

Office, Chief of Staff

AIR FORCE

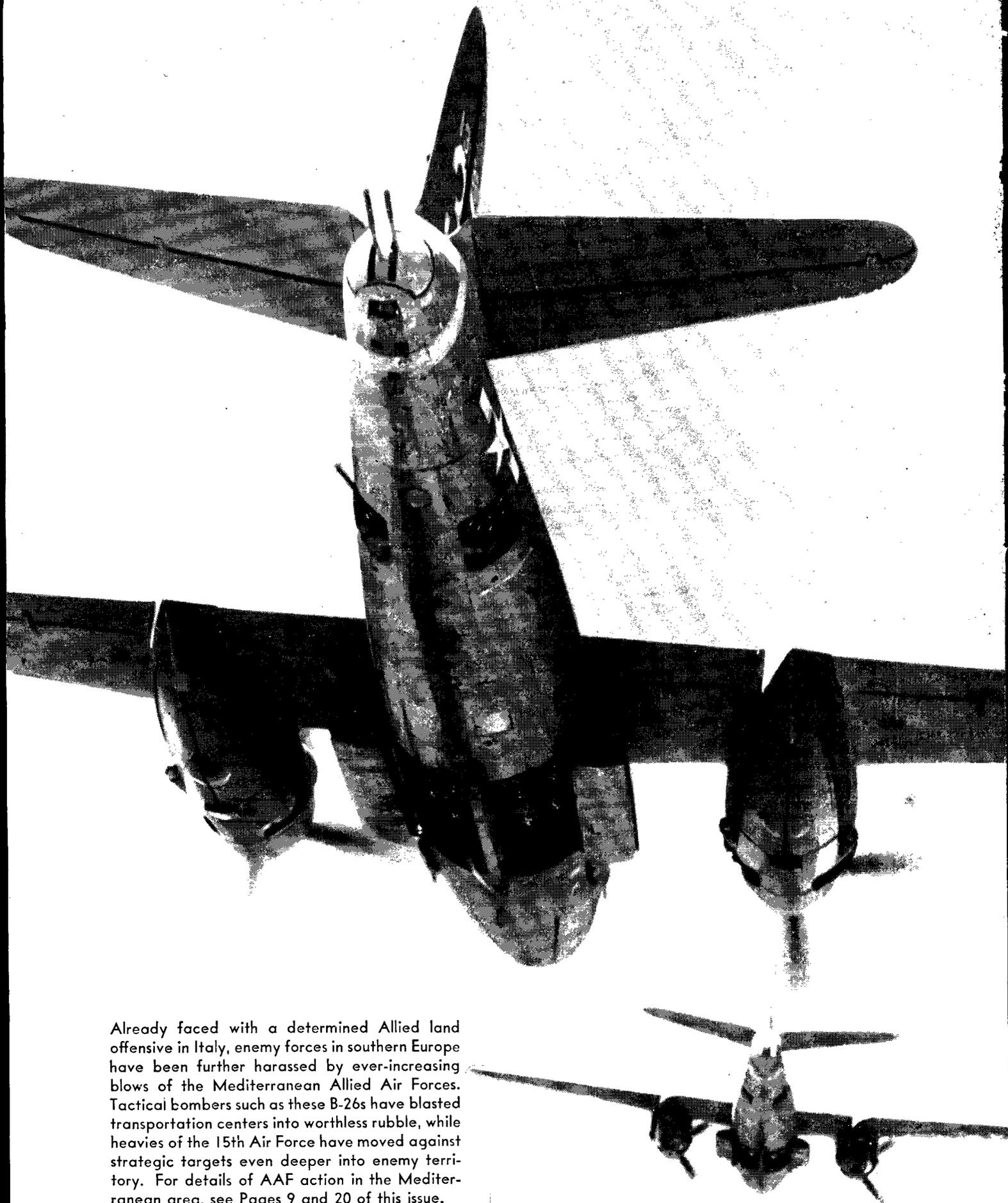
THE OFFICIAL SERVICE JOURNAL

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The B-29 Superfortress

JULY 1944



Already faced with a determined Allied land offensive in Italy, enemy forces in southern Europe have been further harassed by ever-increasing blows of the Mediterranean Allied Air Forces. Tactical bombers such as these B-26s have blasted transportation centers into worthless rubble, while heavies of the 15th Air Force have moved against strategic targets even deeper into enemy territory. For details of AAF action in the Mediterranean area, see Pages 9 and 20 of this issue.

AIR POWER IN THE INVASION

'If you see a plane it will be ours.' It was up to 31,000 airmen to make good that promise on D-day. They did.

**By Cable from AIR FORCE Staff
Correspondents in the ETO**

INSIDE the metal skins of hundreds of C-17s, soot-faced paratroopers knelt in final prayer. Standing beside their fragile craft, glider pilots checked their watches as the minutes ticked away toward midnight. On the Channel coast, civilians felt their beds rock and houses shudder as the RAF hurled down on ten Nazi gun emplacements the heaviest night bomb load of the war. All day long, Lightnings had patrolled the Straits, guarding ship movements from hostile eyes. Now the great armada was well under way, a thousand phosphorescent wakes gleaming under clouded skies. At bomber and fighter stations all over England, lights burned behind guarded doors as the last secret orders came in. Weeks of tension were building to a final climax. This was it; this was D-day.

Shortly before midnight, three airborne divisions were on their way—the American 82nd and 101st and the British 6th. At six minutes past midnight, one great sky serpent, nine planes wide and 200 miles long, thrust its head across the enemy-held coast. Ten minutes later the lead plane of the 9th Troop Carrier Command's Pathfinder group was over the designated drop zone. Lights by the open door of the Skytrain winked red and then green. Carrying radio equipment that would greatly facilitate navigation for succeeding aircraft, the first stick of paratroopers tumbled into the flak-streaked darkness. The time was 0016 June 6, 1944. The liberation of Europe from the west had begun.

Almost unchallenged the great procession swung back toward its base. As the head recrossed the English coast, the

tail was still going out, roaring across the choppy Channel at 300 feet. As each section of the body passed over Cherbourg Peninsula at a slightly increased altitude, hundreds of parachutes blossomed in the gusty air. Some came down through clouds that hung as low as 500 feet. As fast as they hit the ground, the paratroopers seized key positions and began clearing the landing areas of obstructions left by the Germans. Gliders came spiraling down—British Hamilcars and Horsas and the smaller American CG-1As—carrying fighting troops, ammunition, land mines, field artillery, jeeps, medical supplies and even complete radio stations in some cases. The heavy Horsas actually mowed down German obstacles. The giant Hamilcars, with greater wingspread than a Lancaster, disgorged tanks. Some cracked up but still delivered cargoes. Later the Germans complained bitterly about the Allied use of dummy paratroops. One American glider landed by mistake on a roof, spilling out a combat team who promptly captured the village. Others were briefed to land directly on top of gun positions, silence the gun crews and get away before the Allied bombers returned to the job. They did.

THE losses among the Skytrains, flying unarmed and unescorted at less than 1,000 feet, were astonishingly light. The Americans lost only 26 aircraft out of almost 1,000 dispatched, a bargain price to pay for the achievement of landing two crack divisions behind the Atlantic Wall. All the lessons learned in the dangerous night exercises during the past weeks in Britain were brilliantly applied.

The 9th Air Force's Troop Carrier Command could well be proud of the night's work.

By the time the Skytrains were back at base, preparing to fly reinforcements to the men they had dropped, the daylight forces were being briefed for the greatest air effort in history. Everything was going to be thrown in, from heavies to fighters. "You needn't worry about the air," the Supreme Commander had said to his assault troops a few hours before. "If you see a plane it will be ours." It was up to the airmen to make good that promise. Before 0800 hours on D-day, 31,000 of them had helped make it a reality.

Actually, General Eisenhower's prediction, the highest possible tribute to Allied air power, had been made possible by months of unending work on the ground and unceasing heroism in the air. Factory workers in America and Britain were partly responsible, so were American aircrews who flew from Italy to blast German fighter factories in Austria. Ground crews in Britain, working eighteen hours or more each day to keep the planes in the air, shared credit equally with the men who scored the air victories. It was the sum total of the effort that counted.

It would be absurd at this stage of the game to attempt to evaluate air power's contribution to the initial success of the invasion. But looking back over the months that preceded D-day, a certain orderly and logical sequence of achievements can be discerned. First of all, the Luftwaffe was forced back into Germany. This was primarily the contribution of the heavy bombers of the 8th Air Force and the fighter escorts who dealt such terrible

blows to the war-making capacity of the Reich and to the Reich itself that Hitler was forced to husband his dwindling air strength to protect the Homeland. Medium bombers and fighters of the 9th Air Force and the RAF's 2nd Tactical Air Force also deserved credit for making the coastal airdromes too hot for the Luftwaffe to use with any comfort. But it was primarily strategic pressure on Das Vaterland and the steadily dwindling aircraft reserves that cost Jerry all hope of contesting the air over the beaches as he had done at Dieppe.

Once this forced withdrawal of the enemy air force was accomplished, Allied airmen were able to turn their attention to the network of communications on which the Germans relied to supply the armies of the Atlantic Wall. Heavies, mediums, light bombers and fighters of both the RAF and AAF, hammered marshalling yards, junctions, tunnels and bridges into a state of chaos. By D-day, out of twenty-four railway bridges and fourteen road bridges across the Seine between Paris and the sea, all but one railroad bridge and five highway bridges were knocked out. By D-day plus one, they were all destroyed. The effect on Rommel's ability to shift troops quickly can easily be imagined. And the onslaught against rolling stock and road traffic never ceased.

THE pre-invasion function of air power was to observe as much as possible of enemy preparations while denying him the benefits of photo-reconnaissance. In endless sorties, Allied photo planes obtained coverage of the entire enemy-held coastline. At low tide they photographed the steel obstructions planted by the Germans to repel landing craft. Inland they kept a watchful photographic eye on the progress of the anti-glider and anti-paratroop installations. Our fighter sweeps were unable completely to prevent German photo-reconnaissance, especially at night, but restricted it to a point where the Germans obviously were kept guessing.

The fourth and perhaps supreme tactical contribution of Allied air power was the blitz on German coastal defenses themselves for weeks before D-day. Bombers poured an endless stream of high explosives on naval guns—155mm and 170mm—housed in steel and concrete emplacements. On the night before D-day, the RAF dropped 5,000 tons on ten of these crucial batteries in the area between Le Havre and Cherbourg—more tonnage per battery than London ever received at one time during the height of the blitz. At dawn 1,300 American heavies took over where the RAF left off. As a result, the gunfire greeting the seaborne forces was much weaker than expected. The great guns on our battleships could and did silence the shore guns still able

to fire, but the fact that early reports indicated only two destroyers and one LST sunk out of an armada of 4,000 ships shows how thoroughly the way had been prepared.

To thousands of American airmen in Britain, the first warning that H-hour was at hand came when iron security regulations were clamped down on stations, guards were doubled, briefing room doors were locked and no one was allowed to leave. Post visitors were not told of the alert until after they were admitted and then found that they could not leave. In some cases, this sequestration led to awkward situations. At one fighter station, presumably unadorned by any Wacs, the harassed supply officer was pestered by indignant female hostages to provide certain items which he never before in all his Army career had been called upon to produce. At another base, the local vicar arrived in high dudgeon to demand the release of several young women of his parish who, he said, were not adequately chaperoned. They were not released. A farmer, finding the village veterinarian was among those interned, wistfully drove a sick cow up to the gate. The sentry informed him that the cow could be treated only inside the fence and that it would have to stay there. At another station two innocent passersby, who displayed mild curiosity at the blue and white zebra stripes with which all invasion aircraft were feverishly being painted, were enticed inside and held.

Probably the first four-engine American aircraft to participate in the invasion plan were six Fortresses that dropped leaflets warning the French of the storm about to break. Long before any daylight, hundreds of heavies and mediums were airborne, some taking off by moonlight. D-day had been postponed 24 hours to let the weather improve but it was still far from perfect. Through breaks in the clouds, crews of the heavies caught glimpses of the sea armada far below. Some claimed that their bombers were rocked even at that altitude by the concussion of naval broadsides being fired across the beaches.

MARAUDERS, flying lower than on any occasion since their disastrous debut in the ETO, had a better view than anybody. They saw tanks crawling ashore to engage the enemy, fields filled with the wreckage of gliders, bomb-pocked ground littered with parachutes. Fighters, never less than 200 feet over the beachheads, prowled restlessly up and down looking for the Luftwaffe. On the whole they were disappointed. Goering had issued a statement to the effect that the invasion had to be repulsed even if the Luftwaffe perished in the effort, but apparently the Luftwaffe was not ready for a showdown. Barely fifty enemy planes were seen in the battle area all day. Four of the twelve

JU-88s that made a pass at one of the beachheads were destroyed. With approximately 10,000 Allied sorties being flown, the odds against the Luftwaffe were 200 to 1. The Supreme Commander was right: the assault troops did not have to worry about the air.

All through D-day endless air processions went on. The 8th Air Force flew over 4,300 sorties; this was as many battle flights in one day as the 8th Air Force had completed in its first seven months of operations over Europe. The 9th chalked up better than 4,800 and the RAF's 2nd Tactical Air Force recorded some 2,000. It is probable that in the first 24 hours more than 13,000 battle flights were flown. When the late summer darkness descended, the Allied night fighters took up patrols and shot down twelve enemy aircraft that attempted to attack the beaches.

Air opposition stiffened slightly the next day. Air losses were even—both sides losing 23. For the Allies, however, this represented only a tiny fraction of the total forces engaged. By noon of D-day plus two, only 289 aircraft were missing of some 27,000 sorties flown—an overall loss ratio of barely one percent. Meanwhile, the Luftwaffe lost 176.

THE close support afforded by the tactical air forces during the first three days was magnificent. The Marauders, sometimes flying three missions a day at whatever altitude the weather permitted, added their bombweight to the naval bombardment of the stubborn German stronghold of Caen. Bomb-carrying P-47s pinpointed the troublesome gun positions and silenced them. Four 9th Air Force groups were singled out for special commendation by a spokesman representing General Montgomery. Meanwhile, 1,000 American heavies blasted airfields in a wide arc around the battle zone. General Eisenhower referred to "the long and brilliant campaign conducted in the past months by the combined air forces." It had been, he said, an essential preliminary to invasion and he congratulated the airmen on keeping up the good work. Other Allied leaders agreed that the air support was all that could be desired.

On Friday, June 9, the uncertain weather became so bad that all Allied air activity ceased. This respite gave the Germans a chance to bring up badly needed supplies and hindered the landing of our own. The communications of both sides, to a large extent, were at the mercy of the weather, but what was favorable to one handicapped the other. Bad weather tended to bottleneck Allied supplies on the beaches. Good weather closed the stranglehold of Allied air superiority around Rommel's throat.

On Saturday, when the skies cleared somewhat, our planes found the roads behind the enemy lines choked with rein-

forcements. They took up strafing where they had left off on Thursday. Marauders flew in as low as 200 feet. One came back with a fragment of its own bombs lodged in the wing. Twenty-eight enemy aircraft were destroyed that day; twenty-six of ours were lost. Sunday was the same story except that our losses were even lighter and the Luftwaffe more elusive than ever.

By Saturday, emergency landing strips were being used by Allied planes running short of fuel or suffering battle damage. Sites for these landing strips were chosen before the invasion troops left England. Engineers had landed on D-day and bulldozers followed that night. The first strip had been carved out of a corn field under sniper fire and was ready for action by Friday afternoon.

By Monday a Spitfire wing was in full operation and air evacuation of the wounded by transport plane had begun. With the Troop Carrier Command's great fleet of Skytrains virtually intact, supply by air may assume great importance as airdromes are captured farther inland.

As these words are written, on the morning of June 12, D-day plus six, the German Air Force has yet to put in an appearance. Rommel seems to be committing his reserves piecemeal but they are battling without benefit of air power. Germany certainly has enough front line air strength left to make a fight of it for a limited time at least, but so far she is

**For Contents and Cross
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either unable or unwilling to do so. Probably both. Airfields near the battle zone are likely to prove death traps for grounded aircraft. Besides, if the Luftwaffe moves its limited fighter strength forward, American heavies will smash targets left unprotected in the Reich. Already since D-day, Italian-based Fortresses and Liberators in great strength have attacked factories in Austria. The Nazis are in the unhappy position of a boxer with only one hand to guard himself. If he tries to protect his face, he risks a knockout blow in the solar plexus.

Rommel may be saving his air strength for all-out counterattack. If so, British and American fighters are more than ready for him. With Rome fallen to the Allies, with shuttle bombing to Russia from Italian bases an established fact, with the Soviet steam roller beginning to move into Finland, with the last Rumanian oil refineries smashed, the Nazi's plight is an unenviable one.

As one of their own newspapers put it, the success of the Allied invasion "would simply mean the end."

With that Teutonic wail of defeatism, no one seemed likely to disagree. ☆

20th Air Force Superfortresses Open New Era of Aerial Warfare

THE bombing of Japan by B-29 Superfortresses has marked a major development in aerial warfare which is destined to play a leading role in crushing our enemy in the Far East.

Word of the June 15 attack on the heart of the Japanese empire was accompanied by the official announcement that a new air force—the 20th—had been created to have jurisdiction over all combat operations of the B-29.

The 20th Air Force is operated directly under control of the Joint Chiefs of Staff and is commanded personally by General H. H. Arnold, Commanding General of the AAF, with Brig. Gen. Haywood S. Hansell, Jr., as Chief of Staff.

Soundness of such an operational plan was explained by General George C. Marshall, U. S. Army Chief of Staff, who declared the long-range bomber introduced a "new type of offensive against our enemy" and created "a new problem in the application of military force."

"Because of the enormous range and heavy bomb loads of these Superfortresses," said General Marshall, "... they can strike from many and remote bases at a single objective. The power of these new bombers is so great that the Joint Chiefs of Staff felt that it would be uneconomical to confine the Superfortress organization to a single theatre. These bombers, therefore, will remain under the centralized control of the Joint Chiefs of Staff with a single commander, General Arnold, acting as their agent in directing their bombing operations throughout the world. The planes will be treated as major task forces in the same manner as naval task forces are directed against specific objectives."

General Arnold paid tribute to our planners and engineers, coupled with the capacity of American industry, as "an unbeatable combination" and stated that the advent of the B-29 makes possible the softening-up attack on Japan very much earlier than would be possible with aircraft hitherto known to combat.

"The Superfortress," he said, "is not going to win the war by itself nor has anyone thought that it will do so. It will, however, like its predecessors, the B-17 and B-24, strike at the sources of enemy strength and prepare the way for ultimate decision by our well established team of land, sea and air forces."

"In our new strategic thinking, the B-17 and B-24 will now become medium instead of long-range bombers and our B-25 and B-26 aircraft will become short-range bombers. These smaller planes will travel no less distance than they do now, but the B-29 will attack from much greater distance and with much more power.

"The employment of the B-29 is just beginning. It goes directly into battle from the production lines and we have a lot to learn before its full power may be developed. Consequently, the frequency of its use will be carefully determined for some time. From this circumstance, let our enemies take what comfort they can—while they can."

The production story of the B-29 appears on Page 4.

THE B-29

SUPERFORTRESS

By Col. Donald L. Putt

CHIEF, BOMBARDMENT BRANCH, ENGINEERING DIVISION,
MATERIEL COMMAND

THE XB-29 was flown for the first time in September, 1942. Ten months later, in July, 1943, the first production model of the B-29 was completed.

First of the new series of very heavy bombers, the B-29 is far more than a grown-up B-17; its name of Superfortress belies the extent of revolutionary design and structural changes incorporated in our newest and biggest tactical bomber. Actually, the B-29 is as different from the B-17 as the Thunderbolt is from the original Seversky P-35 pursuit.

Outstanding features of the B-29 are: a new type Boeing wing that is claimed to be the most efficient ever designed; a new flap design that limits take-off and landing runs to those of B-24s and B-17s by increasing total wing area nineteen percent when extended; a dual wheel fully-retractable tricycle landing gear; direct actuating controls without booster systems that handle easier than a B-17's; 2,200 hp, 18-cylinder Wright Cyclone engines with dual sets of turbo-superchargers; four-bladed propellers so large (16 feet, 6 inches) they must be slowed down by 35/100th reduction gears to keep the tip speed under the speed of sound.

Statistically, the plane is a third again the size of the B-17, with a speed over

300 mph, an altitude of over 30,000 feet, very long range and a very heavy bomb load. Its wing span is 141.3 feet, its length, 99 feet and its height, 27.9 feet.

As it will write a new chapter in the AAF's concept of aerial warfare, another chapter—this one historical—can be revealed concerning the original conception and design development of this new sub-stratosphere bomber.

During the middle 1930s, aircraft manufacturers were being coaxed along to build bigger bombers with higher altitude performance. The B-17 was the first, in 1935. Next came the XB-15, half again the size of the Fortress, but it was too slow; the XB-19, twice the size of the Fortress, was not sufficiently maneuverable, was limited in performance by undersized engines.

STILL, we needed a newer and bigger bomber. In early 1939, AAF tactical staffs under General H. H. Arnold and Materiel Command engineers under Maj. Gen. Oliver P. Echols, prescribed the military requirements around which our next bomber was to be built. They were assured by aircraft engine makers that horsepower in excess of 2,000 could be expected by the time the plane was to be flown.

Next step—this was peacetime—was to circularize aircraft manufacturers for designs built around the military specifications. Then, as sketches and proposals began to flow into the Materiel Command at Wright Field, the Germans launched their war in Europe. From reports and observations of German progress in aerial warfare, our tactical staff revised its specifications to include leakproof fuel tanks, multiple gun turrets, heavier caliber guns and cannon and more of them more range and altitude.

All sketches submitted by aircraft manufacturers were rejected temporarily, pending the incorporation of these changes dictated by military necessity. Two companies (Boeing and Lockheed) were awarded contracts for an experimental plane when the plans were resubmitted. Lockheed, which already had the Constellation "in the works," intended to revamp it into a bomber. The sudden need for thousands of P-38s, however, forced Lockheed to drop its big bomber project.

