaslee picked a highly experienced intelligence officer who handles the briefing and interrogation, and prepares the various reports. Several skilled navigators who have completed tours in lead bombers were chosen to do the map work and prepare courses. Lead navigators were selected because navigation above the overcast is done wholly on course and time, and accurate planning is most essential.

Three weeks after receiving the green light from headquarters, the 1st Scouting Force flew its first mission. Since that time it has averaged better than one mission every two days.

Today the principal assignment of the scouts still is the accurate reporting of what the bombers will encounter. But this doesn't mean they don't do any fighting. They prefer, of course, to avoid combat until after they have relayed as much information to the bombers as possible. During the penetration phase of a bomber mission the scouts can channel the heavies along the clearest weather paths. It takes a fighter plane only 60 seconds to climb 1,000 feet while a heavy bomber needs five minutes to gain this much altitude. The scouts, probing through the cloud mass, are able to blaze a trail that often saves the bombers from tortuous and time-wasting maneuvers.

When the scouts reach the target they quickly evaluate cloud types, visibility, contrails, smoke screens on the ground and anything else that may be of interest to the bomber commanders. And being veteran bomber pilots themselves, the scout leaders also check the performance of the bomber formations. If some squadron, group or wing is flying sloppily the scouts will take note of the fact.

On the way home, the scouts still must keep a watchful eye on the weather, but much of the pressure is off after the bombs have gone down.

In the words of Lt. Col. Allison Brooks, of Pasadena, Calif., who now leads the 1st Scouting Force, "Contact with the enemy on the route back is always justifiable under favorable conditions."

Brooks admits that the words "favorable conditions" are pretty elastic. At various times, the small scouting formations have fought it out with Nazi intercepters even with the odds against them.

One day the scouts of the 2nd Bomb Division encountered an enemy fleet of ME109s near Magdeburg that outnumbered them nearly 25 to one. In the melee that followed the scouts bagged five of the Hun and escaped unscratched. They brought down five more enemy aircraft on a subsequent mission, again with no loss to themselves.

On another occasion, a flight of seven scouts took on more than 70 Messerschmitts. Nobody was shot down in this skirmish, but the scouts did achieve their objective of diverting the enemy planes from the approaching bomber stream.

There have been other instances, however, when it was more prudent to leave the dirty work to the regular fighter escorts. This happened once when a few elements of the 1st Scouting Force spotted more thar 60 enemy aircraft bearing down on them.

"We were 50 miles ahead of the bomber and fighter formations," Brooks recalls. "When we saw all those Huns we just tipped off the escorts and got the hell out of there. We found out later that our fighters nailed 20 of the Jerries."

Other Air Forces already have evidenced their interest. Those familiar with its operations foresee a much wider employment of the scouting force in the future, including utilization of jet aircraft instead of standard fighters. ☆

Answers to "How Sharp Are You?"

on Page 2

1. Changing an engine.
2. Two.
3. Two.
4. Two.
5. 36.
6. True.
7. No.
8. One.
9. Radial.
10. Three.

FLYING THE ZEKE 52

(Continued from Page 20)

medium bomber, may be faster than either our B-25 or B-26. However, when our unemotional test pilots analyze these figures, the chances are they will be subject to considerable shrinkage. In the meanwhile, we do have the facts on the Zeke 52, successor to the Hamp.

The Zeke 52 is a single-engine single-place fighter with a radial aircooled engine. It has no armor plate of any kind. It has no self-sealing fuel tanks. Its armament consists of two 7.7 mm (approximately 30 caliber) machine guns synchronized through the propeller from the nose cowling and two 20 mm cannon in the wings. As Lt. Clyde Andrews, one of the Navy test pilots, says, "A lot of people used to say that the Japs were clever when they decided to substitute speed and maneuverability for pilot protection and firepower. However, close examination reveals that they were successful in attaining these essentials *only* at low altitudes. Above 10,000 feet, these so-called superiorities tend to disappear."