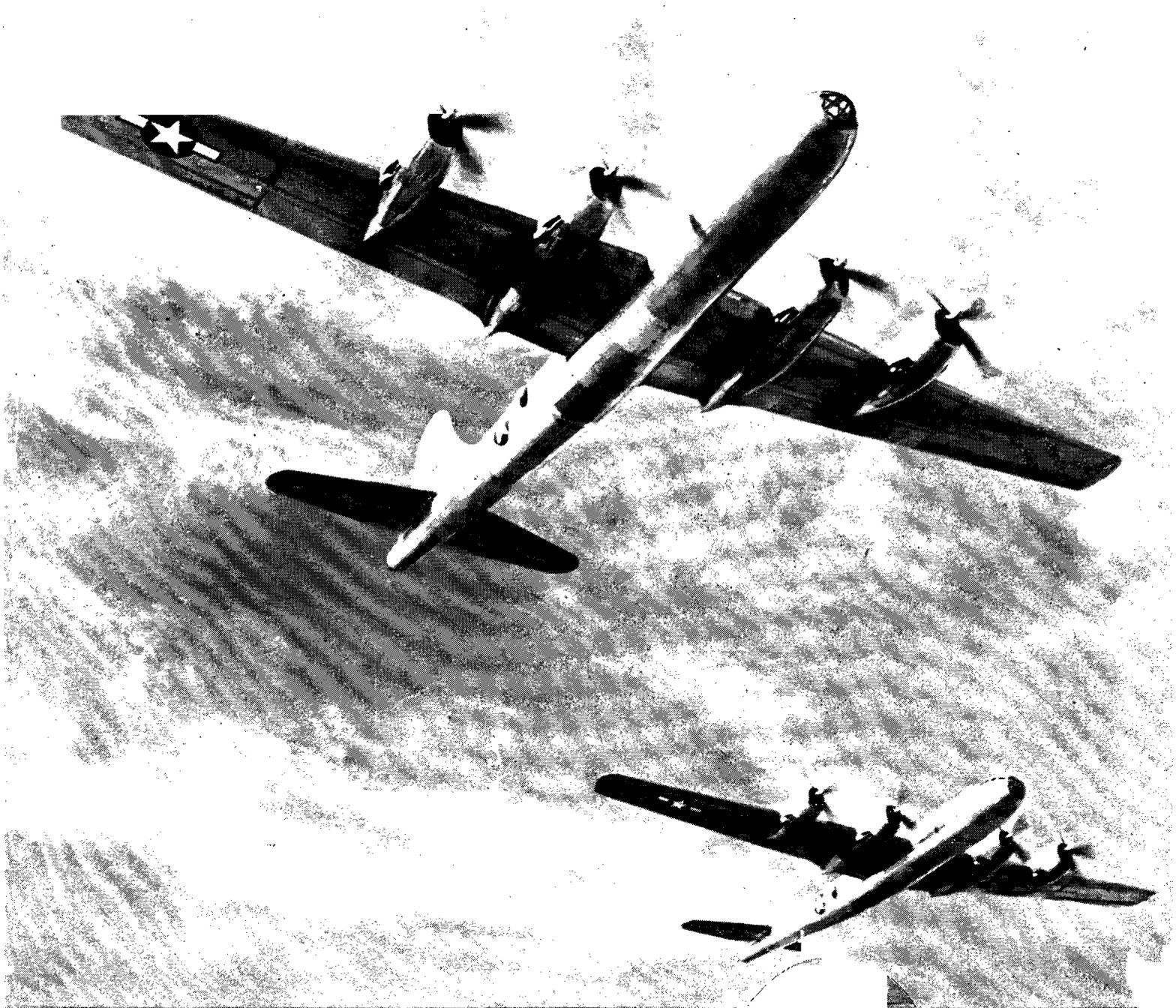
Boeing, with its Stratoliner and experience with the B-17, remained as the manufacturer charged to build the first of the extra-heavy bombers, the XB-29, now known as the Superfortress.

Between the time the XB-29 design

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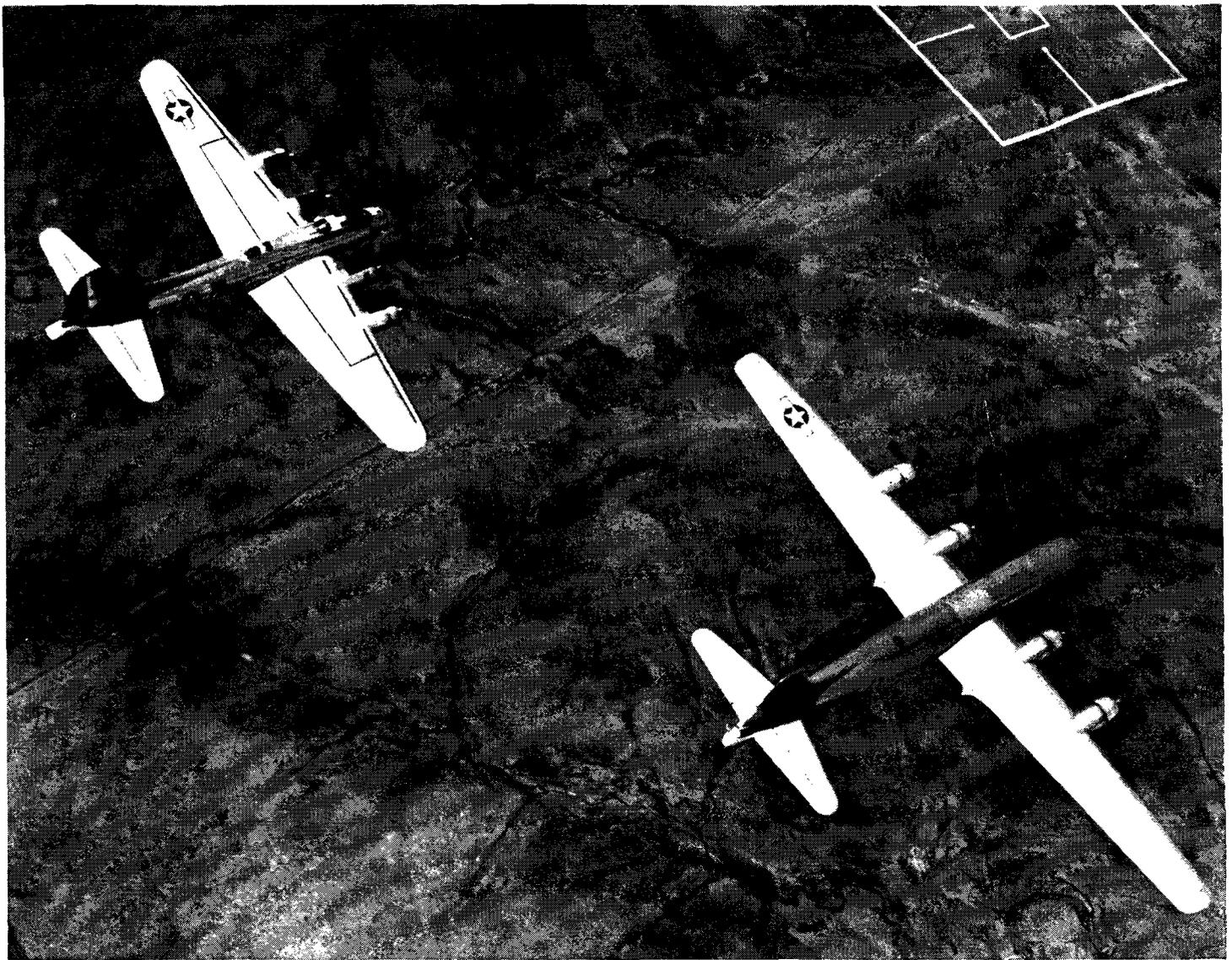
Enlisted man standing near nose of B-29 lends emphasis to size of Superfortress. Right above, B-29s in flight.





**The project officer of the XB-29 tells
the production story of the first
of the AAF's very heavy bombers.**





A comparison between the physical characteristics of the B-29 Superfortress (right) and the B-17 is afforded by this photograph taken of the bombers in flight. B-29 armament in illustrations appearing on these pages has been deleted for reasons of military security.

was approved and the day it made its first test flight, 900 changes were incorporated to improve the plane; 240 more were made before the first production model was completed. Hundreds more have been made since production started. These changes included built-in life raft ejectors and compartments on the top of the fuselage, a switch from blunt to rounded wing tips, lengthening of the tail to provide for better nacelle contour, improved sound-proofing of the cabin, and even the relocation of the crew's lavatory from the right side of the fuselage to the left for reasons of weight.

Inspection of the full-size, all-wood mock-up was made by AAF engineers in November, 1940. Two months later, the XB-29 was under construction in the jigs; four planes were being built simultaneously—one for structures testing, three for flight testing.

Cost of the first four planes approximated \$6,500,000, including models and tests. Wind tunnels at Wright Field,

NACA at Langley and Moffett Fields, and the University of Washington ran exhaustive tests on models that cost as much as \$20,000. These tests led to changes in nacelle design for the cooling of the huge 2,200 horsepower radial engine; drag was cut in half from that of the best designed nacelles on our other bombers. Even compressibility problems were tackled.

Drag was reduced to a minimum by flush-rivet and butt-joint construction. The plane was "clean" aerodynamically, so "clean" that the landing gear, when extended, comprises fifty percent of the drag.

Further wind tunnel tests proved that counter-rotating propellers on each side would improve further the aerodynamics of the plane by nullifying torque. However, with an eye to maintenance problems, it was decided to have all propellers turning in the same direction. This decision led to further research and development of a new rudder design to solve the torque problem. A rudder balance contour also was perfected which eliminated the

need for a booster to help the pilot handle the big ship in flight.

Again military requirements led to a major change when the fuselage was lengthened three feet to permit the hanging of additional racks of 500-pound bombs.

No sooner had the structures test model been completed than it was moved to a specially-constructed T-shaped test building where engineers proceeded to destroy the plane—piece by piece to determine its ultimate strength and load capacity.

Finally, on September 14, 1942, the first XB-29 taxied out on the runway for the initial flight. Eddie Allen, Boeing's chief test pilot, was the man at the controls. The huge sky battleship took off, circled Seattle for about an hour and landed with the ease of an airliner.

Allen, who seldom voiced an opinion about any plane (and he had flown hundreds) simply grunted, "She flies."

George Schairer, one of Boeing's crack aerodynamicists put it another way: "It's the first ship which, after the first flight,

permits me to go home and have damn little to do."

The next day, after a final check-out, I made a second flight in our new XB-29. After a short hop, I jotted down some notes: unbelievable for such large plane to be so easy on controls . . . easier to fly than B-17 . . . faster than any previous heavy bomber . . . control forces very light . . . stall characteristics remarkable for heavy plane. . . .

In rapid succession, for weeks and months, we ran series of carefully planned tests for high speed, landings and take-offs, fuel consumption, speed calibrations, weight trials and firing practice.

Allen and I were at the controls the first time we took the plane off with a full load. It was to have been a normal take-off, but we inadvertently failed to lower the flaps. Nevertheless, the heavily loaded plane lifted off the ground about two-thirds of the distance down the runway, further proving our faith in the plane's flying qualities.

USUAL "teething" troubles of any new plane were ferreted out and remedied during the flight and ground tests—fuel gauges, ignition systems, auxiliary motor-generators, bombing equipment, fuel cell leakage, control cable systems. Each change carried the plane closer to combat. When all of the major "bugs" had been worked out, the B-29 was booked for its big show.

On February 18, 1943, tragedy struck. Eddie Allen, with a fine crew, was killed in the crash of the No. 2 airplane, which had been completed to help with the flight test routine. While in sight of the field, fire broke out in the plane's engines. Allen attempted to get the big ship back but, when just a mile short, the plane fell out of control and dived into a Seattle meat packing house.

Naturally, the crash retarded the program. Causes were indefinite according to the investigation report of the crash board. Steps immediately were taken to reduce all fire hazards in the airplane and, until these changes were made, flight operations were suspended. It was not until September, 1943, that the first ship again took to the air to resume tests.

Meanwhile, production models were being fabricated. We were certain enough of the airplane by now to go ahead full-speed on mass production. To carry out the tremendous program, new plants were constructed and tooled up in Wichita, Kan.; Renton and Seattle, Wash.; Marietta, Ga.; Cleveland, Ohio, and Omaha, Neb. Four different manufacturers tackled the program and 41 percent of their work was subcontracted to other business establishments throughout the United States. When the first production model B-29 came off the assembly line in July, 1943, it already was a modified airplane from the XB model, main difference being in armament which had been increased as combat

dictated the need for more firepower.

Minor alterations constantly are being incorporated as we gain more flight experience; from combat experience, additional modifications will be suggested to increase the effectiveness of this Superfortress against enemy opposition and over enemy targets.

Outstanding aerodynamic development in the B-29 is the low-drag Boeing 117 wing. It carries a high wing loading that is compromised during landings and take-offs by a huge Fowler-type flap adapted to the wing. The new wing has more gradual stalling characteristics and better stall warning than other types used on bombers. The drag per pound of lift has been greatly decreased.

Stability of the plane is excellent; any tendency to fall off on one wing during a stall carries through into a bank and then into a straight-away glide.

Advantages of the tricycle gear—first on a Boeing plane—are easier loading of bombs because the bomb bay is closer to the ground and increased safety in landings, particularly in a cross-wind. Tires are the same size as those used on B-24s and B-17s. The gear retracts electrically. Brakes are operated by a hydraulic boost—the only hydraulic device on the plane.

Belly landings have been made by several of the Superfortresses and in no

case did such a landing cause any extensive damage to the plane. Both ships stopped with hardly a jolt to their crews.

The bomber's structural members are thicker than any used in previous bomber construction. Some of the highly stressed members are of a web-type construction resembling the truss-work of a bridge or a ship's bulkhead.

Eleven and half miles of wiring wind through its framework. There are 150 electric motors of 49 different types.

The interior of the B-29 is almost as large as that of the Stratoliner. The crew is composed of eleven men—pilot, co-pilot, bombardier, engineer, navigator, radio operator and gunners. For comfort, there is a small washroom and four bunks, with oxygen outlets, so crew members can rest on the way to a target. The plane's cabin is sound-proofed more thoroughly than those of airlines.

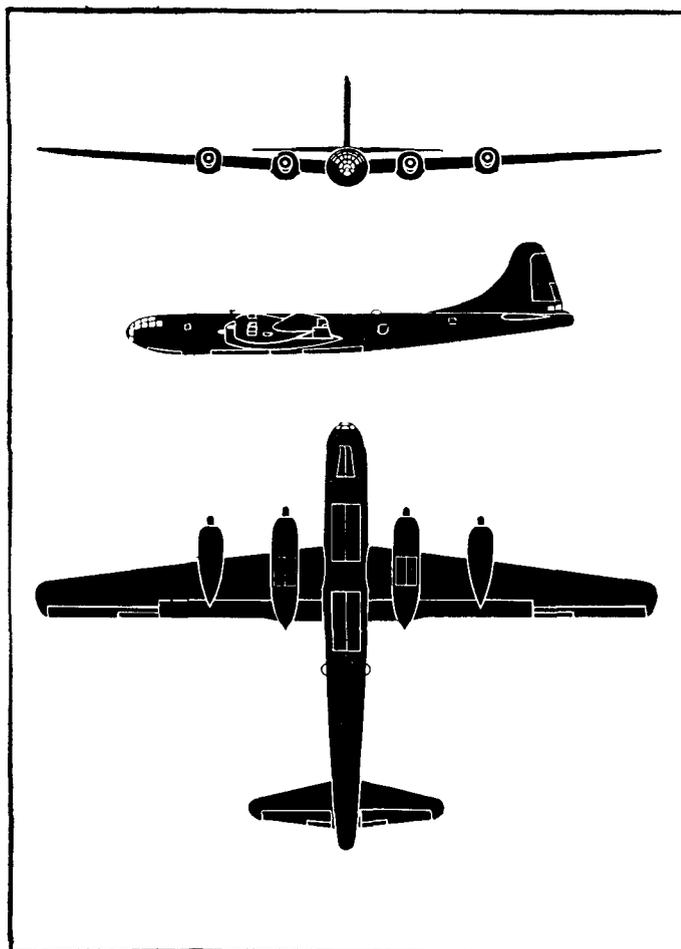
The pilot and co-pilot sit in a large glass-enclosed compartment where visibility is excellent; they can actually look down through the nose at the runway when shooting a landing. The bombardier sits at their feet and can talk with either without interphone. The engineer and radio operator are to the rear of the co-pilot, the navigator on the other side.

The bomb bay was designed and built in two sections connected by a novel catwalk. Crew members now crawl over it, but a small-wheeled belly cart such as that used by mechanics beneath automobiles may be installed in later models. Auxiliary droppable bomb bay tanks can be carried to extend the plane's range.

It is well protected by guns from all angles. It has new sighting equipment, and its gun and cannon installations are power driven. Crew members are protected by heavy armor plating.

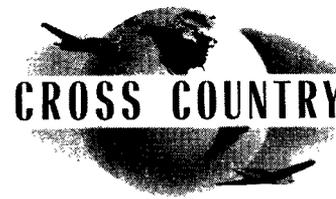
In the development of the B-29, we have witnessed the beginning of a new era in aerial bombardment. It is the first of our AAF extra-heavy, extra-long range bombers that can strike our enemies in all parts of the world and it is destined to play a major role in knocking them out of this war. ☆

B-29 silhouettes.



AIR FORCE

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

In order to provide space in the earliest possible issue for our initial coverage of the invasion, *Cross Country* this month is confined to the important information in this column.

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FOR better coordination of our personnel functions in the field, a Personnel Distribution Command has been established in the AAF under command of Col. Henry M. Bailey, who is responsible to the Commanding General, AAF.

The new command will encompass the functions of the Redistribution Center, Overseas Replacement Depots, Convalescent Centers and AAF shipment supervisors. The Air Surgeon will determine medical policy in Convalescent Centers, as in other AAF medical establishments. Temporarily, headquarters of the new command has been established at Atlantic City, former headquarters of the Redistribution Center.

Although it had operational functions, the Redistribution Center was under the AC/AS, Personnel. The new agency assumes full command status, bearing generally the same relationship to AC/AS, Personnel as, for example, the Training Command bears to AC/AS, Training.

AAF GUIDE BOOK

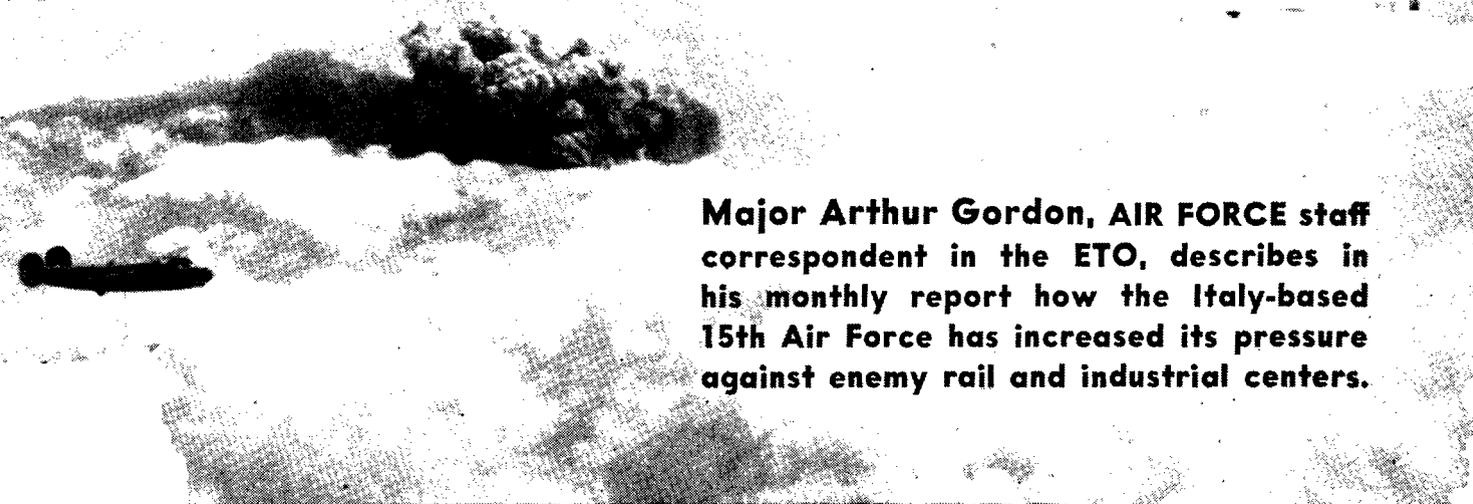
The Official Guide to the Army Air Forces, scheduled for publication late in June (see story on Page 22), will be issued in a special edition for distribution to AAF organizations. This special pocket-size edition will be distributed through official distribution channels to AAF units in the United States and overseas for use as a reference and handbook and in AAF orientation, indoctrination and training programs. For individual use, the Official Guide to the Army Air Forces will be available at PXs and through commercial magazine and book outlets in a pocket-size book and a larger deluxe edition.

NEW PILOT TRAINING MANUALS

Eight pilot training manuals, four for the student and four for the instructor, have been compiled by the AAF Training Command in collaboration with Office of Flying Safety as a vital part in the standardization of AAF training. In addition to the pilot training manuals, the Training Command's Visual Training Department at Randolph Field is now putting the final touches on five manuals for bombardier training. Similar texts on fixed gunnery for fighter pilots and navigation are also nearing completion. Other manuals will be compiled covering all phases of ground school training.—THE EDITOR

WHIPPLISH

FROM THE SOUTH



Major Arthur Gordon, AIR FORCE staff correspondent in the ETO, describes in his monthly report how the Italy-based 15th Air Force has increased its pressure against enemy rail and industrial centers.

Striking evidence of the effectiveness of the 15th Air Force raid on the Ploesti oil refineries on May 5 is the 20,000-foot column of

black smoke which can be seen billowing above the clouds in this photograph. The smoke could be seen 160 miles from the target.

ALTHOUGH figures on bomb tonnages may delight the heart of a statistician, they are usually cold, colorless things, and certainly the enemy is more concerned with the accuracy of our bombardiers than with the weight of missiles showered down. Nevertheless, statistics sometimes highlight a point and that is why it may be worth noting that during the first week of May, when the 8th Air Force was hampered somewhat by bad weather, the payload carried by heavy bombers of the Italy-based 15th Air Force exceeded that of the 8th by a substantial margin.

Yes, the 15th has come of age and, although it still is only about half as large as the Britain-based 8th, our force of heavies in southern Europe packs a tremendous wallop.

When ambidextrous strategic air forces came into being at turn of the year, with Lieut. Gen. Carl Spaatz bossing the show from England, the 15th was a very junior partner, employed as a boxer uses his left jab for rapid, bewildering blows to keep the opponent off balance and on the defensive. Britain-based heavies were the boxer's right hand, capable of delivering more ponderous lethal blows. The 8th, in other words, was the USSTAF's "Sunday punch."

But as winter grudgingly withdrew from the Mediterranean, the 15th began to expand like an accordion. By the end of April, the number of its groups approximately trebled. Communiques on

operations of the 15th began referring to forces of very great strength, which meant its air armadas were approaching the 750 mark. Weather was still disappointing as late as May 19 when the large part of the force attacking Ploesti had to turn back. But summer was coming and with six months of Italy-based operations under their belts—operations as versatile and flexible as any seen in Europe—Maj. Gen. Nathan Twining's men looked to the big push with enthusiasm and confidence.

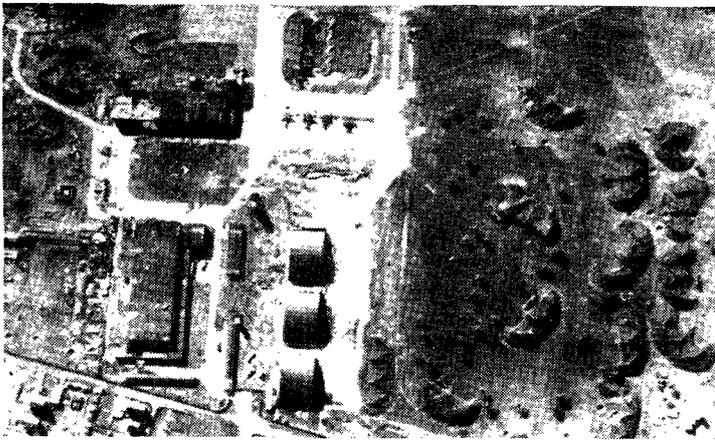
MOVEMENT of the 15th Air Force to Italy in the autumn of 1943 was a triumph of logistics. Three main problems were transportation, establishment of airbases and the organization and activation of service groups. As soon as it was decided that the Foggia plains and heel of the peninsula were to be the new home of heavy bombardment planes, preparations were made to transfer some half-dozen groups which had been flying from African bases.

The main objective was to lose as little operational time as possible and echelons were divided into A and B parties. The advance party went forward, leaving behind minimum crews to keep the big ships flying until they hopped across the Mediterranean to their new bases. Although shipping space was at a premium, vehicles were rushed across in LSTs. Existing airfields in the vicinity had been badly battered. These were repaired and

others were carved out of the soggy Italian plain. The engineering problems involved were enormous. Steel mats were essential for landing strips and perimeter tracks were needed to keep bombers from bogging down in the spongy turf. Roads had to be built that would support the volume of traffic necessary to maintain an operational base. Distribution of supplies inside Italy was a major headache. The bulk of equipment was landed at Naples where shattered port facilities were restored with brilliant efficiency by Army engineers. This equipment then had to be transported over the spiny backbone peninsula to eastern airbases. Sometimes the task of moving several hundred tons of steel mat from one side of a marshalling yard to another was more of a problem than getting the same shipment across mountains.

Fortunately, warfare in Africa had taught everyone, including the AAF, much about the difficult art of keeping mobile. Combat crews never once lacked material with which to fight. Bomb stackage was kept ahead of requirements. Gasoline was piped in and stored in adequate field facilities. Since the service of supply was operating primarily on the other side of the peninsula, the air force set up its own service of supply depot.

In the early days, while fighting equipment came through on schedule, there was little provision made for personal comfort. Living conditions were miserable. The boys munched C rations and



The reconnaissance photo above revealed that the Nazis were rebuilding components of their Messerschmitt works at Augsburg, damaged in the February 25 attack by the 8th Air Force. On April 13 the 8th struck at Augsburg again with the results shown at right: the three round roof hangars were completely leveled and direct hits were scored on large assembly shops, machine shops, warehouses and powerhouse.



shivered in tents. Fresh meat was something which existed only in dreams, and even the dreams were sometimes restless because there were not always enough cots to go around. In such cases, ground crews lived up to their names and slept in bed-rolls and pup tents in mud.

There was some doubt at first whether the number of groups called for in the expansion schedule could be supplied under conditions prevalent in the invaded country. When General Arnold visited the theatre, the A-4 section of MAAF told him that it was possible. "I hope you are right young man," said General Arnold, "I don't know what will happen to me if you are wrong, but I certainly know what will happen to you." A-4 kept his word and his job, and the flow

of new groups through the staging area remained smooth and uninterrupted.

The first dramatic example of combined operations with Britain-based planes of the 8th Air Force came on February 25 when heavies of the 15th were flown over a joint target at Regensburg. Losses were high. The 15th fighter cover was not as extensive as that of the 8th and for that month the loss ratio of both air forces was over three percent of sorties flown. In succeeding months the 15th's losses dropped sharply to about one and a half percent. Their claims in enemy craft destroyed also were much lower than the 8th's and probably will drop still more as units of the Luftwaffe are shifted north to meet the invasion threat.

By April, with weather improving and

green combat crews becoming battlewise, the 15th swung into full stride. On the second day of the month, 850 aircraft were dispatched within twenty-four hours, including several score night-flying RAF Wellingtons. One hundred and sixty-nine enemy aircraft were claimed destroyed. The main targets were the Daimler Puch aircraft factory and ball-bearing works at Steyr, Austria. The ball-bearing plant was badly damaged, a grievous blow for Germans who indirectly admitted a shortage of this vital material by claiming that ball-bearings salvage from Allied planes shot down was one of their chief sources of supply.

On April 3, aircraft factories and railroad yards in Budapest were attacked. On the 4th, marshalling yards at Bucharest received 800 tons of high explosives. On the 5th, Ploesti got its first plastering from Italy-based heavies—and so it went for the rest of the month: Belgrade, Sofia, Nish, Toulon—all were hit hard. On the 13th, the Hungarian Car and Machine Works at Gyor was almost obliterated in some of the finest precision bombing since Marienburg. The flexibility of air power was demonstrated by the ease with which the 15th Air Force, striking marshalling yards in the Balkans, could aid the Russian advance one day and on the next weaken Kesselring by cutting railroad lines as far north as the Brenner Pass. When the big Allied push began in mid-May, the heavies contributed to the disorganization of the enemy by bombing German headquarters north of Rome, the absence of enemy air opposition indicating the toll taken of the Luftwaffe in the bitter campaign of attrition that had been going on since the first of the year. Some observers saw in the manifold activities of the 15th, a blueprint of the program which the 8th might follow on D-day and thereafter.

Meanwhile, in England the 8th was

Bombers of the 15th Air Force are able to strike along the entire southern belt of Europe, from Bordeaux to Ploesti. Below, a B-17 of the 15th is shown dumping bombs on the naval base at Toulon on April 29. Despite heavy smoke screen, docks and warehouse facilities were damaged.



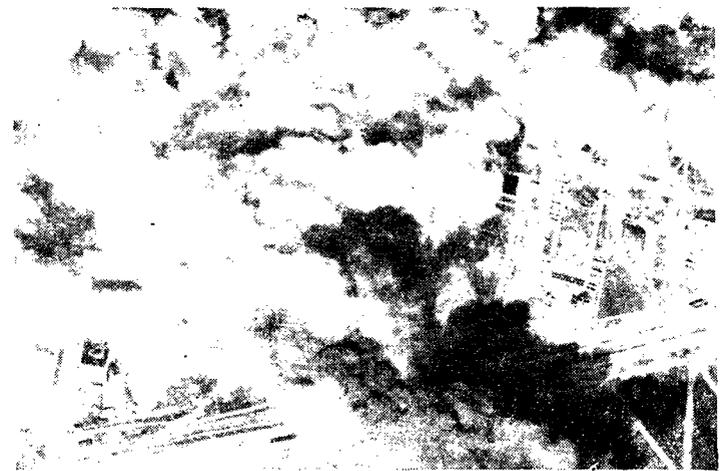


The striking power of the 8th and 15th Air Forces gives the Allies a terrific one-two punch at Germany. In the photograph above, a Flying

Fortress of the 8th is shown participating in the April 29 attack on Berlin. Note the Nazi aircraft parked in the circular area at left.



This is the German aircraft factory at Weiner Neustadt near Vienna as it looked a few minutes before heavy bombers of the 15th Air Force swept in for an attack on April 23. The photo at right shows the

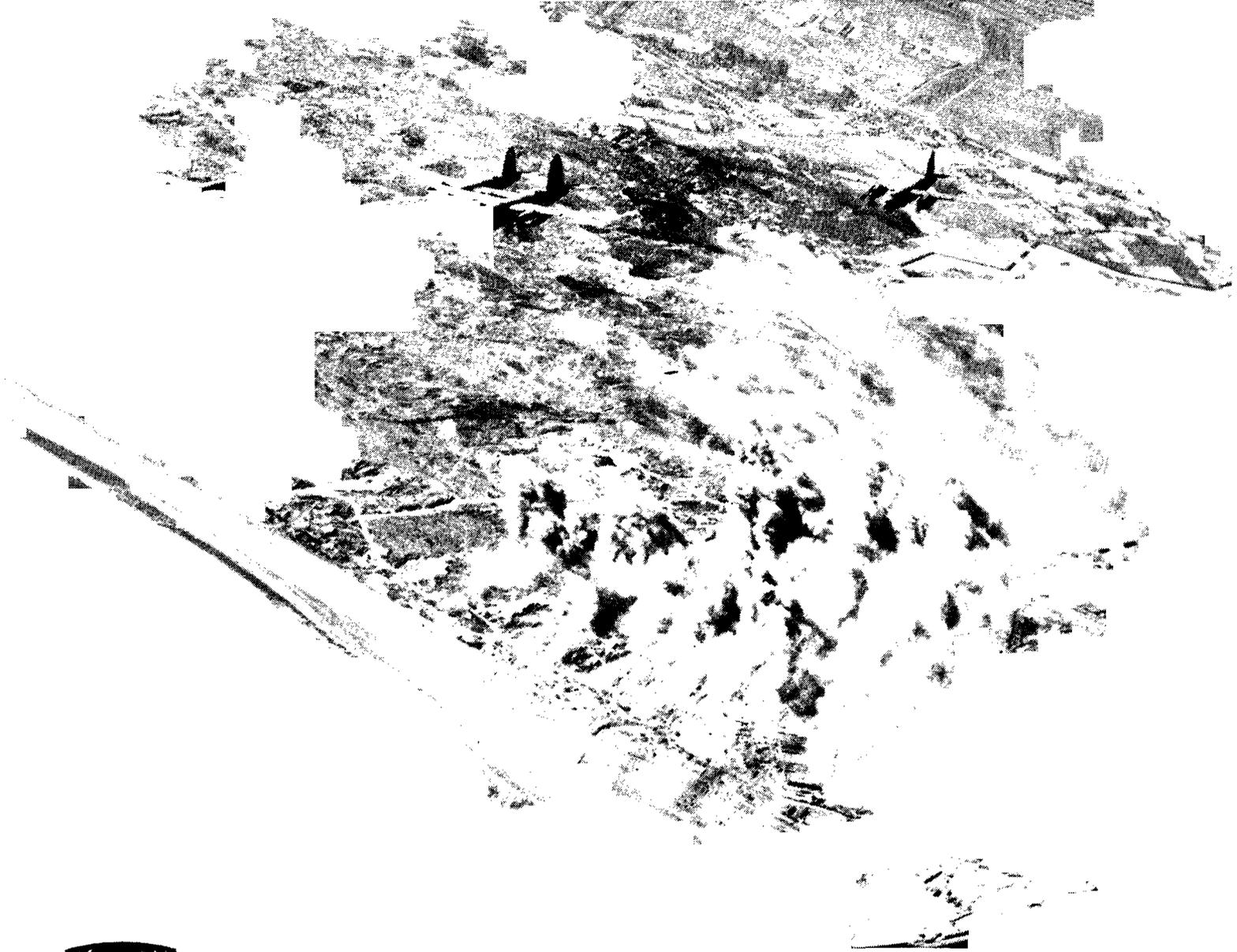


thoroughness with which the target area was covered. Tool workshops were smashed, the main assembly shop was extensively damaged and the large machine shop was pounded heavily by the attackers.

relentlessly pursuing its pre-invasion program of achieving mastery of the skies by destroying the German air force in factory, in depot, on the ground and in the air. While the 15th was seeking out ME-109 factory complexes in southern Europe, the 8th was hammering FW-190 installations in the north and east, interspersing these attacks with blows at synthetic oil plants and the few remaining ball-bearing factories and the ever-increasing number of marshalling yards. The 15th operated nineteen days in April while the 8th operated twenty. Together, the two air forces flew a total of more than 17,000 heavy bomber and an equal number of fighter sorties, dropping some 43,000 tons of bombs—astronomical figures that represent an increase of over

twenty percent above the previous month. In May the tempo rose still higher. The 8th's thrust at Berlin on the 7th found the cloud-shrouded capital virtually undefended by Luftwaffe and only nine enemy aircraft were seen over Berlin. Out of the great American formation only eight bombers failed to return. The 1,200 tons of bombs (some three times the weight dropped on Coventry) must have stung the Germans badly because the next day, in similar weather conditions, they were up in force and thirty-six of our bombers were lost. On May 19, after a five-day lapse due to bad weather, another 2,000-plane thrust at Big B cost us 26 bombers and 19 fighters. One hundred and fifty-three enemy fighters were reported destroyed in the air alone.

Meanwhile, in both theatres the tactical air forces were steadily increasing the weight and variety of their offensive. Dive bombing, strating and medium level bombing were employed almost daily to harass the enemy from Pas de Calais to the Italian front. All along the line the Luftwaffe opposition seemed gradually weakening. In USSTAF headquarters in England a calm confidence prevailed on what proved to be the eve of invasion. There was no dissatisfaction with the number of planes on hand or the replacements being received. As far as the heavy bombers were concerned, the strength asked for had arrived both in Britain and Italy. The job for which that strength was destined was being accomplished. ✪



OUR INVASION AIR FORCE

By Capt. Luther Davis

AIR FORCE Overseas Staff

THE 9th Air Force is like a fighter who has been winning every round with one hand tied behind his back.

Just how well it is doing one-handed may best be observed from a plane over the English Channel. From that vantage point you usually can see masses of B-26s and A-20s approaching or leaving the enemy coast and you may be able to spot some of the fires they have started in France, Belgium and Holland.

P-47s leap and play across the channel like happy airborne porpoises. P-51s and P-38s scramble to and fro on every sort of mission from escort to dive bombing.

Reconnaissance planes leave vapor trails in the sky as they buzz between shores.

Although its activity constantly is on the increase, the 9th's losses are phenomenally low. In its first six months of operations from England, only 100 of its planes were destroyed in Europe or over the channel.

So successful were bombers of the 9th in their first two months of Western European operations, consisting mainly of attacks on airdromes, that they were assigned against what communiques called "military objectives" and what the press guessed were rocket emplacements.

Three months later the 9th, with its B-26s supplemented by fighter-bombers and A-20s, directed its thunder against marshalling yards in Europe. The connection between marshalling yards and invasion was obvious to all, including Generals Von Rundstedt, Dietmar and Rommel, who had thought to use them in counter-invasion measures.

By the end of May, the 9th had battered German aviation, communications and coastal installations to a point where it was ready to use its other hand and deliver the knockout blow. It must not be

AIR FORCE, July, 1944

Faced with an enormous task in the invasion, the bombers, fighters and troop carriers of the 9th Air Force were ready for the big test.

inferred that pre-invasion softening of the channel coast was solely an achievement of the 9th Air Force. Working closely with the 9th was its teammate—the RAF Second Tactical Air Force. Together they form the Allied Expeditionary Air Force. The heavies of the 8th also helped pulverize the Westwall, taking time off from blasting targets deep in Europe.

The Allied Expeditionary Air Force is the greatest aerial team the world has known. The British portion was to support the invading British ground troops while the 9th was to provide cover for U. S. ground forces.

The task assigned the 9th is an enormous one. It had to be prepared to move into Europe with the invaders, give them air support and defense, carry large numbers of troops into combat and build, maintain and protect its own airfields.

Such a big job required a vast organization. In administration of the 9th Lieut. Gen. L. H. Breton, the commanding general, is assisted by Maj. Gen. Ralph Royce, deputy commander. Heading the components of the 9th are Brig. Gen. Myron R. Wood, Service Command; Brig. Gen. Samuel E. Anderson, Bomber Command; Brig. Gen. E. R. Quesada, Fighter Command, and Brig. Gen. P. L. Williams, Troop Carrier Command.

Coordination within such a large organization of dissimilar units and cooperation with naval and ground forces as well as the other air forces presented a difficult problem.

While 9th Air Force headquarters is ultimately responsible for liaison, it is assisted by a mobile advanced headquar-

ters. The latter unit was to move with the invasion troops and keep the 9th's plans well meshed with those of the RAF Second Tactical Air Force and the 8th Air Force in order to provide ground forces with the ultimate in aerial service.

One of the 9th's largest components is its Troop Carrier Command. Although it had not operated against the enemy in the ETO prior to the invasion, this biggest of the Allies' troop carrier organizations was ready for the question. The scale of the TCC's training is indicated by the fact that in five weeks it carried over 3,600,000 pounds of freight in addition to hundreds of special troops, all in maneuvers preliminary to D-day.

For the invasion the 9th's Fighter Command was to be a complete light air force which would work in close cooperation with the ground troops.

BOMBARDMENT METHODS

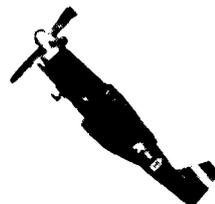
PREPARING for D-day, the 9th's Marauders repeatedly attacked objectives which from the air appeared no larger than a lieutenant's new moustache. To make the job even more difficult, the pinpoint targets were usually in the middle of Nazi-occupied French, Belgian or Dutch towns where inaccuracies would result in death to hundreds of our friends.

They were the kind of targets which some experts said could be hit only by low level bombing. This tactic was tried when the Marauders first arrived in England. Ten went over Ijmuiden, Holland, at zero altitude and all were downed by the

Nazis. It was admitted that some method must be devised for obtaining minimum altitude accuracy from medium height.

The problem was solved not by development of an intricate device but by intensive training in navigation and precision bombing.

In order to avoid heavy flak concentrations, the B-26s and A-20s snaked their way across Europe at 12,000 feet or thereabouts, sometimes making five sharp changes of direction before reaching the initial points. Turns had to be made at



P-51s, a pair of which are seen taking off from a base in England, are playing an important role in the success of the 8th and 9th Air Forces. Capable of exceptional range, altitude and speed, the easily-maneuvered Mustang is used for fighting, escort, dive bombing and strafing.



the right places or a formation would find itself running into flak instead of away from it. This situation required precise navigation to several positions, a job made no easier by the fact that often a formation was almost continually engaged in evasive action.

Success of the 9th's Bomber Command has been due in no small measure to the insistence of its commander, General Anderson, that air crews be kept intact. To achieve this ideal of smoothly working combat teams, crewmen had to take their furloughs or leaves simultaneously and squadron and group commanders had to ground an entire crew if one member was on the sick list.

Each crew assisted the scheme by correcting faults of individuals within its own organization, thereby obviating the necessity for shuffling of personnel.

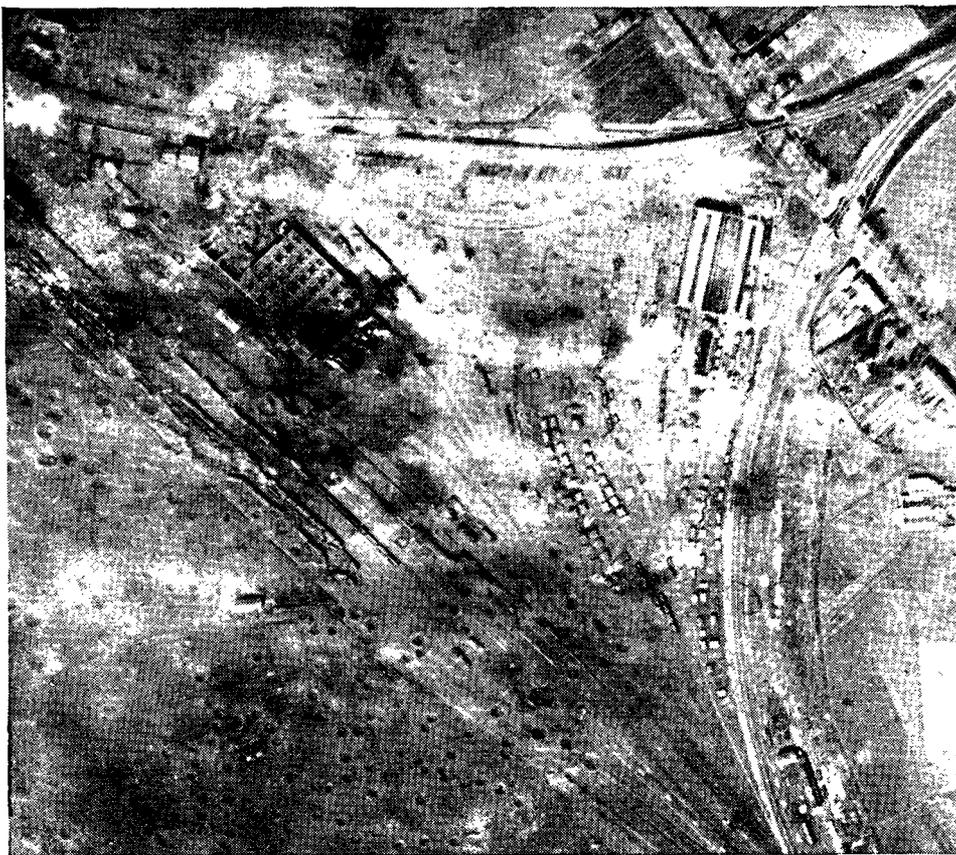
The training program of the 9th was an arduous one. Often men came back from missions over Holland or France, brushed flak particles out of their hair and took off for training flights to check formation flying, navigation or gunnery.

The standard operating procedure at the B-26 bases called for men to fly double headers—two combat missions daily, the first of which probably was briefed before dawn. In the beginning all griped their heads off. Later they reached the point where they felt let down if they didn't fly six or eight hours out of every twenty-



One of many vital blows against the Nazi transportation system was struck April 11 when B-26s of the 9th Air Force attacked railroad marshalling yards at Charleroi, Belgium. Dense clouds of smoke are seen rising from burning rolling stock, locomotive roundhouses and repair shops.

Nazi communications were further disrupted when the 9th's Marauders bombed the rail junction at Hasselt, Belgium. Destruction seen in track area halted movement of military supplies on Antwerp-Maastricht-Aachen line. One of the bomb craters was 150 feet long and 40 feet wide.



four. Such a schedule kept maintenance crews constantly on the go.

Ground schooling was a required part of the strenuous program. On a non-operational day, all aircrew members were given a minimum of ten hours in classes and, regardless of the flight schedule, each airman put in at least an hour each week on basic synthetic devices such as the shadowgraph, Link trainer and bomb teacher. All hands were checked on procedure, skeet shooting and the Hunt trainer.

The heavy work program, however, was balanced by periodic opportunities for recreation. The 9th's Bomber Command has many officers who were with General Brereton throughout the North African campaign and they knew exactly how much personnel could take.