Take, for example, the rate of climb. At 10,000 feet, the Zeke 52 climbs at 2,900 feet per minute. That is from 300 to 600 feet per minute faster than the P-38G and P-47G at the same altitude. But look at the difference at 15,000 feet. There, the rate of climb of the Zeke drops off to 2,100 feet per minute while the Lightning and the Thunderbolt are from 100 to 400 feet per minute faster. At 20,000 feet, the Zeke climbs at 1,500 feet a minute, while the 38G and the 47G are faster by 500 to 800 feet a minute. And compared to the P-51B, the Zeke looks even worse, for the Mustang can outclimb it at any altitude.

You have heard, probably, that the Zeke has a terrific rate of climb. Actually, it only seems to be climbing fast because it goes up at an extraordinary sharp angle. At 5,000 feet, the Zeke climbs at about a 35 degree angle which, our technically minded experts tell us, is phenomenal. But, you will be happy to know, it doesn't get there any faster.

In comparative speeds, any of our standard fighters, including the P-40N, can move considerably faster than the Zeke. The Zeke's best speed is at 20,000 feet where it can travel at 335 mph straight and level. At that altitude, the slowest of our planes goes some 15 mph faster while the Mustang can whip along about 80 mph faster. All these figures give the Jap the benefit of an analytical doubt, for at higher altitudes—25,000 feet—the Mustang is at least 100 mph speedier than the Zeke.

"The Zeke can do most everything fairly well—at slow speeds," reports Lt. Herbert Jay, USNR. "It rolls beautifully below 150 mph, but when you get up around 170 to 185, it starts to tighten up, and at 225 mph, it is extremely difficult to roll. The aileron action is poor and the stick gets very heavy. The best characteristic of the Zeke is its ability to turn—and even then, it has that advantage only at slow speeds at low and medium altitudes. Around 150 mph, it can turn on a dime and return nine cents change. But at 225 mph, great force is re-

quired to maneuver the airplane and above that speed it is almost impossible to turn and still retain complete control. The Zeke was built to fly low and slow."

Lieutenant J. Michael Kirchberg, USNR, reports that a Jap pilot may be able to dive the Zeke at high speeds but when he pulls out, the whole plane may not come with him. "The thing is so tinny," he says, "that I was scared to death to dive it too fast for fear it would fall apart. There is very little control of the ailerons in a diving speed."

Generally speaking, the Zeke is an easy plane to fly. However, in landing, complications set in. With respect to the wheel and flap levers, the following procedure must be used to land a Zeke: Wheel lever down, flap lever down, flap lever to neutral, wheel lever to neutral before you hit the ground. Then, wheel lever down, flap lever up, flap lever back to neutral and wheel lever back to neutral.

Strangely enough, some of the instruments are exact copies of those in our pre-war aircraft. The Jap radio compass, for example, is so exact a duplicate of one Fairchild instrument that some of the parts are interchangeable with it. One compass still had the Fairchild trade mark on it. The only instruments which were criticized by the test pilots were the gas gauges. Of these, Lieutenant Andrews remarked, "They are undependable and inaccurate." But he has a prejudiced opinion. On his first test flight, he ran out of gas.

Maj. F. E. "Al" Hollar, U. S. Marine Corps, takes an unfavorable view of the airplane. "It's a hydraulic nightmare," he says. "It leaks fluid continually. What's more, it's a firetrap. I don't care how fast or maneuverable a plane may be, some armor plate and leak-proof gas tanks are necessary. Don't get the idea, though, that the Japs will continue to turn out airplanes of this poor quality. Compared with the earlier Zeke, the 52 climbs about 300 feet a minute faster, it's about 150 pounds heavier, and it has about 1,300 feet more ceiling. And they are getting better."

Conclusive evidence that the Japs are getting better all the time is found in a late report on a Zeke captured in the Philippines. It was equipped with a third 20 mm cannon in addition to its standard firepower. The new cannon, mounted behind the pilot, was inclined forward so that it fired up at an angle of thirty degrees over the pilot's head, clearing the propeller arc.

Other reports indicate that the light 7.7 mm machine guns have been replaced with 12.7 mm machine guns and later models may carry a 13 mm gun.