Every combat crew received two days' free time every two weeks and, after completion of a tour of missions, fortnight leaves and furloughs sometimes were granted.

The pressure of combat was relieved also by non-operational flying, an idea borrowed from the 12th Air Force. To tighten formations and improve bombing accuracy, each group at infrequent intervals devoted a week to practice.

During these non-operational runs, the group CO or someone he selected rode herd on the formation in a control plane that followed but did not join the others.

The Troop Carrier Command of the 9th Air Force was primed for a real job when Allied invasion forces began to move. Commanded by Brig. Gen. P. L. Williams, this largest of the Allied troop carrier organizations was trained to move personnel and equipment by transport and glider to the battle areas. Months of training, based on lessons learned in the Mediterranean airborne invasions, smartened and hardened TCC personnel and they were ready for anything. During an intensive five-week training operation in preparation for D-day, the command hauled more than 3,600,000 pounds of freight plus many units of special troops. Drawings on this page were made by Capt. Raymond Creekmore of AIR FORCE staff during TCC domestic maneuvers. His top sketch depicts paratroopers trailing in line from their transport plane. Lower drawing shows glider-borne forces rushing into action after landing under cover of darkness.



The control officer kept the radio hot with helpful and sometimes unflattering comments on formation work. But it all was taken in good spirit because everyone knew that the control officer, whatever his rank, would be in the pack and probably receive his share of criticism the following day.

Non-operational weeks were popular with the flyers. Men, who for long months had made all their take-offs with 4,000 pounds of high explosives in the bomb bay and who had forgotten that it was fun to fly, keenly appreciated the joys of handling a light ship and of being released from a tight time schedule.

MUSTANGS OF THE 9TH

A POTENT factor in the successful operations of both the 8th and 9th Air Forces has been the P-51B, which is used for bomber escort and for high and low altitude fighting, dive-bombing and strafing.

Deep in German territory recently a pack of the Luftwaffe's best pilots managed to sneak into the sun and gain a position over one of our Mustang forma-

tions. Flying at about 32,000 feet, the Nazis giggled through their intercoms as they got set for the kill.

But the Germans' dream of a field day was cut short when the fabulous Mustangs speedily climbed 5,000 feet, chased the enemy planes all over the sky and destroyed most of them. The Hun might have recovered more readily from that setback if the same P-51Bs on their way back to England hadn't rubbed it in by hitting the deck and strafing railroad rolling stock.

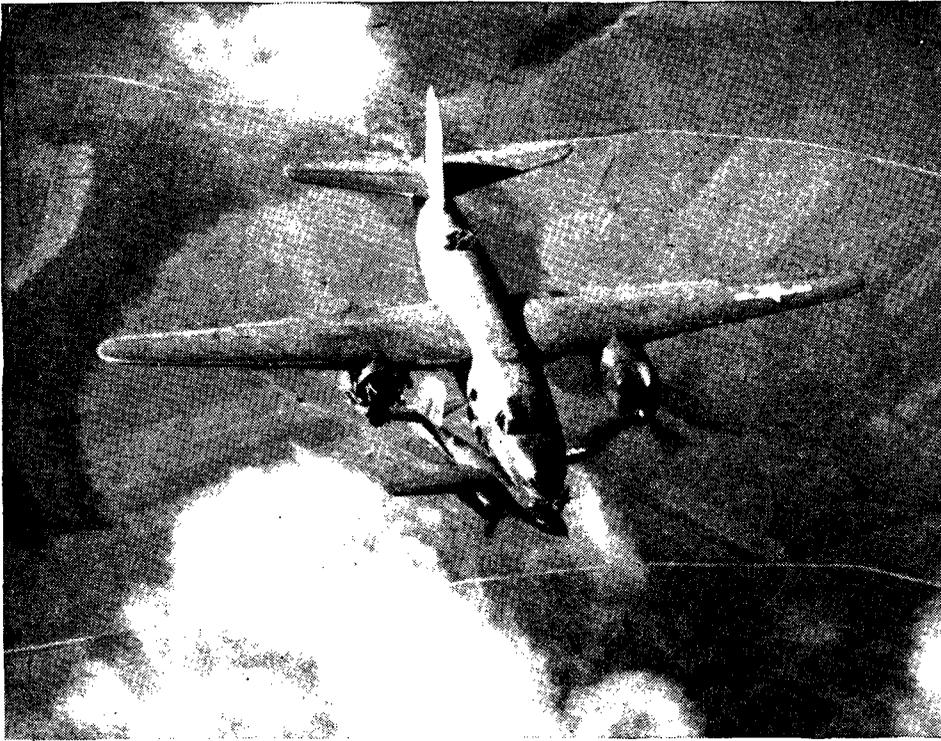
In discussing his plane's speed, range and maneuverability, a P-51B pilot uses only superlatives. He will swear his ship can outperform any other fighter in the world.

The AAF first used the P-51 in combat

in the Mediterranean area. Its performance at less than 10,000 feet was so good that technical experts decided to try substituting a Rolls Royce engine for the Allison motor in an effort to produce a high altitude fighter.

In the autumn of 1943 the initial shipment of the high altitude ships was received in England by an AAF fighter group which had been trained in Airacobras.

A few weeks later the new Mustangs were sent into action against the enemy for the first time. But advance notices of the P-51B's power must have reached the Luftwaffe. Over Emden, six enemy fighters, preparing to attack our heavies, turned tail and fled when the Nazi pilots spotted the Mustangs. *(Continued on Next Page)*



Victories of the 9th Air Force are not always gained without the loss of some of its planes. Seconds before this photo was made, the B-26 in the foreground sustained a direct hit from a Nazi flak battery and its right engine was shot away. The pilot kept the crippled Marauder on an even keel and a steady course until his crew and, finally, he bailed out safely. Another B-26 is seen continuing toward its target, unscathed by the withering bursts of enemy anti-aircraft fire.

Camouflaged for the night is this P-51B, seen through a tent opening at a 9th Air Force base in England. Naturally, an enemy pilot would rather destroy a Mustang on the ground than meet one in the air, for he knows the odds are against him when he mixes with the speedy fighter.



The first real test of the P-51B came January 5, 1944, when the Mustang-equipped group escorted bombers to Kiel and mixed with enemy fighters for almost an hour. In destroying eighteen Jerries, the American group sustained not a single loss.

This pioneer Mustang group in England broke the American ETO record by shooting down its first 100 planes in 83 days. In its first five months of operations, it destroyed 253 enemy planes in the air and on the ground. Its own loss was approximately one-fifth of that amount.

Members of the group modestly admit that the secret of their success is the plane's magnificent performance. Tactically they have no secret weapon or trick but in all their operations they emphasize mutual support. Their creed is that the wing man stays on the wing, that the teamwork of the group is of paramount importance and that if one of them is in trouble another must come to his aid.

The Mustang boys neither claim that teamwork is original with them nor that they are responsible for any innovations. They fly escort the same as other fighters and dogfight about the same, with the exception that they would rather clobber Jerry's tail off than attack headon, for the P-51B's armament is light compared with that of the P-47 or P-38.

As a dive bomber the Mustang's performance is distinctive but not revolutionary. Usually P-51B pilots begin a dive at about 12,000 feet and keep as steep as possible, 70 degrees being customary. They release their bombs somewhere between 4,000 and 6,000 feet and whiz from the target area at 500 or 600 miles per hour. On dive bombing missions two 500-pound bombs are usually carried instead of wing tanks but no armament is sacrificed.

Naturally, some mechanical difficulties presented themselves in the early days of P-51B operations. Many of these were caused, however, by the fact that there were no tech orders on the new model and maintenance crews had to feel their way along.

For instance, propeller seals leaked. After all sorts of remedies were tried, a mechanic solved the problem by boiling the seals in oil for fifteen minutes. His method was SOP until new type seals arrived.

Gun stoppages occurred at the rate of one in every 150 rounds until a master sergeant of the ETO's pioneer Mustang group invented a gadget that keeps ammunition feeding no matter what the stress on the chute may be.

There were other troubles but most of them were ironed out in the field and the P-51B long has had a clean bill of health, except for one feature. Mustang missions average four and one-half hours and the pilot's seat is a wooden one. ☆



Leaving a target several thousand feet below, engulfed in smoke and flames, a trim A-20 of the 9th Air Force is shown streaking for its home base after a recent attack against one of Hitler's invasion defenses on the Continent. The versatile A-20s, operating from England, form a component of the Army's mobile bombing force which, in addition to blasting Nazi airdromes, rail lines, bridges and airfields, is prepared to support Allied ground forces when they invade the Continent.

NAVIGATORS CAN'T DAYDREAM



The job of navigation is tough at best; don't make it more difficult with overconfidence and laziness.

THE B-17s were about an hour out of Frankfurt. There had been no fighter opposition. The flak was light and ineffectual. Flying conditions were perfect. It was one of those dream missions.

But not a bomb was dropped on Frankfurt that day.

Because of sloppy navigation, the flight didn't come anywhere near its target. The striking power of more than 100 B-17s was completely wasted. Actually, their bombs finally were dropped on a target in France but it was little more than a we-had-to-bomb-something gesture.

The trouble started with the navigator in the lead ship. He had depended entirely upon his flight plan instead of watching his direction and checking on it regularly. A sudden windshift had pushed him 95 miles off course, but he was completely unaware of the change in the forecast winds. When his plane was forced to turn back due to engine failure, he was unable to give the deputy group navigator a precise indication of the flight position.

But the deputy group navigator was just as bewildered. He had been playing follow the leader, and when the lead ship turned back, he too was lost. He called the lead navigator of the following group and asked for the proper bearing. But that navigator was just along for the ride. He had relied upon the lead navigator and hadn't bothered to chart his position.

Almost unbelievably, the same was true for every navigator in the flight. They all had depended upon their leader—and they were lost too.

The mistakes are painfully obvious. The lead navigator erred in using only one method of navigation. He should have kept a close check on his winds and used every navigational aid at his command to determine his position. And the other navigators should have been plotting the course. The series of circumstances which made this mission a complete failure came from overconfidence, laziness and plain inefficiency. The worst part of the failure was that the navigators knew better.

Mistakes are apt to happen to the best airmen. But there is no excuse for failure

when you have sufficient ability and training to avoid error in the first place. The incidents reported here—as told to an AIR FORCE staff writer—come straight from the navigators who made the mistakes and admit that they should never have happened.

Take the case of the navigator who was leading a practice flight over England. His radio operator asked for a QDM and got a QDR instead, indicating the presence of a balloon barrage. The navigator simply failed to plot the bearing given him. If he had, he would have realized that he was leading his flight over a restricted area. His lapse resulted in bringing the flight directly over the heart of London at 1,200 feet in perfect visibility. As he tells it, "our bomb bay doors were open, and if one of our practice bombs had fallen, we would have been blown right out of the sky. I could see the AA batteries tracking us as we came over. I made a fast correction and we turned right over Buckingham Palace. It was fortunate for us that the visibility was good and they recognized us. Else we surely would have been shot down for being where we shouldn't have been."

All this navigator had to do was plot a given course. He figured he could follow his QDM right into the field. A simple error, but it could have been fatal.

A situation where laxity in checking signals did result in a fatality took place under somewhat similar circumstances. A Fortress coming into England from the States was supposed to pick up a radio beam near the coast and follow it in to the proper airfield. The navigator picked up a station on the correct frequency and without bothering to identify the call letters, he instructed the pilot to follow its signal. They flew 120 miles off course to the station sending the signal, but there was no airfield available. They had to turn back to the original field, but they were low on gas. A crash landing resulted and a crew member was killed.

The navigator had failed to identify properly the call letters he had received. What's more, he should have had a complete knowledge of the call letters of all

the stations in the vicinity. It seems to be the simple things which cause most of the trouble. Consider the case of a lead navigator who just didn't remember his instructions. Six B-24s set out to attack dock installations on the middle eastern coast of China. The flight plan called for them to come in south of the target until they reached the coast line, make a sharp turn and follow the coast to the target. The pilot of the lead ship was told that if he found any enemy shipping which would make good targets of opportunity, he should swing out to sea instead of coming up the coast. The flight was informed of this attack alternative.

When the flight hit the coast, the lead plane continued out to sea and the bombardiers in the following planes started searching the ocean for enemy shipping. Then, without warning, the lead plane turned back directly over the dock area. The bombardiers were not prepared for this sudden move and they had no opportunity to see the installations they were supposed to hit.

The lead navigator had failed to correct his deviation at the right time and the right place. He instructed the pilot to swing out over the ocean so that he could have an opportunity to correct his course. He forgot that the turn meant so much to the bombardiers. The target was missed completely.

EVERY navigator knows that there are many safeguards which can be used to correct for compass deviation. Yet, in many instances, they expect the lead navigator to make those corrections, and if he is wrong the entire flight suffers. Such was the situation when a flight of B-17s took off to bomb Sofia, Bulgaria. The lead navigator did not correct his compass properly and 125 planes overshot their target. Not one navigator in the flight used any of the available precautions.

One of the men explained what could have been done. "First of all," he said, "we should have used our astro compass and found our true heading from the sun. Or we could have found the compass deviation by comparing the true course actually established from ground check points, making allowances for wind drift, and then using that wind drift and comparing the first course with the course established by the compass heading. Actually, we all depended too much on our magnetic compasses without checking them. All we had to do was swing our compasses celestially in the air and on the ground more frequently."

Even the most experienced men have been known to make the same old mistakes. Consider this story from an extremely red-faced navigator. "I was supposed to be checking out two navigators in England," he reported. "We were flying low, circling airfields, but I didn't pay any attention to where we were going.

Suddenly it got dark—it does that in England—and my pupils informed me that they did not know where they were. The pilot asked me how to get home and I didn't know because I had not been watching. There were no lights, no landmarks, and we were lost right over our own territory on a flight in which I was supposed to be checking on proper navigation. The pilot brought us in on a VHF bearing—but it could have been serious."

There is nothing anybody can do for you if you make mistakes like that. As one instructor put it, "We can give them a handkerchief and tell them to blow their nose, but we can't do it for them."

Then there was the navigator in a B-24 on a trip from Hawaii to Christmas Island. It was a daylight flight with no moon. Under such circumstances, the navigator could use only sun lines to determine his location. This navigator took his last sun line approximately a hundred miles out of the island and gave his pilot a 140-degree bearing with instructions to fly for forty minutes on that bearing. Then he told him to turn in on the sun line and he indicated the maximum time of arrival.

The pilot had his radio compass on and realized that he was going away from the island rather than toward it. He reversed direction and split the airfield in two. Mistake: the navigator had not allowed a sufficient margin of error in plotting his landfall. He allowed only a sixty-mile error whereas it should have been at least a hundred. The plane was coming in to the right of the island, and the navigator called for a turn to the right—away from the base. He also made a second mistake.

He did not use all the facilities available to him. If his radio had been on, the mistake never would have been made. It is the navigator's job to make the radio check—not the pilot's. He figured he was a hot navigator and he failed to make use of all the navigational methods available. He could have used radio beams, sun lines, radio fixes, checked his forecast winds and read drift. But he didn't. And if the pilot hadn't been on the ball, the crewmen would have practiced their ditching procedure for keeps.

THIS business of being a hot navigator keeps popping up. A B-24 hit the coast of New Guinea on its way back from bombing Wewak. The navigator thought he was to the left of Port Moresby when actually he was to the right. In that area, there are few landmarks and you have to be able to recognize the coast line. The navigator studied the coast and instructed the pilot to turn to the right. The pilot flew in the direction indicated until the ship got low on gas. Then he got a DF bearing and discovered that he was going in the wrong direction. He reversed his course and made home on two engines.

The navigator thought he knew where he was going but he did not want to admit that he might be wrong. He was afraid to use his radio because the pilot might have thought that he was lost and that would reflect on his ability. He didn't want to appear to be lost in broad daylight—so he took a chance. The radio is there for you to use. No pilot will think less of your ability if you use every navigational means at your command.

Some navigators seem to work under

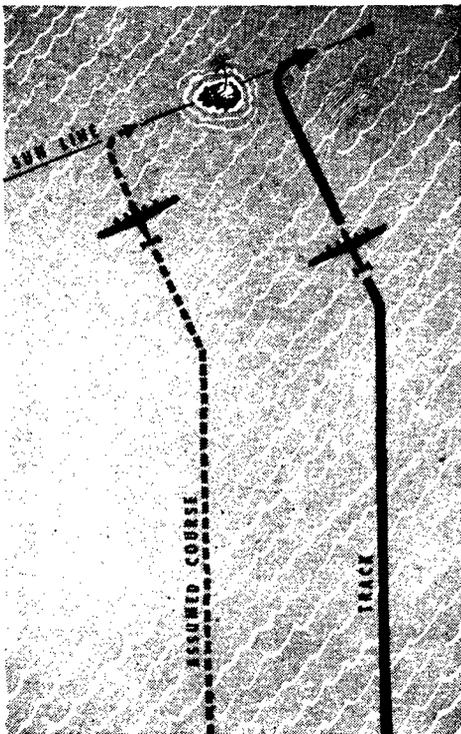
the assumption that flight plans, like pie crusts, are made to be broken. A flight plan is selected with scientific accuracy, taking into consideration such factors as enemy fighter fields, flak belts and radio detection stations. Yet some navigators want to win the war their way and they make up their own course in preference to the one they are instructed to follow. A gunner from the Mediterranean theatre tells this story:

"We were returning from a flight to Innsbruck, Austria, and the navigator brought us back over the Adriatic coast. Our flight plan called for us to fly down the middle of the Adriatic but this navigator had his own ideas. Maybe he wanted to test out the enemy's flak installations for he brought us right over the heaviest flak belt I ever saw. Over Yugoslavia we ran into a lot of fighters who probably never would have found us if we had stuck to our course."

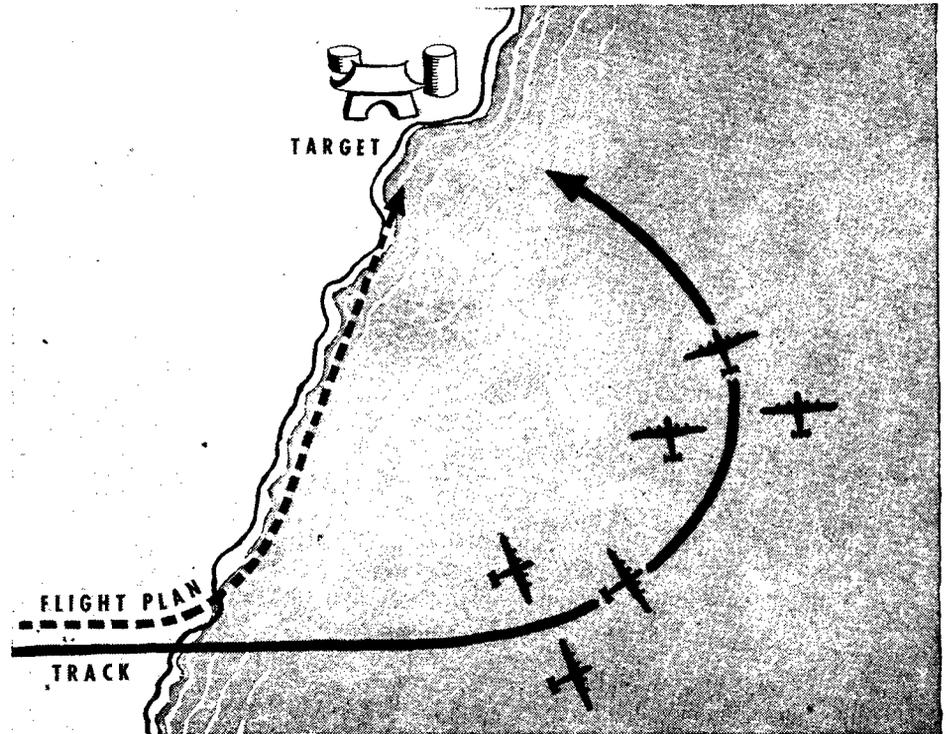
The point here is that this is not an unusual case. There was the navigator in Italy who brought his flight over Leghorn for no apparent reason. He wasn't lost, he was just stubborn. Leghorn was protected by a great many flak batteries, and two ships were shot down. It never would have happened if he had stuck to his flight plan which recognized this enemy stronghold and by-passed it.

A navigator's job is tough enough without making it more difficult. Any man can err—the trick is to be aware of what might happen and take the proper precautions. That's the opinion of the men who made the errors and are willing to talk about them. You may not have a chance to make a second error. ☆

Far to the right of his base, the navigator gave instructions for a turn to the right. He failed to allow a sufficient margin of error.



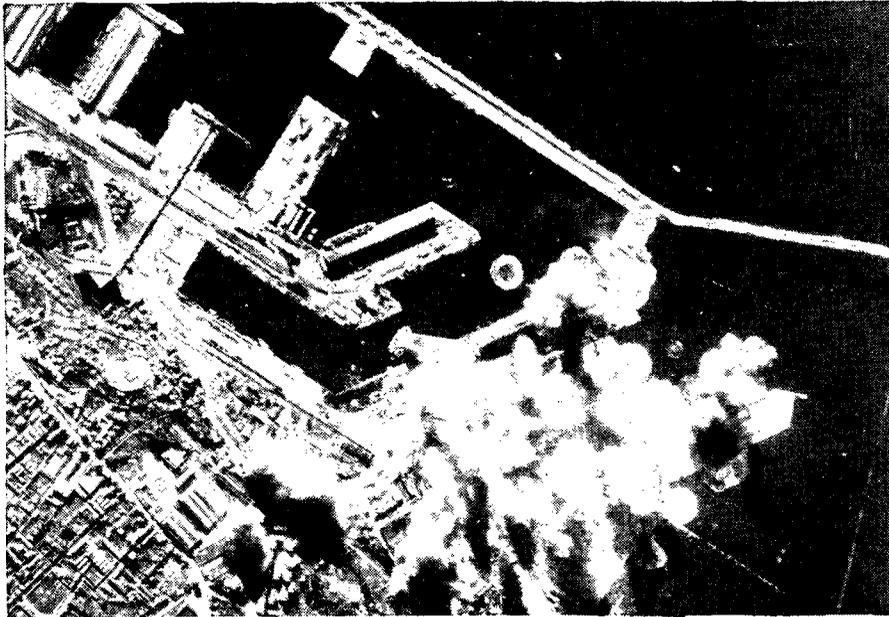
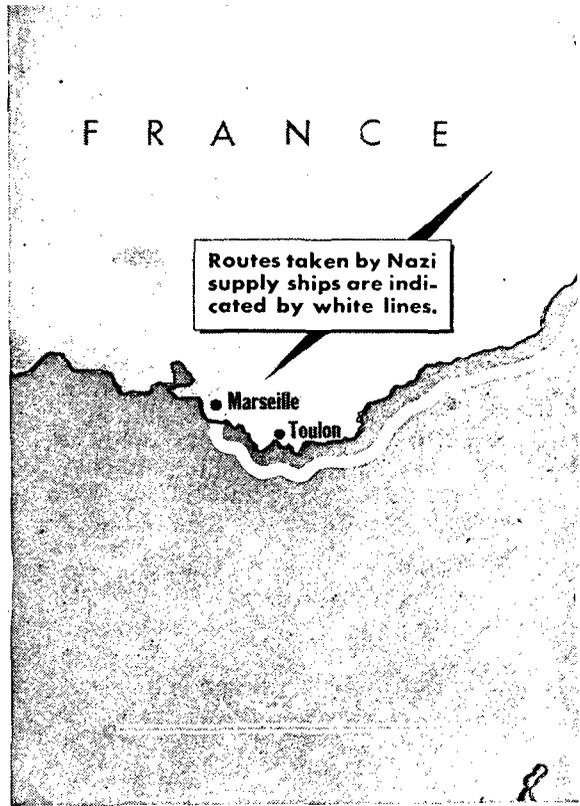
Given a choice of two flight plans, the lead navigator didn't follow either one. He confused the entire formation and missed the target.



PITCHING STRIKES AT ENEMY HARBORS IN ITALY

German supply trains which normally run over northern rail routes into Rome have been bottled up by MAAF bombers since March 24. The bombers have strangled rail communications so effectively in northern Italy that the Germans have been forced to resort to round-about shipping routes.

But as the Nazi has turned to the sea so has the MAAF, and Allied bombs are now ripping into German-held Italian harbors, smashing dock installations and adjacent rail yards. Coastal bombers based in Corsica and Sardinia have halted enemy shipping by daylight down the northwest coast of Italy, which means that the Germans are now forced to do most of their shipping at night. From both sides of the Italian mainland, the Nazis have been sneaking supplies along the coast and shuttling them into their harbors before dawn. Nevertheless, MAAF bombers are making it tough for German boats, even under cover of darkness, to land vitally needed cargoes. ☆

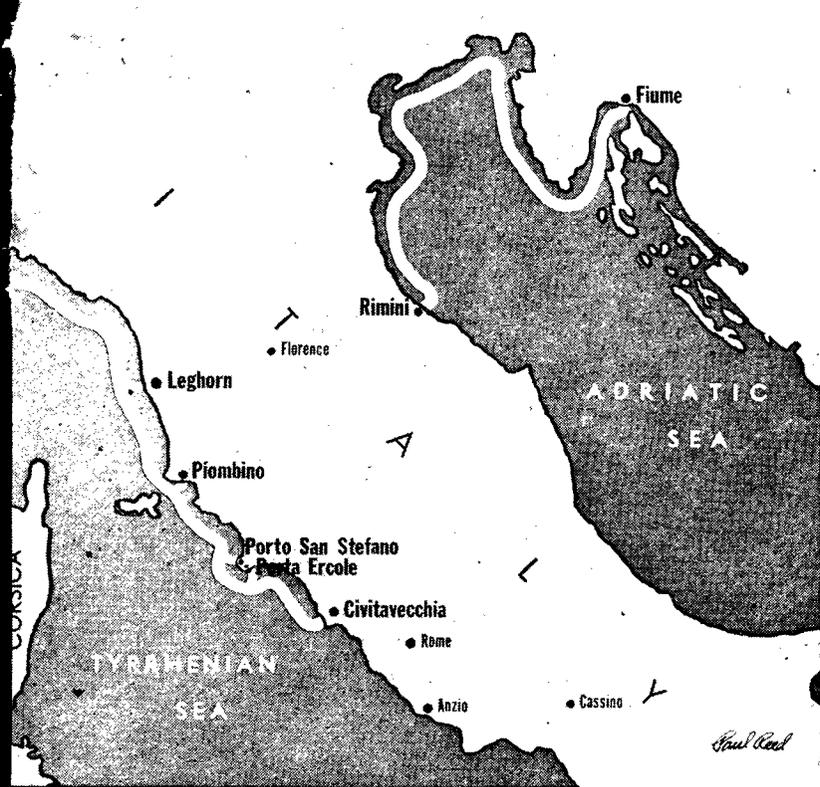


MARSEILLE is the Nazi's most important supply outlet from southern France. This photo affords an excellent view of the harbor and submarine pens under attack by B-17s.

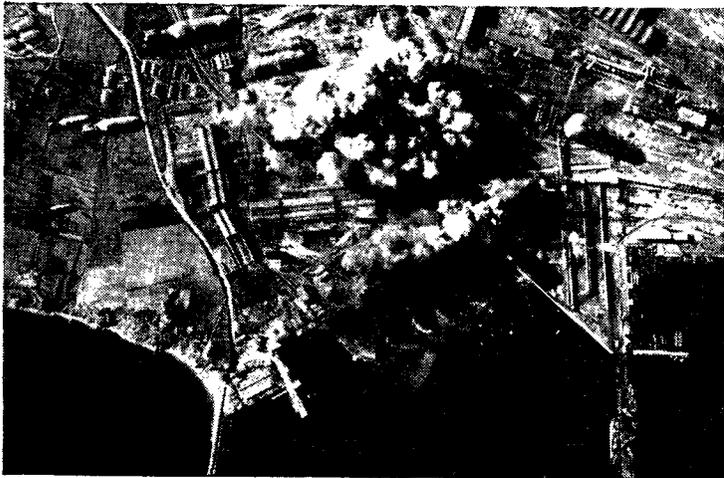
SAN STEFANO. B-17s did a good job on the harbor area in this attack. Photo interpreters estimated approximately half of the eighty ships in the harbor were destroyed. A rail tunnel, feeding into the Rome-Leghorn line, was blocked.

LEGHORN. Six ships, 390 freight cars, extensive harbor installations were smashed in this attack. Bombed effectively in the photo below are: (A) cooling basin, (B) terminal yard, (C) oil storage, (D) barge basin, (E) harbor warehouses, (F) grain elevator and (G) additional warehouses. First bombed by B-24s last summer, Leghorn harbor has been struck repeatedly.





FIUME is a key port from which supplies are fed across the Adriatic. Flying Fortresses are shown pummeling the harbor and its facilities which include oil refinery, torpedo factory and rail lines.



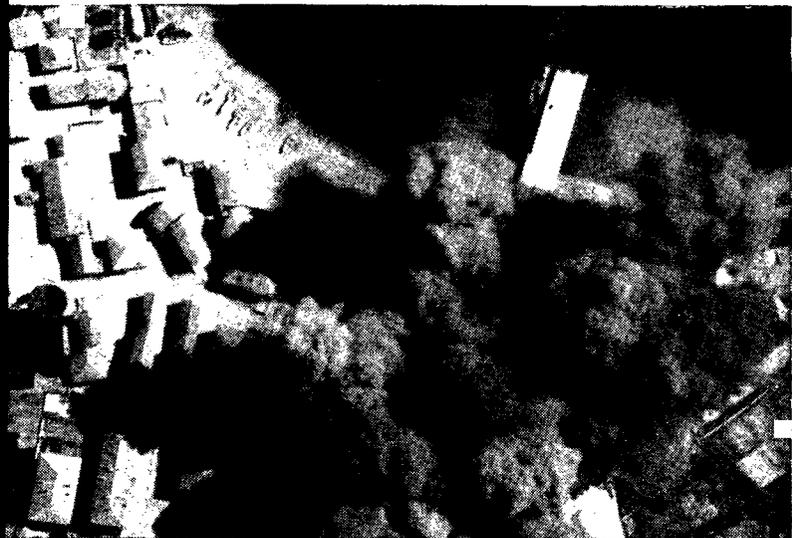
PIOMBINO. Marauders are busy dropping 1,000-pounders on the coastal railroad lines, marshalling yards, steel mills and harbor facilities.

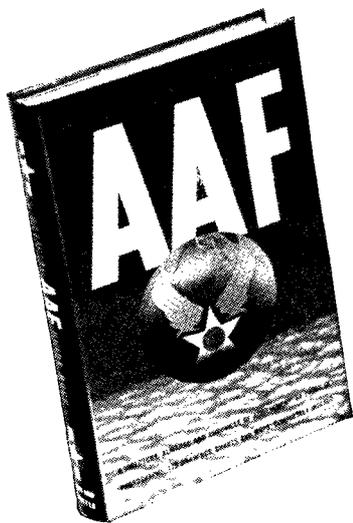
PORTO ERCOLE. On March 20, B-26s came in low over the harbor, paged dock facilities, starting fires. Note "F" type landing craft at jetty.



RIMINI. Adjacent to the harbor is a large rail yard on which the Nazis depend for moving supplies to front lines. In a twin attack both harbor and rail yard were bombed by MAAF Liberators.

CIVITAVECCHIA. Barely visible against the Tyrrhenian Sea, B-25s wheel away from Civitavecchia after bombing the harbor. Bomb hits started fires along the entire length of the mole.





THE OFFICIAL GUIDE TO THE ARMY AIR FORCES

EVER since the Army Air Forces began its tremendous wartime growth there has been need for a single book to tie together, as a source of reference, the many components of the global network we call the AAF.

Such a book, of necessity, would have to be authoritative. It would have to be comprehensive without burdening itself with excessive detail. It would have to be well-balanced and readable. If possible, it should have a freshness to its presentation.

Its basic objectives could be explained as follows: (1) to provide a concentrated, handy source book for quick reference; (2) to afford each member of the AAF a clear insight into the importance of his own job and how it fits into the entire pattern of our operations; (3) to supply a concise medium for orientation and training purposes; (4) to lend historical perspective to current operations.

There was ample reason why such a book should be designed for those out of uniform, as well as for those in the service, why it should be written not only for the men and women of the AAF but also for their relatives and friends and for the many civilians whose work is di-

rectly allied with the AAF. General Arnold has explained: "Fundamentally, the AAF is a people's air force, and its bombs dropping on the enemy represent the work of millions of Americans in and out of uniform."

Thus, there was added another requirement—the book would have to be popularly styled for general readership, would have to explain in basic terms the whole giant AAF pattern of men and planes, supply lines and airbases, tactics and techniques. To this was added a final requirement—that the book have as widespread distribution as possible.

The result is *The Official Guide to the Army Air Forces*. The Official Guide will be available in late June to both service personnel and the public. It appears in two editions, one a pocket-sized 25-cent edition, the other a deluxe, cloth-bound volume at \$2.50. The content of both is identical. All royalties accruing from the sale of the two editions will go to the Army Air Forces Aid Society, which holds the copyright. The pocket edition was published by special arrangement with Pocket Books, Inc., the cloth-bound edition by special arrangement with Simon and Schuster. The Official Guide will be available at Post Exchanges, both domestic and overseas, and everywhere in the United States that books and magazines are sold.

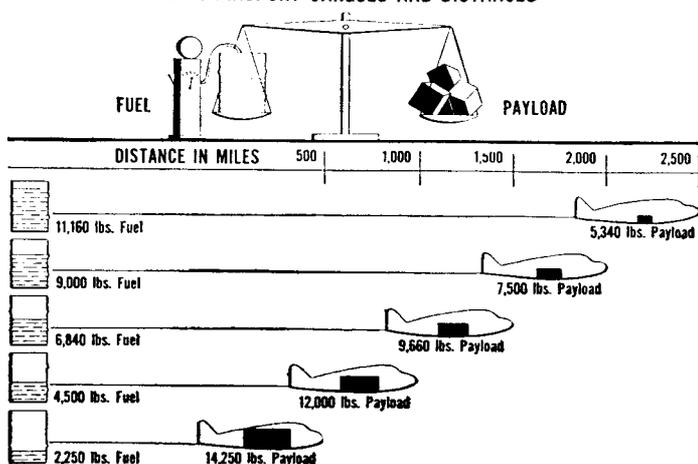
In both editions, the Guide contains 388 pages, including four pages of full color, and 64 pages of rotogravure pic-

tures selected from more than 5,000 official photographs. The text is illustrated with more than 175 charts, diagrams and maps prepared especially for the Guide. AAF officers, enlisted men and civilians collaborated in the researching, writing, illustrating and designing of the book.

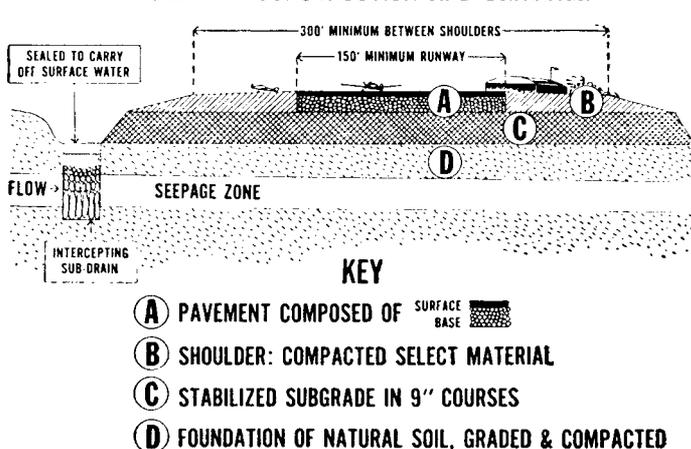
General Arnold states in his foreword to the volume: "This book is a useful, accurate guide to our operations, and should be of wide personal interest to those who know the AAF through relatives and friends in the service. It will be especially valuable to those who hope to become directly associated with us. To officers, men and women of the AAF it should serve as a helpful work of reference."

THE Guide takes up, in sequence, the AAF in its many aspects—the challenge of war, the air war plan, organization, personnel, training, equipment, supply and maintenance, airbases, combat tactics and techniques, combat operations, the records of the combat air forces, unit citations, individual achievements. It includes what is perhaps the most complete chronological report ever published on U. S. military aviation, from the Civil War to the early months of 1944. Its coverage regarding AAF planes includes the B-29, P-61 and identification of the 56 instruments on the panel of a heavy bomber. The extent of the information presented in this book is indicated by the size of the index which contains approxi-

AIR TRANSPORT CARGOES AND DISTANCES



RUNWAY CONSTRUCTION AND DRAINAGE



NOT DRAWN TO SCALE

mately 10,000 references. Chapter headings in the Official Guide, with brief summaries of the information contained in each chapter, are as follows:

On Target: An Introduction to the AAF

The challenge with which the AAF was confronted on December 7, 1941; the resources we had to meet the challenge; our plan for air war; the building of the AAF; the AAF in action today.

What We Are

Brief outline of the AAF from its beginning as a branch of the Signal Corps in 1907; the membership and functions of the air staff, the commands, continental air forces and other AAF agencies; the organization of an air force, starting with aircrew, group, wing and division; how a squadron, group, wing and division; how an air force is organized for combat; the duties of commanding and staff officers; the inspection system — administrative, technical and tactical; the place of the AAF in the total war plans of the Army; teamwork and combined operations.

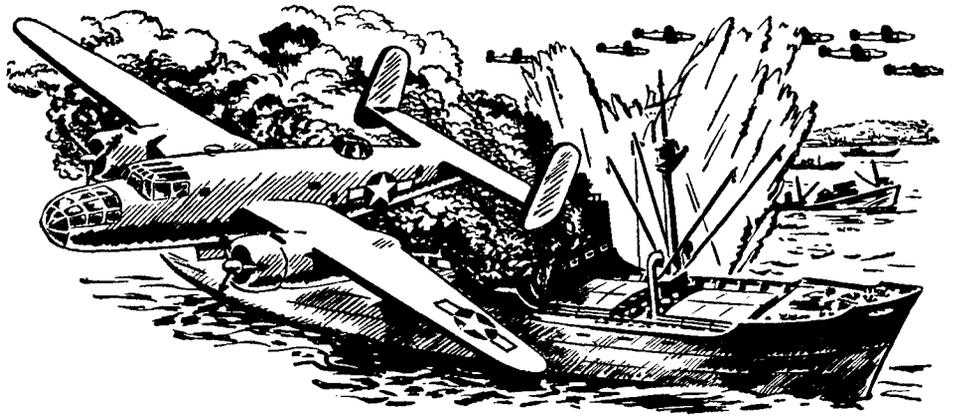
Who We Are

Personnel expansion; how personnel are procured, replaced and rotated; the Aviation Cadet Recruitment Program—physical and educational requirements and recommended courses of study for those who want to enter; a breakdown of military specialties, giving duties of each specialty for both officers and enlisted men; aeronautical ratings and requisites for obtaining them; aircrew wings and who may wear them; pay and insignia of officers and enlisted men; dependency allowances; duties of chaplains, special service and personal affairs officers; how personnel are brought back from overseas and redistributed; the AAF hospital program; recruitment, training and duties of Air Wacs, nurses and Wasps; the part played by civilians in the AAF; volunteer organizations — Ground Observer Corps, Aircraft Warning Corps, National Association of AAF Women, Army Air Forces Aid Society.

How We Train

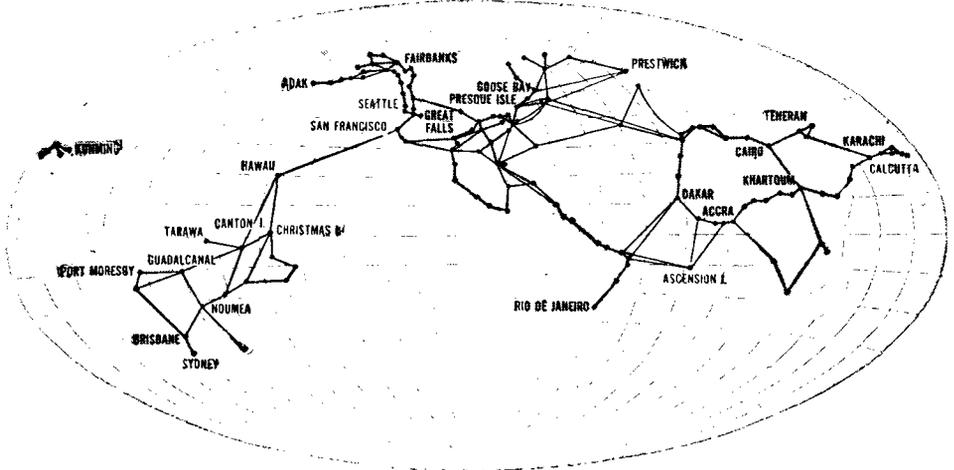
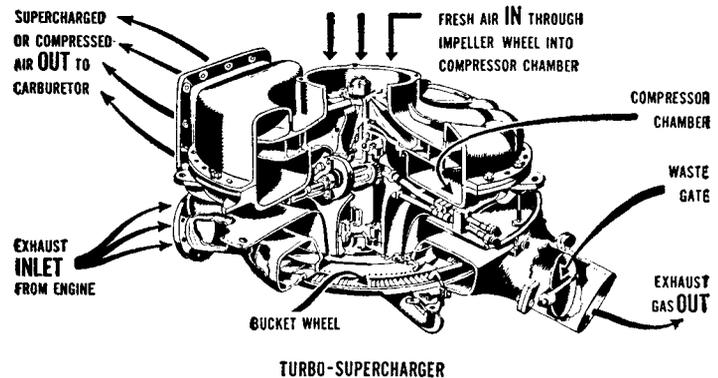
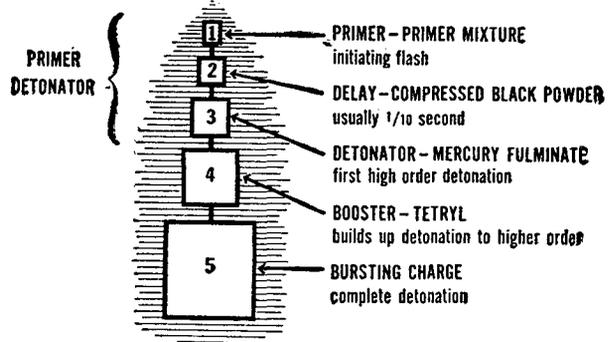
The growth of the training program; courses taught to pilots, bombardiers, navigators, glider pilots, radar observers, aerial gunners and non-flying AAF specialists, both officers and enlisted men; the welding of individual trainees into

The illustrations on these pages are a few of the hundreds of drawings found in the text of the Official Guide. In addition, the Guide contains three rotogravure sections, with 64 pages of photographs of AAF leaders, men, airplanes and combat operations.



EXPLOSIVE TRAIN OF GENERAL PURPOSE (DEMOLITION) BOMBS

IN GENERAL, THE EXPLOSIVES IN THE SYSTEM ARE ARRANGED IN ORDER OF SENSITIVITY, FROM A SMALL QUANTITY OF A SENSITIVE EXPLOSIVE TO A LARGE QUANTITY OF LESS SENSITIVE EXPLOSIVE



AAF COMMUNICATION ROUTES OVER WHICH AIR TRANSPORT COMMAND OPERATES

crews and units—fighter, bombardment, reconnaissance, troop carrier, air transport and service; the preparation of units and crews for combat; the final polishing given to personnel in overseas theatres; courses taught at the AAF Tactical Center; the School of Aviation Medicine; the School of Air Evacuation; courses for staff officers; training air and sea crews for emergency rescue work; hospital courses taken by sick and wounded; the training of instructors; students from foreign nations training in the U. S.; types and uses of training aids; the AAF's part in the High School Victory Corps and Civil Air Patrol cadet programs; how training accidents are kept at a minimum.

What We Fight With

The production and procurement of planes; the meaning of aircraft designations such as A, B, P, C, X, Y, Z, etc.; a comprehensive table of aircraft in use by the AAF, giving manufacturer, designation and name of each; prices of AAF planes; a chart of performance and characteristics of thirty AAF aircraft, giving engine type, dimensions, speed, weight and operational ceiling; how planes are tailored for combat; helicopters and gliders; airframes, airfoils, cabins, flaps, landing gear, tires, engines, propellers; jet propulsion; how the supercharger works; aviation fuels and fuel tank construction; electrical and hydraulic systems; types and operation of fixed and flexible guns; turrets; aerial cannon; ammunition for cannon and machine guns; types, sizes and purposes of bombs; bomb racks and release mechanisms; how flight and navigation instruments are used; the automatic pilot; how we employ electronics; types and construction of parachutes for personnel and supply; oxygen equipment for high altitude operation; aerial photography equipment; Wright Field, where new equipment is developed for combat; Eglin Field, where the equipment is proved under combat conditions.

How We Keep 'Em Flying

The units responsible for supply, transport and maintenance; the four types of supply—planes, aircraft parts, consumable aircraft supplies (gas, bombs, ammunition), material procured by Army Service Forces for everyday needs (food, clothing, building material); the domestic and overseas air depot system; transportation of supplies by ship; the value of air transportation; the problems involved in moving an AAF unit; procedure for overseas movement; transportation within the theatre of operation; the amount of transport needed to keep a combat unit in operation; ferrying aircraft; functions and routes of the Air Transport Command; operations of the Troop Carrier Command; problems of aircraft maintenance; the four echelons

of maintenance; preventive inspection; standardization of maintenance procedures; reclamation and salvage.