The general test pilot opinion of the Zeke 52 adds up to this: it is like flying an AT-6 with 1500 horsepower. The Jap pilot has a very light airplane with a good engine, so the recommendation is not to try to turn with it at low altitudes and never dogfight with it. Don't follow it in a shallow loop for it will be on your tail before you level off. Given the fact that you can go higher, farther, and faster with full armor protection and superior firepower, you can select your own tactics against it. As Lt. Jay says, "The Zeke 52 is just another airplane with a couple of good characteristics." ☆

Dangerous April

Prepared by Hq Weather Wing, AAF

For airmen in the United States, the expression "Beware the Ides of March" might well be changed to "Watch the weather during April." It is in April that most aircraft accidents occur as a result of weather.

The primary reason is that over most of the United States, the characteristics of both summer and winter weather are present during April. There are six meteorological situations by which weather accidents are classified (see chart below), and four of them occur in April. They are cold frontal, pre-warm frontal, air mass cloudiness, and air mass thunderstorms.

Cold fronts may produce cumuliform clouds, turbulence in the lower levels, unstable lapse rate, showers, thunderstorms, hail, sleet, and snow flurries. Warm fronts may produce stratiform clouds, fog or ice-crystal fog, poor visibility, drizzle, and heavy dew.

Less than three percent of the accidents to Army aircraft in the United States during 1944 involved weather as a contributing factor, according to statistics compiled by the AAF Weather Wing, Asheville, N. C. Considering the fact that this country produces some exceedingly nasty weather —and the further fact that vital air schedules are met despite it—that is a record worthy of note. However, weather accounted for approximately 16 percent of the fatalities resulting from accidents, which establishes weather as the most ruthless enemy a pilot must face outside of actual combat conditions.

Normally, the greatest weather hazards in the United States are air mass thunderstorms during the summer, and air mass cloudiness and pre-warm frontal weather in the winter months. However, during the periods when these situations are most frequent, accidents due to weather conditions do not reach their expected peak. The reason for this is twofold: during the summer, pilots are usually alerted to the danger of thunderstorms, and during the winter, extra precautionary measures ground the planes when weather difficulties appear imminent. The safest months, weatherwise, are from July through October when the occurrence of warm fronts, occlusions, and air mass cloudiness is at a minimum.

In evaluating crack-ups due to weather conditions, Accident Investigation Boards usually assign responsibility to one or more of three groups: pilots, clearing and supervising authorities, and forecasters. Although weather was a contributing factor in three percent of the accidents in 1944, less than one percent of these mishaps resulted from incorrect forecasts by the AAF Weather Service. A comparable record is being maintained in every part of the globe. ☆

Distribution of Weather Accidents by Month by Type of Weather in Percentages

1944	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Occlusions	1.6	0.5	0.2	0.5	0.0	0.2	0.0	0.2	0.0	0.0	0.2	0.2
Cold Front	1.4	0.2	2.5	3.9	1.8	1.1	0.7	1.1	0.9	0.9	2.7	0.9
Warm Front	3.2	4.8	2.7	2.3	0.9	0.7	0.2	0.5	0.9	1.4	1.8	1.6
Air Mass Clouds	3.9	2.5	3.6	3.0	0.7	1.4	1.6	1.4	2.3	2.3	3.9	2.7
Air Mass Thunderstorms	0.0	0.2	0.5	4.7	7.1	5.0	2.3	2.3	1.1	0.2	0.2	0.0
Air Mass Visibility	1.1	0.2	0.2	0.0	0.5	0.2	0.2	0.0	0.2	0.5	0.2	1.1
TOTALS	11.2	8.4	9.7	14.4	11.0	8.6	5.0	5.5	5.4	5.3	9.0	6.5

Mud

Best mudder in the AAF is the caterpillar tractor, shown here helping a Thunderbolt over French terrain. Fighters taking off from muddy strips often get windows of gun cameras splattered and kills made during mission cannot be recorded. This P-47 will bomb obstacles in path of Sixth Army.

France. Broom brigade of First Tactical Air Force engineers swabs landing mat in effort to keep field operational. Straw is sometimes placed under the steel mats to stop mud from oozing up.

Marianas. When mud threatened this 7th Air Force base with ration spoilage and turned roads adjoining the field into unmanageable bogs, aviation engineers laid coral on road surfaces, piled rations on dry base of Marston matting.

Of all the enemies that beset the AAF, mud is one of the most dangerous, tricky, exasperating. It can turn taxi strips into bogs, high morale into black frustration. To all those who have slogged, churned and fretted in it, these pictures are dedicated

Italy. Rover sits high and dry and watches Cpls. Arthur Zeitler and Francis Vincenti dig away at the muck which has mired their bomb dolly, loaded down with 1,000-pounders.

England. Pity the poor mech who has to slosh through two feet of slime to change a tire, fix an engine, patch up a flak hole, go to the latrine.

India. The monsoon brings mud as surely as privates get KP. Indian laborers are shown here unloading gas drums under supervision of enlisted man.

Saipan. Here's Brig. Gen. H. S. Hansell sans paddle. Col. J. Montgomery is the wary pilot.

Belgium. Slippery landing strip caused this Lightning to skid off runway. Mud forms when drainage ditches can't handle constant rain loads. Rapid wear of brake drums and linings, broken axles, stripped gears are among mud's victims. Rocks stuck in mud damage tires.

And so we bid farewell to sunny Italy, land of olive trees and goo. To GIs everywhere goes a muddy orchid for good work against a tough enemy.

SHOOTING THE BREEZE

GOT ANY GOOD STORIES? SEND 'EM IN!

South America. At one time B-29s were so secret that on their way overseas they presented many difficulties to their crews. As one colonel once complained, "I wish we could dehydrate these things and stuff them in a barracks bag." A real problem came when one of the Superforts landed somewhere in South America enroute to a combat theater. After politely explaining to a heavily braided captain of that country's Army that he could not take a ride in the plane, or even inspect it, the crew asked for a guard around the aircraft. The captain agreed. A cordon of his soldiers was strung around the B-29. Satisfied that their plane was safe from prying eyes, the crew went to town for the night. When they returned

next morning they found everything in order. No one had gotten within 50 yards of the Superfort. The crew was highly pleased—until they started out to the plane. The guards had their orders, and their guns were loaded. Frantic investigation revealed that the South American captain in charge of the guards had gone on a hunting trip into the mountains. It took 15 radio messages and two American consuls to dismiss the guards. Twenty-four hours later the B-29 got off the field.

USA.—Among the AAF combat men already returned from overseas there are some who have been assigned to office jobs in Washington, D. C. As such they have heard all the standing jokes. They know the one about a disgruntled citizen who in the dead of night stole up to an important government building and installed a placque saying: "Washington Slept Here." And others. But it remained for a bombardier, now running a typewriter, to hit two jackpots in one day. In making a telephone check on a traffic matter he heard a husky voice in a government office identify his station as "Frustrated Freight!" A short time later, calling an operations office, a sweet, sexy little voice answered: "This is Strategic Resistance."

New Guinea. The truck driver stood before Chaplain Lloyd M. Alexander and explained the purpose of his visit. He wanted the chaplain to assist him in securing Red Cross aid for his sister back in the States. Knowing the Red Cross as the surest and quickest span between troubled soldiers and their kinfolks, the chaplain asked the soldier to sit down. The young man's sad expression and soft voice emphasized the need of such a friend. After they had talked for a minute the chaplain asked what, specifically, was the sister's problem.

"Oh, she's got no problem," the boy said. "She teaches school, and her husband works in a war plant."

"Then, why do you want the Red Cross to help her out?" the chaplain asked.

"Because she was always good to me," the soldier answered. "Now, I'd like to do something for her."

South Pacific.—It wasn't the heat, but the humidity. Day after day the men of an antiaircraft crew had fought the heat and dampness. Sweat ran in their eyes and made their lips taste like the rim of a pickle barrel. After one atrocious day when the humidity was almost unbearable, the crew, grown a little daft, reported: "There was so much moisture in the air today that we shot down four submarines." The report went to headquarters. Back came a poker-faced reply: "We doubt that this is true."

Hawaii. The Vulnerable Sons of William Tell, an impromptu organization of tow target pilots, has been responsible for some cynical retorts which should live as long as this old world has need for antiaircraft gunners. The latest and maybe the best remark was made one night by a daring young man pulling target high above this southern clime. Either it was very dark, or the gunners were over-eager, but in any case the pilot noticed that ack-ack fire was coming closer to his plane than to the sleeve which was the target. He maintained a stoic silence as shells burst close on his tail, but when a couple of shots puffed out ahead of him he broke his silence.