What We Fight From

The importance of airbases; construction of an offensive base—runways, aprons, hardstands, revetments; storage, maintenance and control facilities; active defensive measures (fighter planes, aircraft warning systems, antiaircraft, etc.) and passive defenses (camouflage, dispersal, shelters, barrage balloons, etc.); definitions of types of installations—landing strip, airbase, satellite field, subbase, airbase area, AAF airways station; the expansion of our airbase system from 69 to 1,400 bases; the battle for forward bases, illustrated by the Solomons-New Guinea campaign; how a site is chosen and a new airbase is built; the specifications for bomber bases; landing mats; camouflaging a base; facts and figures about AAF bases in all theatres; organization, function, methods and achievements of the Aviation Engineers; a day at a typical combat base in Britain.

Our Battlefield

The natural hazards of the air—wind, fog, rain, snow, turbulence, cold, clouds; warnings and navigational aids transmitted by the Army Airways Communications System; mission and operation of the Weather Service; what happens to the human body in flight—anoxia, acrobolism, freezing, defective vision, excess intestinal gas, flying fatigue; aviation medicine in the AAF and how it overcomes the physiological dangers of flight; methods of bailing out; procedures for ditching; emergency ditching equipment; how crews are trained and equipped to survive after forced landings in desert, jungle or tropics.

Our Air Forces in Action

The difference between strategic and tactical operations and the employment of each; classification of bombers; bombing altitudes; what determines the size of a bombing force; bombing formations and their components; how the bombsight operates; area, low level and overcast bombing; how bombers defend themselves; uses of medium, light and fighter bombers; fighter tactics and formations; how fighters engage the enemy; methods of fighter escort; fighter sweeps and intruder raids; ground control of fighters; radar detection of approaching aircraft; interception of attacking enemy planes; the employment of airborne troops; mission and operation of reconnaissance aviation; navigating by pilotage, dead reckoning, celestial fixes and radio aids; briefing and interrogating aircrews; photo interpretation; interphone, plane-to-plane and air-ground communications; the science of aerial gunnery; the combat air forces—summaries of the war records of

the eleven overseas air forces and the Antilles Air Command and Antisubmarine Command, including the number of sorties flown, tons of bombs dropped, enemy planes destroyed and AAF planes lost.

Our Leaders

Pictures and brief biographies of some AAF personalities holding key assignments.

Awards and Insignia

Qualifications for Medal of Honor, Distinguished Service Cross, Silver Star, Distinguished Flying Cross, Soldiers Medal, Air Medal, Purple Heart, Bronze Star, Distinguished Service Medal, Legion of Merit, American Defense Medal, Good Conduct Medal, theatre campaign medals; origins and descriptions of AAF squadron insignia.

Battle Honors

Achievements of the following cited AAF units: 5th Interceptor Command, 19th Bombardment Group, 17th Pursuit Squadron, 7th Bombardment Group, 49th Fighter Group, 435th Bombardment Squadron, 11th Bombardment Group (Heavy), 374th Troop Carrier Group, 44th, 93rd, 98th, 376th and 389th Bombardment Groups (Heavy), 480th Antisubmarine Group, and the India-China Wing of the Air Transport Command.

Medal of Honor

Stories of the exploits which won the nation's highest award for seventeen AAF officers and men.

War Calendar

Two hundred and nineteen significant dates and events in the AAF's war record since Pearl Harbor.

Historical Highlights

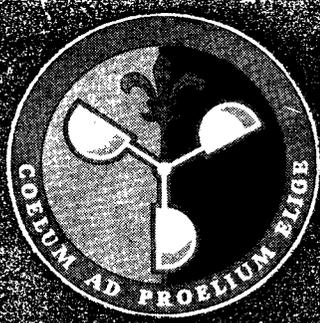
A brief history of the growth of the AAF from its inception as a part of the Signal Corps in 1907 to its present position as the world's mightiest air force; a chronology of United States military aviation from the Civil War to Pearl Harbor, containing more than 375 separate entries.

Appendix

A bibliography of nearly 200 books and magazines about the AAF, the history of aviation, lives of flying personalities, theory of air war, military airplanes, air narratives of World War II, principles of flight, pilot training, technical handbooks, mechanics and engines, model airplanes and all other aspects of aviation; short glossaries of common air force abbreviations and vernacular.

Index

One thousand eight hundred entries and almost 10,000 references. ☆



BATTLEGROUND OF THE AIR

"COELUM AD PROELIUM ELIGE."

Under this banner, literally translated "Choose the Weather for Action," the Army Air Forces Weather Service is operating on the far-flung battle lines of the world. Weather has always been a factor in military operations, but never before has the science of weather been as important as in World War II.

Weather is a primary factor in determining the battleground of air warfare. It, too, is a weapon which must be weighed along with men and planes, ships and tanks, guns and supplies. To meet this demand thousands of young men have been trained in order that the Army Air Forces and our Army may have the best possible weather information.

From Alaska to Australia, from Greenland to Guadalcanal, the weather service is in the front line. The first world-wide weather service in history, it was born of military necessity. Its reporting and forecasting stations are strung from the frozen wastes of the north to the jungles of the south Pacific. Today they are a military necessity; tomorrow these outposts will be landmarks in the air travel anticipated in the post-war world.

Weather information is of value in inverse ratio to its age. At all events it must be up to the minute. It is of greatest value to our flyers when it is fresh off the ticker or radio receiver, less valuable the older it gets.

Weather, therefore, must always be in the front line, be it in North Africa or Italy, the CBI theatre, the South Pacific or continental Europe, wherever our forces fight or are poised for fight. Weather men set up their stations alongside advance air strips, whether captured or constructed; they are with the first wave that storms ashore.

Front line action means casualties and the weather service has had its share.

The men of this service have never forgotten the fifteen weather men who made the last ditch stand on Bataan and Corregidor. They look forward to the day when this region will again be active and will send an advance detachment to open a weather station atop the Emperor's palace in Tokyo.

On succeeding pages, AIR FORCE presents the story of the AAF Weather Service to afford personnel of the Army Air Forces a more complete understanding of the importance of this service to the successful prosecution of both air and ground operations.



WEATHER IN YOUR HAT

By Capt. Luther Davis

AIR FORCE OVERSEAS STAFF

A BLINDLY zealous reporter stormed Supreme Headquarters in London, cornered a Major General and pleaded, "Sir, just give me a hint. When is the invasion going to start?"

"Well," said the General, "Someday a weather corporal out in the woods will stick a wet finger into the wind, think a minute and then tap on his teletype. 'Eisenhower, you may proceed.' Why don't you find the corporal and ask him?"

Not only will D-day and H-hour be set by meteorological experts, but the succession of aerial, amphibious and airborne operations which logically follow will not take place until Supreme Headquarters consults the staff weather officer.

Responsible for observing and forecasting weather for the 9th Air Force, which will provide tactical support to our invading troops, is a very special weather squadron. This fog-conscious organization will also do the forecasting for our Ground Forces as soon as they land in Europe.

To do their job our weather units must be very mobile. The first and most important aid in this regard is the K-53 Mobile Meteorological Station which is a van mounted on a two-and-a-half ton, six-by-six truck. In it are crammed gadgets for making hydrogen and sending up balloons, drafting tables, teletype machines, barometers, blue pencils, red pencils and even green pencils. When open for busi-

ness, the whole establishment is topped by an old-fashioned weather vane not unlike the one on your grandfather's silo.

The K-53 is the result of a lot of thought and experience gathered by the weather boys who helped chase Rommel across Africa. They have it in the Mediterranean theatre now and swear by it—as do the men in the U.K. who expect to ride it to a lot of interesting places.

With every K-53 will be a communications truck carrying two standard radio receivers and transmitters, plus an electric generator to run them. These two large trucks plus two personnel carriers and a jeep will take care of a detachment of about 24 men of whom half will be "Met" personnel and half from a certain mobile communications squadron which was activated, staged and shipped along with the 9th Air Force's weather squadron. The two function in closest coordination.

Plans call for one of these free-wheeling detachments with every operating group of 9th Air Force planes, while higher headquarters—including Ground Force Armies and Corps—will have slightly augmented staffs and extra equipment.

In case we need weather observation ahead of sectors where trucks can roll, the job will be done by similar personnel with "package sets," which are complete weather observing and forecasting stations designed to be broken down into eight easily transportable units, no unit weighing over 200 pounds.

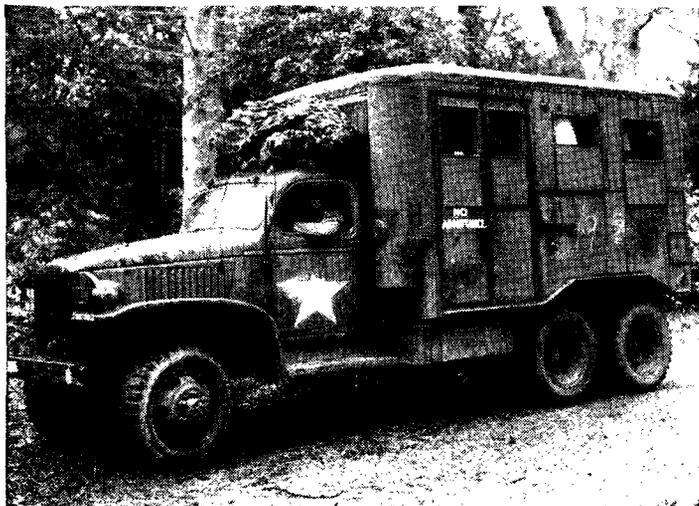
These fit neatly into a C-47 and unload with amazing speed. In actual field tests in England one of these package sets, plus its related packages of radio equipment, was unloaded and in operation forty minutes after the wheels of the transport touched the ground.

Although no one can guarantee that we will have good weather for our European tour, we surely will have enough warning to don our rubbers in time.

Things are cozy and rather academic inside the mobile weather station, but it's likely to be rugged outside. Helmets are in order.



K-53 Mobile Meteorological Stations like this move with invasion troops, carrying weather personnel attached to the 9th Air Force. As camou-



flage experts the weather men rate high. What you see at right below is a camouflaged weather station capable of operating 24 hours a day.





With atmospheric enemies which can be just as deadly as opposing planes and anti-aircraft fire, the airman needs to know what to expect from fog, storms, icing and headwinds. These weather men follow the pilot balloon with a theodolite to learn the speed and direction of wind aloft.

ATMOSPHERIC TERRAIN

EVERY battle in the air is fought on the shifting terrain of the atmosphere. This battleground of winds, clouds, rain and blue skies must be mapped by the AAF Weather Service as carefully as the surface of the earth is mapped for Ground Forces operations.

What a nightmare would confront the general on the ground if the mountains he had charted so painstakingly suddenly changed in height by thousands of feet, if the plains on which his troops were maneuvering started to go up and down like elevators, and the rivers his army expected to cross began to alter course, dry up or flood, all with disconcerting speed.

Yet these are problems faced by the air commander, by every pilot and navigator.

To the end of employing "atmospheric terrain" to the greatest tactical and strategic advantage, the AAF Weather Service operates like the block signal system of a railroad. The service's green and red lights flash on all over the world. Sometimes military exigency dictates air operations when weather is unfavorable. In those cases the weather service merely advises flyers what they may expect.

A mountain the infantryman has to scale has been there from time immemorial, the product of a plowing glacier or mighty upheaval of the earth. The mountainous clouds with which the airman must contend or in which he must seek refuge often start building up and rolling a thousand miles away from the scene of battle only a day or so before. Movements

of the weather, like this war itself, are world-wide in dimension.

That explains the vital importance of Allied control in Spitzbergen, Iceland and Greenland. Our outposts in these lands give us knowledge ahead of time of the approach of bad or good weather for the European theatre. By the same token, one of the principal reasons for booting the Japs off Attu was to establish a weather station there. Many of the storms that hit North America are brewed in the Aleutians and move eastward.

THE general circulation of the world's atmosphere does not take place in small eddies and gusts, but in great, deep, broad rivers of air, far deeper and broader than the Gulf Stream or the Japanese current in the oceans. Air currents, too, flow far more rapidly than water currents.

A stream of cold, polar air starting southward from Hudson's Bay today may be over Chicago tomorrow, and the next day pouring countless cubic square miles of cold Canadian air over the southeast coastline. This great mass of cold air transported from the region where it acquired its low temperature will be denser and heavier than the warm, moist air moving up from the Caribbean. So the cold air sinks while the warm air rises and flows over it. Then, as the warm air rises, it expands and cools, causing the moisture it carries to condense into clouds, rain, snow and other phenomena.

Conditions along the edge of such a

cold front are not favorable for air battle. Advancing at a speed of from thirty to fifty miles an hour, rivers of water are cascading down along the forward rim of the front. Thunderstorms form suddenly, dissipate as suddenly. Air operations must be conducted so as to dodge or take advantage of this squall line.

Time and again, our bombers enroute to and returning from Nazi industrial targets have used cloud cover for protection from enemy fighters and flak.

Our meteorologists hold no claims to infallibility in their predictions and Allied air operations have sometimes suffered from forecasts going sour—as have the enemy's activities at times.

Certainly none of the contesting powers has suffered such disastrous results from a forecast going sour as have the Japs on two notable occasions.

For one, the Jap armada of aircraft carriers and warships crept toward Midway and Hawaii under cover of a bad weather front. When they approached to within striking distance, the clouds began to dissipate, American airmen gave them a terrific hammering and the surviving remnants of the fleet beat a hasty retreat for home waters.

Once again a Jap fleet sallied forth. This time 22 warships and cargo vessels sailed for New Guinea across the Bismarck Sea behind a curtain of advancing rainstorms, clouds and fog. What was to all appearances a well-behaved front suddenly veered off in an unexpected direction. The weather cleared, leaving the enemy ships exposed like sitting ducks on a pond. AAF bombers sank virtually all of them, and thousands of Jap soldiers and sailors were drowned.

Mapping the aerial battleground begins as soon as air operations start from the field captured from the enemy or built by our own fighters. This must be done for the most efficient use of bombers and fighters. When a flight of bombers is forced to turn back because weather has soaked in over a target, there is a costly waste in machines, fuel, jettisoned loads and sometimes in the lives of men.

The air commanding officer must have a new map of his battleground every time he starts out on a new undertaking. He must know what his battleground will be—not as of the time when the planes take off, but as it will be when they arrive at the scene of battle. It is not a problem of preparing accurate weather reports so much as a problem of making accurate forecasts from the reports.

Enemy planes and anti-aircraft are not the only foes of the airman. He has the constant threat of fog, turbulence, icing and headwinds. Weather has taken a greater toll of ships and men on some aerial missions in this war than the enemy. It is the job of the weather man to forewarn the pilot where lethal weather elements are lurking in ambush.

BATTLEGROUND OF THE AIR



The small package held by this cadet is a radiosonde, a miniature radio broadcasting and weather station which is sent aloft by hydrogen balloon to record and transmit information on temperature, atmospheric pressure and humidity. At 30,000 feet it descends by parachute.

THE AAF WEATHER SERVICE

By Col. W. O. Senter

COMMANDING OFFICER, AAF WEATHER WING

WHEN war broke out in Europe in the fall of 1939, the AAF Weather Service was a mere infant—and not a very lusty one at that. But the scant handful of officers and enlisted men in service at that time has since been increased by 9,000 percent.

Today the AAF Weather Service stretches around the world, operating wherever you find American troops and planes, and in a great number of lonely outposts where you find little more than polar bears or tropical fish.

Four years ago, the AAF weather service had no radiosonde, the gadget with

which the meteorologist measures the temperature, humidity and pressure of the upper air masses, and obtains invaluable data with which to check his forecasts. Now our weather stations are sampling the air above the overcast or cloud deck with the radiosonde in a number of places, the bulk of them strategic points in theatres of operations.

On July 1, 1937, the Air Corps took over from the Signal Corps the responsibility of furnishing a meteorological service for the air arm and for weather forecasts required by divisions and higher headquarters. The Chief Signal Officer

continued to have the job of developing, procuring, storing and issuing meteorological equipment.

One of the first moves of the Air Weather Service was to divide topographical United States into a patchwork quilt according to land and water masses. Each patch constitutes a weather region, manned by a squadron and regional control organization.

Later the global map was given the same treatment and today throughout the world there are more than twenty such organizations, including air weather reconnaissance squadrons and mobile weather units. Within each region there is a number of weather stations which exchange information with each other and carry on forecasting for aircraft units in the vicinity.

In addition to the officers in charge of the fixed and mobile stations, there are staff weather officers with theatre commanders and with various aircraft groups. The latter obtain information from the stations, then advise the commanding officers of their tactical units on the most efficient use of the weather elements.

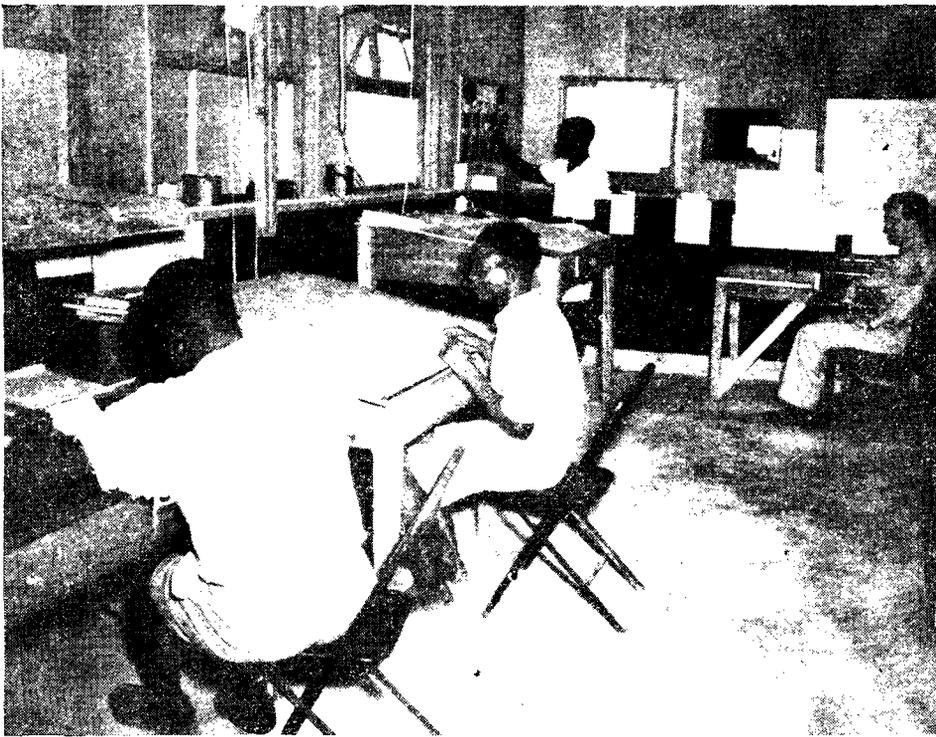
WHEN the AAF first began to spread its wings over the world, the demand for weather officers was serious, in many instances acute. Even as late as October, 1942, there was a pressing need for weather officers in the headquarters of each bomber, interceptor, air support and air service command.

The weather service was fortunate in being able to obtain as commissioned officers several experienced meteorologists, who had been employed by commercial airlines and the U. S. Weather Bureau. But the number of trained scientists and specialists in the field of meteorology was definitely limited.

To help fill the need for competent personnel, a weather cadet program was set up under the direction of the AAF Technical Training Command, which arranged

Operating this theodolite is Sgt. Doris Williams, then corporal, who was in North Africa with the WAAC and reenlisted when it became the WAC.





The interiors of weather stations look much alike whether they are situated in the Aleutians or in steaming jungle growth. Natives of lands around the world have been taught to assist the weather men under military supervision. Here African natives are at work over their charts.

with several colleges and universities to offer an eight-month graduate course in meteorology. When it was determined that a lack of qualified prospects existed for this course, many cadets were given six months' preliminary training to bring them up to graduate level. The educational program continued for two years

before enough weather officers were obtained to meet the demands of the fast-growing AAF.

Meanwhile, thousands of enlisted men, drawn from all walks of life, were sent to AAF technical schools where they learned in concentrated doses all about the theodolite, barometer, whirling psychrometer

and other weather instruments. With additional training, some became forecasters.

Training now has leveled off, but the service is still expanding to meet new demands placed upon it. Lengthening of bombing range made possible by development of the B-29, requires weather forecasting over a wider area and, consequently, enlargement of the reporting station network. And as new fronts are opened, the AAF Weather Service will be required to extend its operations even further.

Administratively, the broad policies of the service are shaped by the Weather Division in Washington. Chief of the Division is Col. H. H. Bassett, who is also General Arnold's staff weather officer. In addition to advising the General Staff, the division supervises the weather requirements and information branches. The information branch makes long-range forecasts and prepares climatic data for use by Ground and Service Forces as well as the Air Forces.

The job of sending trained and fully equipped weather personnel overseas is handled by Weather Wing headquarters at Asheville, N. C. Wing headquarters also exercises command control over weather squadrons and regions in the continental United States and large areas bordering on the north and south. Squadrons outside direct wing control are governed by theatre commanders. However, the wing performs functions which indirectly influence methods abroad toward a more uniform and efficient service.

WEATHER BREAK

The AAF Weather Service in England hit the jackpot on popularity recently. Weather section of the bomber command had been working diligently to improve the accuracy of long-range forecasts. Culminating this effort was a correct forecast that the weather would be so lousy for three days that no type of bombing - not even through overcast - would be feasible. The commanding general of the bomber command gave the entire operational personnel a 72-hour pass.

PLANE VS. DOG

Besides dishing out weather information for the Air Forces and other arms, there are times when the meteorologist himself has to wrestle with the elements. Take the establishment of a new station in Canada's sprawling northwest territory. A total of 12,300 pounds of supplies and equipment had to be moved from the nearest army post.

Consuming a month's time and making eleven landings, two Norsemen planes brought in 9,900 pounds and landed a weather man and radio operator to get out reports for future flights. But it was decided the weather was too much of a

hazard. The remaining 2,400 pounds of equipment and personnel were transported by dogsled.

DEFINITION

A meteorologist is a man who can look a girl in the eye and tell weather.

LADY AND THE LEOPARD

At one AAF weather station in Africa the appearance of a full grown leopard at the door causes no more commotion than a pilot who comes in to get a line on the weather. Raised from a cub by station personnel, the leopard is almost as tame as a kitten - thus far. Louise Rainer, the actress, visited the camp one day and was asked to enter the leopard's cage to pose for pictures.

"They did not tell me I had to do this when I left the States," she protested. But she obliged. The leopard seemed delighted.

INDIAN WEATHER

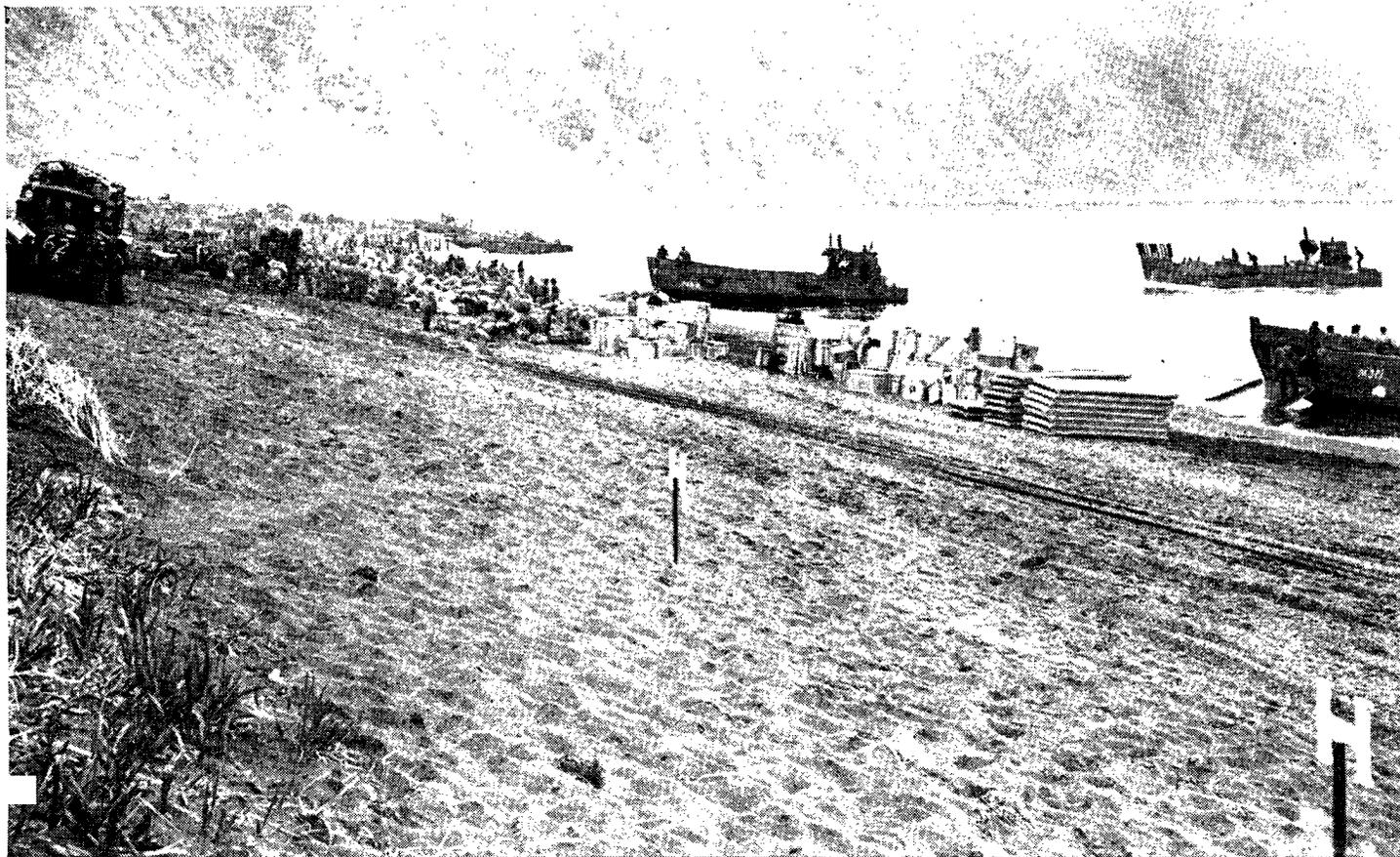
In India we use information supplied by the local weather service to supplement the reports furnished by our own weather stations set up in the far corners of the country. The art of weather ob-

serving in India is handed down from father to son.

Indian weather observers are all civil servants. They stay in their jobs which they do so precisely and well that their climatological data is among the most accurate in the world. Our forces leaned heavily on their findings in assessing the weather for the difficult task of flying and bombing the Jap during the monsoon season. Our flyers were able to bomb 27 out of 31 days in one month during the monsoon rains thanks to accurate weather information.

WEATHER ON WHEELS

Utility of those mobile weather units in the Mediterranean theatre is showing up in many ways. One of the stations on wheels was landed at Salerno and moved overland to Pomigliano airport near Naples. The radio communications unit was slid off the truck and placed on a concrete platform. The truck was then used for supply purposes. The radiosonde unit was also removed to make more room inside the truck for station operations. Another mechanized weather station near the front found its hydrogen inflation shelter unserviceable, used it as a latrine.



Advance weather information, supplied by the AAF to other arms and services, makes possible scheduled landings of materiel under favor-

able conditions. Much of this cargo piled on an Aleutians beach might have suffered great damage if put ashore during a rain storm.

SERVING OTHER ARMS

SINCE atmosphere is the medium for aircraft, development of a weather service was primarily the job of the Army Air Forces. However, other arms are using the forecasts of the AAF Weather Service on a mounting scale. This is especially true near the front lines where weather can make or break an operation.

Mindful of the universal use to which our world-wide weather service could be put, General Arnold some time ago directed that weather information be made available to other arms and services upon request.

Last winter along the mountainous Italian front, where snow, sleet, mud and murky skies slowed up the Allied offensive, the AAF Weather Service furnished forecasts to all corps of Lieut. Gen. Mark Clark's Fifth Army. Some prognostications were prepared a week in advance.

Mobile weather units, operating near the fighting lines, formed conclusions on

the future course of the weather upon which the timing for two Fifth Army major offensives was based. The service also compiled climatological data on several months of the Italian winter before American forces moved northward from Naples.

When the Army fought its way to the banks of the swollen Volturno River, the Corps of Engineers turned to the AAF Weather Service. Its rainfall forecasts were taken into account in the design of bridges and the timing of their construction over the Italian stream.

In England, our weather service put together climatic data for certain sections of the British Isles on request of the Medical Corps.

Both climatic information and periodic forecasts of the service were used by the engineers in construction of the Alcan highway and other installations through Canada and the Yukon to Alaska.

On our own Pacific coast in recent months, the Quartermaster Corps has been obtaining minimum and maximum temperature forecasts from the AAF Weather Service. The information is used in planning the handling, transportation and warehousing of large stores of perishable foods and other Army supplies.

To the end of fostering closer liaison and determining weather needs of other branches, air weather officers have been assigned to the Infantry school at Fort Benning, the Field Artillery school at Fort Sill, to battalions and research projects of the Chemical Warfare Service and to the Signal Corps.

Nearly every day in Washington, the General Staff requests climatic information or long-range forecasts from the AAF Weather Information Branch. Such data is obtained by other arms in this country by channeling requests through the Military Intelligence Section of G-2.

CAVU AT PARAMUSHIRU

By Capt. Virgil E. Sandifer

WEATHER OFFICER WITH 4TH AIR FORCE

FORECASTING for any raid in the Aleutians neighborhood is a ticklish proposition. Weather fronts build up west of the Aleutians and move roughly eastward toward North America. So the meteorologist stands on the jumping-off place and tries to predict what's cooking in enemy waters without any reports from that area to go on.

From reports sent in by our own outposts in Alaska, the weather officer draws a surface synoptic weather map. He then studies the situation to decide whether any storms or squalls might come in and close the fields. Getting planes back in is always a problem in this part of the world. Finally, he sends out a meteorologist (often

himself) in a plane to find the storm, to determine its limits and intensity. Periodically, he reports to the station where his findings are included on the current weather map.

Patrol planes also send back signals and, when they run into a particularly severe storm, radio its position. Pilots also size up the weather. It is important to know the flying possibilities of the weather because types that are flyable in some ships are unflyable in others. A weather man must constantly keep in mind the type of ships to be used on missions.

Much has been written about weather in the Aleutians. I don't know whether it's worse than in other theatres, but I can

say you encounter as much bad weather in these islands in one year as you do in four years in the States.

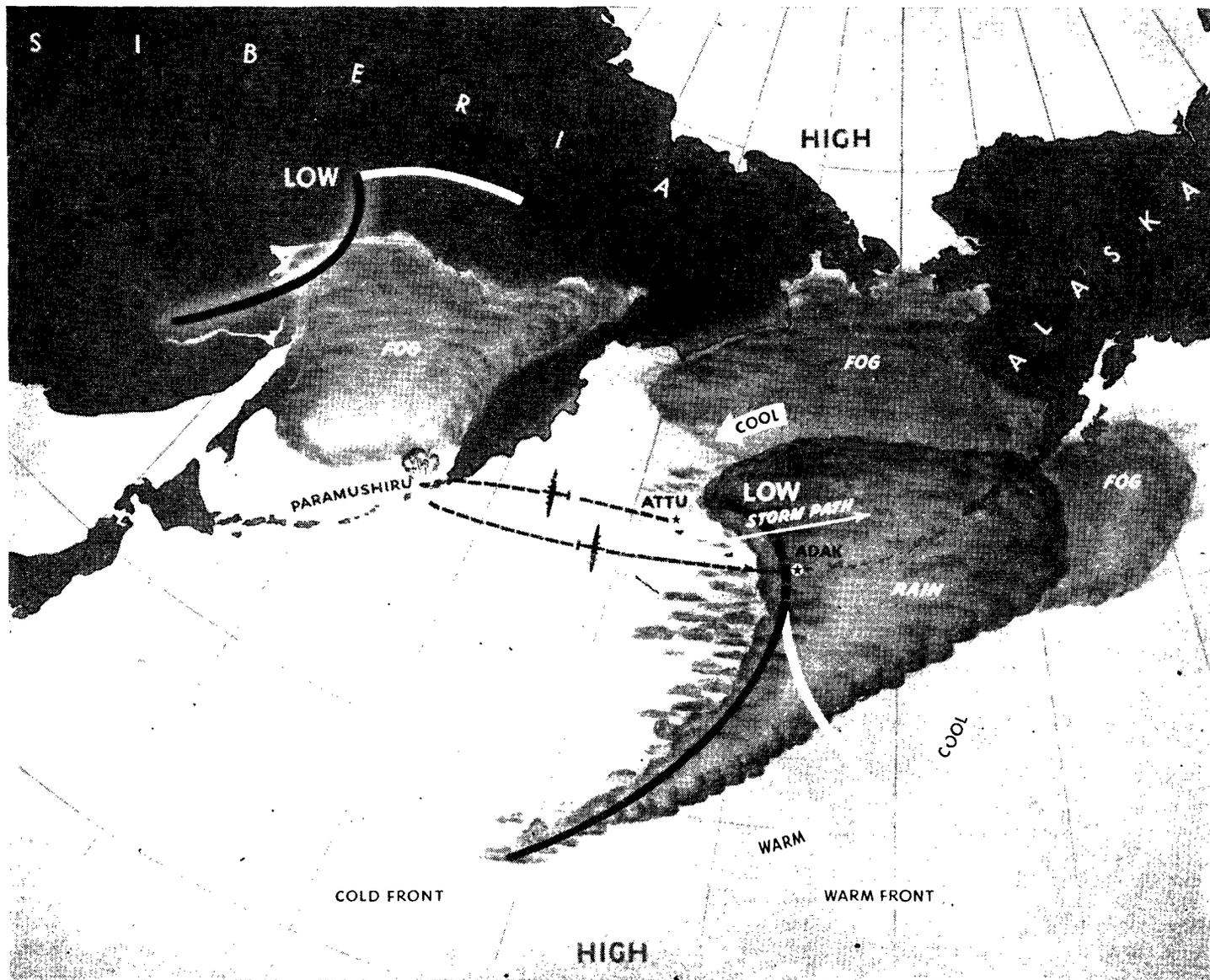
Good weather prevails for only a few days in the spring and fewer days in the fall—when air and water temperatures coincide. Weather in the Aleutians builds up largely from the variation between these two temperatures. Fronts of bad weather may move through the Aleutians at 24-hour intervals, but they sometimes come as close as eight hours apart.

Weather's violence is caused by the cold air moving down from Siberia across the Bering Sea and hitting comparatively warm water. This warms the air and sets off squalls.

Now and then, these storms spread over an area as large as the United States. They tend to move into the Aleutians area and center themselves between Alaska and Dutch Harbor. There they remain for three days, spinning around with great gustiness and winds as high as 107 miles

Good weather days in the Aleutians prevail in limited number in the spring; they are even fewer in the fall. Incident to the first raid on Paramushiru, favorable weather followed passage of a well developed

cyclone into the Bering Sea north of Adak Island. This storm brought down cool air from the north which momentarily cleared the summer fog from Adak and the air route between Attu and Paramushiru.



BATTLEGROUND OF THE AIR

an hour. Precipitation consists generally of snow pellets. Flyers are warned to stay out of the clouds because of the turbulence and extreme icing conditions.

With the coming of summer, warm air from south Pacific latitudes will cool upon striking the cold water around the Aleutians and cause fog.

When word came that we were to raid Paramushiru, the Jap's Kurile Islands base, for the first time, other problems were simple compared to the complicated weather situation.

We had to have two terminals open for the planes when they returned, one at Attu and the other at Adak. In addition, Adak had to be open in the morning for the take-off. There could be no frontal bad weather between the bases and the target. The target had to be clear. Then, if possible, we wanted to have sheet-like stratus clouds over the Kurile Islands to furnish protection for the bombers since they would be without fighter escort.

I was working at headquarters with Capt. Archie M. Kahan, another weather officer. We sweated it out a week and a half for the right conditions. Meanwhile, all during that time the crews and planes were all set.

Each night, shortly after midnight, we would go in and wake up the commanding general, Maj. Gen. William O. Butler. He didn't mind it. In fact, most of

the time he was waiting for us to get there with the maps. We didn't have to do more than put the maps down. He could read them as well as we could for the general had learned a lot about meteorology through practical experience. Later we would go over the reports. General Butler had to be absolutely certain that the conditions were right for this important mission.

FINALLY the day came. The weather looked good to us. It also looked good to the general. Messages went out to the bombers. That morning they took off.

I never wanted a crystal ball as much as I did that day. I didn't have one, so I did the only thing a weather man can do when he sends a mission out. I went to the top of the hill, where the weather shack stands, to sweat it out. It offered a fine view of the Bering Sea, the Pacific and all the runways. But that day all I was watching was the weather and, as the time lengthened, I began to listen for the sound of our planes.

At first, all I could hear was the radio station next to the weather shack and the chattering of the teletypes as they sent messages out to the various dispersal points on the island. The worst moments came when a couple of secondary fronts settled in at the Adak terminal. But eventually the weather broke and when the planes were due to return it was almost CAVU at Adak.

Paramushiru took a pasting and all our planes returned safely. I left the hill and the weather shack and didn't give a damn how the weather was for the rest of that night.



From such outposts as this little weather station, Army Air Forces meteorologists are able to observe and forecast the conditions which air-men will encounter on their missions against the enemy. From this weather station in India, Capt. John A. Hass prepared his forecasts for medium bomber strikes against targets in Burma. By briefing the pilots as to the best elevations for strong tail winds enroute to the target and light head winds on the way home, the bombers were able to make eleven sorties on the gasoline previously consumed in ten trips over the target. Such fuel saving is important in the CBI.

MAKIN'S WEATHER AND JAPS

By Lieut. Les Goldberg

WEATHER OFFICER, CENTRAL PACIFIC WEATHER REGION

WE landed before the battle was over. In fact, there were still 150 very live Japs cornered on the east end of Makin Island. Our artillery would shell them half the night. When our guns would stop, the Japs would come out and use their mortars and machine guns on us. Then their snipers would start sneaking all over the island. Some men got hit five miles behind the lines.

The weather equipment hadn't arrived so, feeling bored with nothing much to do, I joined one of the patrols which went Jap-hunting in the jungle. The patrols would look for Japs in the daytime and the Japs would look for patrols at night. In between times I pitched a pup tent and found some palm fronds for a bunk.

On the second day, I began to run into weather men. They had witnessed the naval shelling and landed right in the

middle of the assault wave. After sweating it out for five days, we began to find our crates of instruments. We built our own furniture and set up the weather station temporarily in a pyramidal tent before erecting the permanent structure.

Our building was the first one completed, and we actually had the first installation on the island permanently established, moving in three weeks after arrival. It took some promoting and scrounging and plenty of hard work, but it was well worth the trouble.

Thanks to the cooperation of the colonel we were able to get the big things done with a minimum of red tape. We put 30 miles a day on a three-quarter-ton weapons carrier assigned to us. When we needed some glue, we were able to talk the Coast Guard into sending a landing boat out to a freighter lying in the lagoon so the sergeant could go aboard

and obtain glue from the ship's carpenter. Everytime we passed a keg of nails without a guard on it, we refilled our nail box. The barometer was damaged moving over but there was a Signal Corps lieutenant on the island who was a meteorological instrument technician. He fixed it.

Soon we started forecasting. The first day after the planes landed, the colonel asked for a forecast for a strike on a Jap-held island in the area. I hadn't seen a synoptic weather map for two months but a cold front had gone by the day before, and, with that as a basis, I prepared the forecast aided by a pibal (pilot balloon run to determine direction and velocity of winds aloft), and hit it on the nose. We've made forecasts for more than thirty strikes over five islands and we haven't missed yet. You can't help bragging a bit when the breaks are that good.

I had a phone in my bomb shelter so

when Charlie came over, I could be reached directly by the colonel to give headquarters the best information we had on the weather so it could be decided whether to follow them back or not. We also have had to forecast for joint Army-Navy-Marine strikes on twenty minutes' notice.

To add to the sidelight statistics, we had been bombed 33 times when this was written. I nearly got mine one night

when a 500-pounder landed about 100 feet from me while I was in my bunk. I can still hear the swish of that baby.

I AM reminded of an alarm we had at night recently. One of our latrines, which are built out over the lagoon, broke loose and floated away. Our detection devices picked it up and the whole damn place got called out to stop an invasion of enemy surface vessels. ☆

'MET' BOYS IN THE SOUTH PACIFIC

By Sgt. John Fitting, Jr.
SOUTH PACIFIC WEATHER REGION

THE AAF spirit of teamwork, famous in every combat theater, nowhere is better exemplified than in the South Pacific where cooperation of weather men and flyers often draws the line between success and failure of a mission and sometimes spells the difference between survival and death for the airmen.

In the broad expanse of tropical waters, dotted by insular stepping stones to Tokyo, the elements can be either a protecting friend or vicious foe of the men who fly. The job of the weather man is to permit use of Mother Nature's fickleness to advantage by the accurate prediction of her variable moods.

And her moods are extremely variable in the South Pacific. Pilots in this theatre must know before taking off on a mission precisely what atmospheric conditions they will encounter to, from and over their target. They must know where best flying levels are to be found, whether the target will be clearly visible and if cloud coverage will shelter their approach and provide them a haven after the bombing run.

Just as important as weather information that can be used to tactical advantage are warnings given flyers of impending danger in the form of tropical storms which are of sufficient fury to dash a plane and its crew to destruction.

In the South Pacific, AAF meteorologists have to employ plenty of ingenuity to overcome the natural advantage afforded Japanese forecasters by the earth's rotation, which causes weather normally to move from west to east.

While the Japanese with little effort can determine what sort of weather is heading toward our installations and operational areas, AAF meteorologists frequently fly far over enemy-held territory to obtain an accurate line on approaching conditions.

The AAF weather observer flies on a bombing mission one day to evaluate atmospheric conditions in their application to the next day's operations. Along the route he watches the gradual building of billowing cumulus. When he returns, he

has data on amounts and types of cloud formations seen at various points.

Many of the flying observers are qualified gunners and when the occasion demands they can take over at a gun position. But if a weather man is lucky enough to knock down a Zero, the achievement is only incidental to his principal mission, for outguessing the weather is his chief concern.

EVERY AAF base in the South Pacific has its own weather station. Instrument readings on prevailing local conditions are combined with reports of the flying observers and radioed advices from other stations in the AAF's weather network.

The information at hand is plotted on large maps and charts which enable meteorologists to trace weather transition over a wide area and to analyze its portents. Often weather men work all night in order to have the forecasts ready at take-off time the next morning.

The men who study the elements are constantly on the alert to detect the presence of thunderheads, technically known

SCIENCE MOVES ON

You've heard about Col. F. A. Kluever's reliable rheumatic donkey which brayed whenever it was due to rain in his section of Africa. In New Caledonia the weather boys found a different answer, when their whirling psychrometer broke and they had to find a way of measuring relative humidity for the synoptic reports.

They strung a rope between two Gaia trees. Whenever the rope tightened, they knew there was plenty of humidity. When it relaxed, the air was dry.

SOUTHWEST PACIFIC FORECASTS

A recent analysis conducted by a weather regional headquarters in the Southwest Pacific shows the tremendous volume of air traffic in that theatre which must be serviced with adequate weather information. The canvass brought out the fact

as cumulonimbi. A manifestation of Nature in her ugliest mood, the thunderhead is one of the deadliest perils to flying in the South Pacific.

In that area, the thunderhead's anvil-shaped top may climb as high as 35,000 feet. Its danger lies in the steel-like strength of its vertical air currents, which attain a velocity of 125 miles an hour in their six-mile ascent.

Up-drafts conflict with down-drafts of equal velocity and a plane caught in the opposing streams can easily be ripped to pieces. Its wings can be torn off and its fuselage broken and scattered. So powerful are the currents that debris of a wrecked plane can be held aloft for as long as fifteen minutes.

These giants of destruction hover over many of the routes flown by the AAF in the South Pacific. They are found in unbroken lines hundreds of miles long in frontal zones which exist where two huge air masses of conflicting physical properties meet.

Should a pilot run into a particularly dangerous thunderhead, he and his crew and plane would have only the slimmest chance of survival. Fortunately, however, the weather men can foretell the position of the white parapets of the cumulonimbis. If they lie along the route of a proposed mission, the take-off normally is delayed until they clear away. But if the mission must be flown on schedule, the weather men can advise the pilots concerning an alternate route, by which the hazard can best be avoided.

The AAF Weather Service in the South Pacific also plays a big part in the rescue of flyers, forced to ditch at sea. Search planes are given data on winds and drift in the vicinity of the crash, and location of the survivors' life raft is thus facilitated.

The flyers are the boys who register the put-outs in the South Pacific but the weather men must be credited with plenty of assists. ☆

that more than 35,000 forecasts were furnished during a six months' period for the safe conduct of aircraft in the theatre.