"Hey," he screamed back to his radio man. "Tell those morons that I'm pulling this rag, not pushing it!"

Italy. It was well after midnight when a lieutenant and a private pulled up in their jeep where a mountain road forked in two directions. A lonely and brooding MP loomed in the darkness, stationed there for the purpose of guiding traffic.

"Which is the road to our lines?" the lieutenant asked.

"Take the right, sir," the MP answered.

The jeep lurched along in the indicated direction.

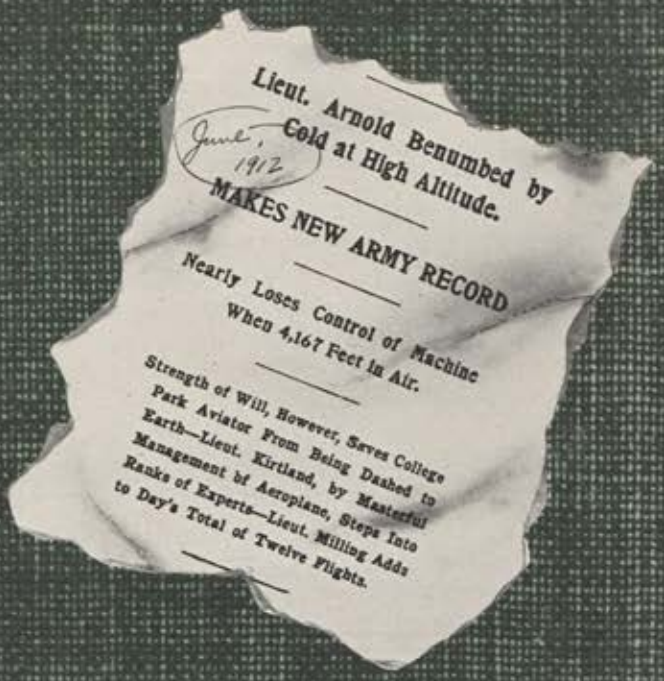
Then, some sixth sense that hovers over privates who live right cautioned the driver to stop the vehicle. He walked ahead 50 feet in the deep gloom. And there, where a bridge should have been, was only a gaping drop of 300 feet into a gorge.

Incensed, the lieutenant and private quickly drove back to the MP. After the officer had applied a severe tongue lashing, the MP shook his head sadly.

"Can't understand it, sir," he said, "I've been sending traffic that way all night, and you're the first to complain." ☆

THE ALBUM

1909 (5 miles). This is it, men, we're all set for the big hop from Fort Meyer to Alexandria, Va. Orville Wright piloted, Lt. F. P. Lahm went along for the ride.



June 1912

Lieut. Arnold Benumbed by Cold at High Altitude.

MAKES NEW ARMY RECORD

Nearly Loses Control of Machine When 4,167 Feet in Air.

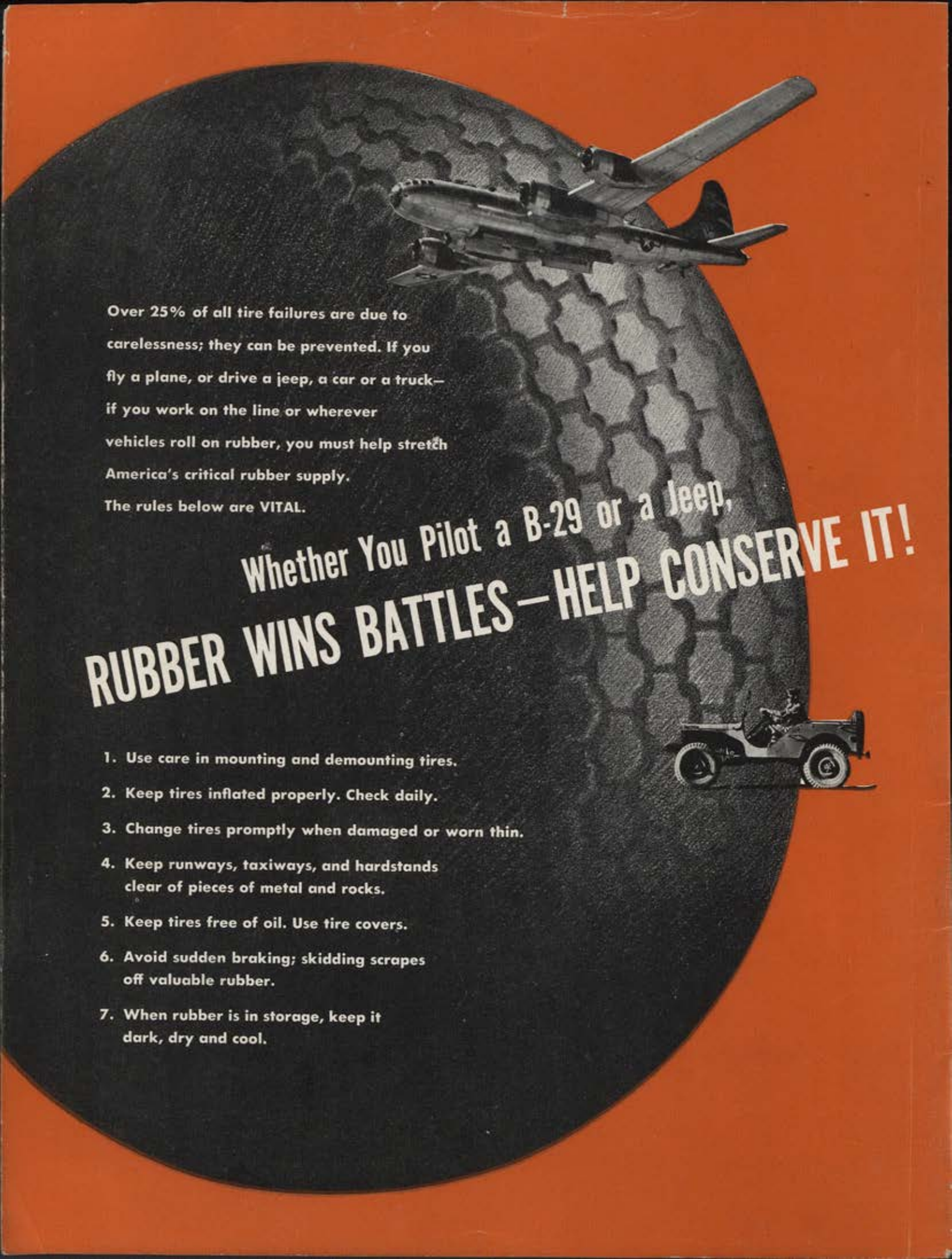
Strength of Will, However, Saves College Park Aviator From Being Dashed to Earth—Lieut. Kirtland, by Masterful Management of Aeroplane, Steps Into Ranks of Experts—Lieut. Milling Adds to Day's Total of Twelve Flights.

1912 (30 miles). Earl Sandt conquers the vast, icy expanse of Lake Erie. On the way back, Yours Truly's engine got nasty, abruptly landed him in a frozen heap.

1922 (2,060 miles). Flappers, Blind Pigs and Cal Coolidge were newcomers when Lts. O. G. Kelly and J. A. Macready flew this signboard from California to Indiana.

1929 (11,300 miles). For six days the Army's "Question Mark," a Fokker C-2, hovered over southern California, getting fuel transfusions and setting a world record.

The Question Mark's crew: S/Sgt. R. Hooe, Lt. E. Quesada (now Maj. Gen.), Lt. H. Halverson (now Col.), Capt. I. Eaker and Maj. C. Spaatz (now Lt. Gens.).



Over 25% of all tire failures are due to carelessness; they can be prevented. If you fly a plane, or drive a jeep, a car or a truck— if you work on the line or wherever vehicles roll on rubber, you must help stretch America's critical rubber supply. The rules below are VITAL.

Whether You Pilot a B-29 or a Jeep, RUBBER WINS BATTLES—HELP CONSERVE IT!

1. Use care in mounting and demounting tires.
2. Keep tires inflated properly. Check daily.
3. Change tires promptly when damaged or worn thin.
4. Keep runways, taxiways, and hardstands clear of pieces of metal and rocks.
5. Keep tires free of oil. Use tire covers.
6. Avoid sudden braking; skidding scrapes off valuable rubber.
7. When rubber is in storage, keep it dark, dry and cool.