INDIAN AIR JITNEY

A C-47 used by the AAF Weather Service in India has been busier than a New York taxicab on New Year's eve. Over a period of more than four months, this aircraft has been flying on an average of five hours a day, carrying approximately 3,000-pound loads and six passengers on each trip.

Col. Richard E. Ellsworth, regional control officer, and his staff have used the plane to visit outlying weather stations. In addition entire station units—personnel, supplies and the instruments required for measuring the weather elements—have been hauled by the plane to outlying points in the mountains and jungle. ☆

ON THE ALERT!



CARTOONS BY JIM RAWLS

TIMELY ADVICE FROM THE AIR INSPECTOR

Administrative ★ Tactical ★ Technical

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

► **How to Attain Old Age:** Self-preservation is a basic instinct of man but, unless supported by practical knowledge, the instinct often is ineffectual. In order to determine just how well he can take care of himself, every soldier should give himself this quiz:

- (1) Do I know how to use my individual weapon to the point where I have confidence in it?
- (2) Am I familiar with defense tactics applicable to my assignment in the air or on the ground?
- (3) Can I perform first aid on myself?
- (4) Do I have a knowledge of means of survival if stranded in the area in which I am fighting or will be fighting?
- (5) Do I know how to avoid diseases common to the area in which I am stationed?
- (6) Do I know the ordinary rules of sanitation concerning mess utensils, latrines, etc.?
- (7) Have I learned well the lessons of chemical warfare and is my gas mask ready for use?
- (8) Do I heed safety rules or do I take unnecessary chances?

► **Unnecessary Equipment:** Overestimating supply needs is an error which can grow like a snowball rolling downhill. An overseas report calls attention to the dangers of supply personnel ordering equipment their units "might need . . . perhaps . . . someday." Depots in turn will multiply their requests, and shipment

of needed items consequently may be held up because space is utilized by the unnecessary materiel.

Equipment, whether controlled or not, must be placed where it can do the most good. Frequent checks must be made to assure that there is no excess equipment on hand. Attention is invited to AAF Regs. 65-43 and 15-108, and TM 38-220.

► **Accrued Leave:** Many officers, warrant officers and flight officers apparently have not been properly instructed in maintaining a record of their accrued leave. Sec. I, WD Cir. 55, 1943, requires officers to certify the amount of their accrued leave and to maintain personal records necessary to prepare certificates. The information will not be furnished by the Office of the Adjutant General. A certificate will be required whenever an officer is relieved from active duty under circumstances entitling him to terminal leave. (Par. 2a, AAF Reg. 35-31, 5 April 1944.)

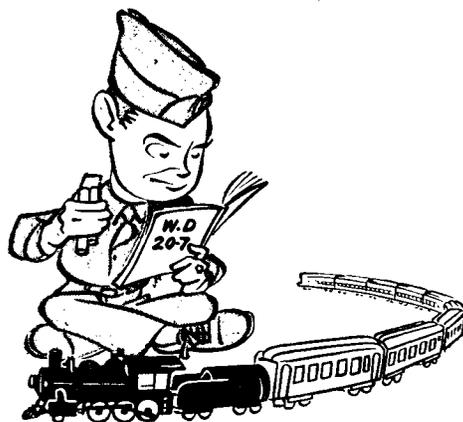
► **Ordnance Reclamation:** Shortage of critical materiel and need for ordnance equipment repair parts make it imperative that all AAF installations utilize to the fullest extent facilities available for reclamation of unserviceable ordnance equipment and assemblies. Prompt evacuation of assemblies, sub-assemblies, and other reclaimable items must be made to expedite reclamation by various service commands. Direct exchange of unserviceable items will be made to prevent backlogs or accumulation of ordnance property. Maximum service must be derived from all components and materiel before they are consigned to a salvage officer for scrap. (AAF Memo. 65-5, WD Cir. 7, 1944, AR 850-15, 28 August 1943, and Army Service Forces Cir. 140, 6 December 1943.)

► **When Lights Are Low:** Truck units are not fully trained for the job ahead if they cannot keep their vehicles rolling under blackout conditions. And there isn't al-

ways a nicely lined concrete highway to follow when drivers overseas are ordered to go easy on the lights. Tactical inspectors should check to be sure that this type of driving is given due attention in training.

► **Personal Affairs:** Every soldier going overseas should place his personal affairs in proper order before leaving his home station. Reports indicate that too many individuals, about to depart for overseas stations, arrive at staging areas without having completed arrangements for insurance, allotments of pay, maternity care for wives, family allowances and similar other matters. (Sec. 5, WD Cir. 134, 1944.)

► **Troop Train Commander:** When an officer is designated as commander of a troop train the first time, he usually starts scrambling to learn his duties. Few assignments allow so little time for preparation and training because troop movements are usually on short order. To assist officers, WD Pamphlet 20-7, Troop Training Commander's Guide, was published 14 March 1944. The introduction points out that "careful reading of the guide and appropriate regulations, plus a combination of good judgment and a sense of humor in performing his task, will insure for each train commander the successful accomplishment of his mission."



► **Maintenance Rivalry:** Rivalry between maintenance crews of various squadrons is an example of the American spirit that is helping get this war job done, but it should not be permitted to go too far. An overseas report points out that friendly competition may become dangerous.

Consider the case of structural damage to an airplane, due to enemy gun fire or other causes. The squadron maintenance crew, of course, wants to exhaust its own resources before turning a ship over to a service group.

Maintenance crews, however, are not equipped with facilities for proper and safe structural repair, and should release the plane to a service group. A "patched up" job, performed by the crew, may result in the plane's failure to return from its next mission.

► **"Switch It Off":** A small card carrying the reminder, "Switch It Off," will be posted soon near all electric light switches in Army installations (Conservation Program Project No. 13-E-2). Where used to date, the card has resulted in savings of from 5 to 12.9 percent in consumption of electric power, reports the Corps of Engineers. An average reduction of 7.5 percent in power use by all posts, camps and stations in the Zone of the Interior would bring a total annual saving of approximately 213,900,000 KWH or \$2,438,460. It pays to "Switch It Off."

► **Defense Against Radio Jamming:** It is hard for a radio operator to avoid getting into a "jam" overseas, but the trick is knowing how to get out of it. Both the Nazis and Japs use jamming tactics against our radio circuits especially when they have something important brewing. WD Technical Bulletin Sig 5, "Defense Against Radio Jamming," contains many tips for radio operators in anti-jamming tactics.



► **Advice From a General:** "Much more emphasis must be placed on military courtesy, on dress, and on cleanliness. If a man is so lethargic that he fails to salute, he is so lethargic that he will fail to recognize an enemy. If he gets himself dirty, he loses self-respect. Discipline is based

on obedience. The best way to insure obedience is from the bottom. If men salute properly, pay attention to their dress, wear the clothes ordered, they will carry out orders in battle. If they fail in these respects, they will be negligent in battle and will be killed to no effect." (Letter from a General Officer in Tunisia.)

► **Order of Importance:** "In order to insure that the utmost benefit is derived from inspection, it is necessary that inspection emphasis be placed, in order of importance, on those major factors affecting performance of the mission of a unit or activity and the efficiency and economy of its operations." (Par. 2b, AAF Reg. 120-1, 29 March 1944.)

► **Dental Treatment:** The phrase, "Let's get our teeth into this war," takes on a literal meaning in preparation for overseas movement. Par. 9b(6), POM, directs that "all necessary dental treatment, from a health and functional standpoint, will be provided troops prior to their departure from home station." This doesn't mean, however, that dental work should be put off until troops are alerted. Dental officers and inspectors must continually check records to insure that work is progressing satisfactorily and individuals must report promptly when defects develop. No one wants a toothache over Berlin. ☆

HERE ARE THE ANSWERS

Q. Is it necessary for all AAF organizations to maintain a duty roster?

A. No. Following approval by the War Department, Headquarters, AAF, delegated authority to major commanders, including station commanders, to dispense with maintenance of a duty roster in specific installations, organizations and detachments where it serves no useful purpose in effecting daily assignment of personnel to housekeeping details. (AAF Ltr. 35-37, 16 December 1943, Subject: "Maintenance of Duty Roster")

Q. Is an overcoat included in the baggage limitation for personnel traveling outside the continental United States in AAF aircraft or aircraft operated for the AAF?

A. One overcoat or raincoat, if worn, is not included in the baggage limitation. (WD Cir. 122, 1944)



Q. Should an officer be barred from promotion because he has not served under one commander for a sufficient period of time?

A. No. In accordance with existing regulations, Par. 5c, AR 605-12, it is only necessary that the commander originating the recommendation have knowledge of the manner in which the officer has performed duties considered commensurate with the higher grade. This information is available on the officer's record card, Form 66-2. (AAF Ltr. 35-76, Subject: "Overdue Promotions," 5 April 1944.)

Q. May enlisted men wear the coat, mackinaw, while on furlough?

A. Under current Tables of Equipment, enlisted personnel with certain occupational specialist designations are issued the coat, mackinaw, in lieu of the overcoat and are therefore authorized to wear the coat, mackinaw, while on pass or furlough. Except as provided above, the coat, mackinaw, is not authorized for wear on pass or furlough. (Sec. IV, WD Cir. 64, 1944.)

Q. When traveling, is it permissible to pack the gas mask in the barrack bag?

A. No. Packing of gas masks with

other individual equipment in barrack bags on change of station has resulted in broken eyepieces, crushed canisters and torn carriers. Personnel will discontinue this practice immediately. The gas mask will be carried on the soldier's person. (Sec. I, WD Cir. 325, 1943.)

Q. Will towels and toilet articles worn out through fair wear and tear normally be replaced by government issue?

A. No. There is authorization, however, for replacement issues of such articles when they are lost, destroyed or rendered unserviceable in combat or in other situations in which the enlisted man concerned is not at fault. (WD Cir. 121, 1944)



Q. May an officer see all classified matter?

A. No person is entitled to knowledge or possession of classified matter solely because of his grade or position. Classified material is entrusted only to individuals whose official duties require such knowledge or possession. (Par. 19, WD Cir. 91, 1944)

When the food bombardiers plaster a friendly airfield their aim must be accurate or supplies will fall out of reach of our men, or even into

the hands of the enemy. At this location, airdrome construction crews are supplied with food packages dropped from a cargo aircraft.

FEEDING THE AAF

By Capt. Benjamin J. Grant, Jr.

AIR FORCE Staff

AMERICAN ships carrying B rations began arriving at Oran on December 15, 1942. Working in a driving rain, Arab laborers passed the cartons hand to hand from shipside and piled them on the dock. Arabs work slowly. At least one ship was ten days in the unloading.

The inevitable happened. Rain-soaked cartons broke open and labels disappeared. The result was a fifty-foot heap of unsorted and unpredictable canned goods. A mess officer wanting beans was lucky not to get salmon or evaporated milk. But everybody was good-natured about it, because it was nobody's fault.

Harassing experiences like this of the 12th Air Force have been multiplied around the world, wherever AAF units have moved quickly into new places. Food for the AAF's ever-moving outfits has been hauled by camel pack, by mule, by native carrier, by barge and by airplane. It has been flown over the heads of the enemy and dropped, with or without parachutes, to isolated stations. It has taken all the ingenuity of air quartermasters to meet these situations.

Today, the AAF is feeding something like 10,000,000 pounds of food a day to a family of more than 2,000,000 men and women. The daily diet of AAF soldiers is 1,800,000 pounds of meat, 2,800,000 pounds of vegetables, 1,200,000 pounds of fruit and 2,000,000 pounds of dairy

It takes 10,000,000 pounds of groceries a day for our big family's three squares.

products, plus appropriate quantities of items such as soup, dessert, salad, coffee, tea and candy.

Spread these requirements around the world, to desert stations, to tiny Pacific islands, to Arctic weather stations, to jungle bases accessible only by air, allow for the quick movement of AAF units, add a generous portion of combat emergencies and the special problems of diet for flying personnel, and you begin to comprehend the extent of this task of feeding the AAF.

It is an interesting fact that the average AAF soldier eats five ounces less food per day than the average ground soldier. But in the AAF we consume an average of five pounds of GI food apiece every day, which should be enough to keep a fellow from going dangerously hungry.

To see that the AAF gets its three squares a day is one of the jobs of the Air Quartermaster, Col. H. R. W. Herwig. Operating under the Assistant Chief of Air Staff, Materiel, Maintenance and Distribution, he has the task of representing the AAF on all matters having to do

with quartermaster supplies, personnel and equipment. This involves more than food. It also includes clothing and equipment, which themselves are very considerable orders.

To clarify the division of functions, the procurement of food and its transportation to railheads, ports or warehouses, here and overseas, are jobs of the Quartermaster General; from there on, feeding AAF personnel is the AAF's business. This includes the issuance of food to units or messes, preparation, serving and salvage disposal. It also includes finding the answers to special AAF problems and delivering food by air to isolated troops, ground as well as air.

SOME of the most daring missions of the war have been flown to isolated spots to drop food, and more than a few AAF airplanes have been shot down on such flights. Back in the early days--and even now, for that matter, for we still have much to learn about making deliveries under such conditions--beleaguered men found themselves on pretty thin rations. At Guadalcanal, some had to get along on monkey meat and onion sandwiches.

In many cases, the food "bombardiers" have been handicapped by a shortage of information about the target. The aim must be accurate or the food goes to waste--or worse, into enemy hands. Having

learned our lesson about overshooting the mark, our relief forces now try to place in each food-carrying airplane a man thoroughly familiar with the territory in which supplies are to be dropped.

When the Japs captured Kokoda, some Australian troops were trapped in the Owen Stanley Mountains. U. S. airplanes, flying a perilous course, dropped rice to them day after day. At first, the bags burst when they hit the ground and much of the rice was lost. Then they tried using two bags, one inside the other, but they still burst open. Finally, they put on a third bag and, thus reinforced, the package held together. For all the difficulties, it was considered a successful operation.

In the New Georgia operation, our troops in pursuit of the enemy outdistanced the movement of supplies, which were transported slowly over almost impassable terrain. Supply by air became necessary. Many tons of supplies were dropped by parachute to field units.

In another case, it was necessary to drop food to U. S. troops in a New Guinea forward area, where the terrain made surface transportation arduous and slow. Most of the dropping points were at the bottoms of deep, narrow valleys where, in some instances, it was necessary to descend 2,000 feet, drop the supplies and climb steeply to get out. Many a ship returned with damaged ailerons and elevators.

Such experiences have led to the development of a new, streamlined ration, known to be palatable and believed to be as healthful and substantial as that now fed to AAF soldiers, but weighing only two and a half pounds. It consists of dehydrated, canned and processed foods, and is designed for use in the field in situations where the ten-in-one ration (a day's food for ten men) is not available. The new ration has undergone tests by the Air Forces Board at Orlando, Fla.

This is typical of current studies to improve the food of our fighting men, to adjust it to high altitude flying, to correct its packaging and to get the distribution system in line with war conditions.

Supply problems on Guadalcanal in the early days, particularly the handling of food for the first arrivals, were met by quartermaster personnel in the best possible way. These ground crew men of a fighter squadron line up for chow. Far better facilities are in use today.



AIR FORCE, July, 1944



The home of this fortunate fighter unit in the jungles of Assam was formerly the mansion of a manager employed by a British-India tea company. The men seem to be making out in reasonable comfort as compared to the usual housing of crude bamboo huts. They are served by India bearers.

At Salina, Kan., tests are being made of all the elements of AAF food, and some of the findings have been quite remarkable. Enough already has been done to establish pretty definitely that a man who flies at high altitudes is a special feeding problem. For example, it has been learned that at 18,000 feet, the volume of gas in the intestine is doubled, at 39,000 feet it is increased five times.

It has become recognized that fried or crusted foods, fibrous foods such as celery and cabbage, food of high fat content such as pork, and carbonated beverages cause distention of the intestine at altitudes above 20,000 feet. This results in pain similar to that caused by indigestion and effects the efficiency of the flyer.

The experiments at Salina concern pre-flight, in-flight and post-flight feeding. The findings likely will result in a number of modifications of the diet of flying personnel.

Experts working in cooperation with Colonel Herwig and his subsistence offi-

cer, Maj. E. W. Elliott, are making studies looking to the elimination of the sandwich-lunch system now in common use for long flights. The only alternative today—and this one is almost as undesirable—is to rig up the airplane for cooking. The answer probably will be food trays, one for each man, neatly stacked away and kept warm until meal time, like the arrangement now used by the commercial air lines except, of course, that on Army transports or bombers there will be no pretty hostesses to do the serving.

THE AAF has developed an aircrew snack lunch and has bought 10,000 of them for testing in the theatres. Designed to give the boys a lift on the trip home after combat, these neat pocket-size boxes contain:

- (1) Chocolate, because the boys like it and because it gives them energy.
- (2) Caramel, for the same reason.
- (3) Chewing gum, because it absorbs nervous energy, keeps down thirst and reduces the liquid intake.
- (4) Hard, bland candy, because a little of it goes a long way. A small piece of such candy is enough to last a man fifty miles or more. It serves also to release from the body tissues a considerable quantity of water which is not used in digesting the candy.

There are other AAF rations: the parachute ration, two in each parachute seat, consisting of high protein foods; the life raft ration, containing candy, chewing gum and vitamin tablets; the combat lunch ration, for use in airplanes equipped for cooking; the D ration, the same as the one issued to the rest of the Army but specially packaged for the AAF, and the K ration, modified for the AAF by the addition of citrus juice. (Continued)

WHAT'S YOUR AIR FORCE I.Q.

All over the world, the AAF is engaged in on-the-job experimentation with methods of packing food for dropping to isolated troops. Aside from the standard containers, which are not always available, the most satisfactory packaging material so far discovered is sawdust, which has proved adequate protection for free-dropping canned goods and, if very carefully packed, bottled food.

Packaging for dropping, free or parachute, is done locally with whatever materials are available. Sometimes sawdust isn't, and substitutes include excelsior, rags, hay, straw and even paper. AAF units in Africa once complained that aircraft engines shipped to that theatre from the States were not as well packed as those shipped from Britain. When more details were requested on what was wanted, it developed that the interest of the complainants was in getting more salvageable packing materials to make containers for dropping food from airplanes.

Parachute food packages usually weigh 100 to 175 pounds. Free-drop units normally weigh forty to sixty pounds, although ninety-pound packages have been



At this desert training center men are taught to pack food and equipment which are dropped by parachute to troops in isolated sectors.

dropped with fair success. The normal food for dropping from airplanes is the C ration, packed in cases of eight rations. Each ration contains six 12-ounce cans—one of meat and vegetable stew, one of meat and beans, one of meat and vegetable hash, and three of biscuits, confection and beverage. The ration also includes halazone tablets for purifying water. Two tablets are used for a quart of clear water and four for muddy water. Five tablets are provided each man daily.

If it is necessary to drop large quantities of water to troops, ten-gallon milk cans normally are used as containers.

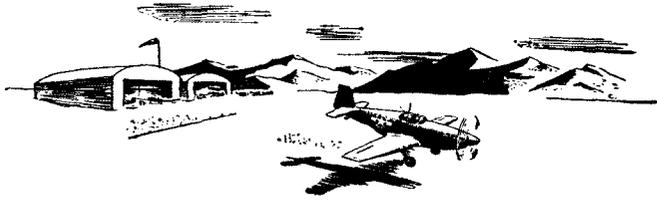
With home sources hard-pressed to meet military and civilian food needs, the AAF has initiated a program to salvage and utilize waste materials. As an example of the accomplishments, one air station which used to buy 22,000 pounds of lard per month has since been able to reduce its lard requirements to zero. In one month, the cooks produced 25,000 pounds of fat by rendering it out and saving fat drippings. ☆

Roll up your sleeves and spar for a mental round or two with this month's AIR FORCE Quiz. Chalk up the usual five points for each correct answer. A score of 90 to 100 is a little beauty; 80 to 90, good; 60 to 80 not too bad; below 60, room for improvement.

1. The distance in statute miles from Hollandia to Davao in the Philippines is approximately
 - a. 1,100
 - b. 375
 - c. 600
 - d. 2,200
2. In ditching a B-17, the top turret gunner should place his guns facing
 - a. Backward
 - b. To the right
 - c. Forward
 - d. To the left
3. If an engine exhausts black smoke, it means that
 - a. The mixture in the carburetor is too rich
 - b. There is a leak in the exhaust stack
 - c. The mixture in the carburetor is too lean
 - d. There is an excessive air leak in the bleeds
4. The location of 6th Air Force headquarters is
 - a. Hawaii
 - b. Alaska
 - c. The Canal Zone
 - d. The Solomons
5. The Navy's Corsair is a
 - a. Twin-engine, two-place, mid-wing monoplane
 - b. Single-engine, single-place, mid-wing monoplane
 - c. Single-engine, single-place, low-wing monoplane with inverted gull wings
 - d. Twin-engine, single-place, low-wing monoplane
6. The Balearic Islands are located
 - a. In the North Sea
 - b. Off the coast of China
 - c. In the Mediterranean
 - d. Two miles due east of Australia
7. A tandem airplane is a plane which has
 - a. More than two engines
 - b. Two seats, one behind the other
 - c. A retractable landing gear
 - d. Twin tail booms
8. Eglin Field is located in
 - a. Oklahoma
 - b. Texas
 - c. California
 - d. Florida
9. The E6B is
 - a. The night-fighter version of the P-38
 - b. A navigational computer
 - c. The military terminology used to refer to the 75 mm gun in the B-25
 - d. An anti-aircraft gun
10. The Jap aircraft popularly referred to as the Helen is a
 - a. Twin-engine medium bomber
 - b. Single-engine fighter-bomber
 - c. Twin-engine fighter
 - d. Four-engine bomber
11. Formosa is located
 - a. North of Tokyo
 - b. In the Marianas
 - c. Off the Chinese mainland
 - d. In the Malay States
12. The approximate oil pressure in pounds per square inch necessary to feather a prop is
 - a. 150
 - b. 250
 - c. 400
 - d. 600
13. A straight line from London to Berlin would cross
 - a. France
 - b. The Netherlands
 - c. Denmark
 - d. Switzerland
14. The term "Mayday" is often used
 - a. To call for help
 - b. To request a tighter formation
 - c. To indicate approaching enemy aircraft
 - d. To identify yourself as a friendly aircraft
15. The P-38 has a tricycle landing gear
 - a. True
 - b. False
16. AAF personnel are not eligible to receive awards and decorations made by the United States Navy
 - a. True
 - b. False
17. An aircraft flying at 150 mph ground speed consumes fuel at the rate of 21 gallons per hour. The consumption for a 250-mile flight at this speed would be
 - a. 35 gallons
 - b. 50 gallons
 - c. 42 gallons
 - d. 63 gallons
18. Subsidence is
 - a. A form of anoxia
 - b. An allowance for expenses incurred in performance of duty
 - c. The total aerodynamic force on an object
 - d. A meteorological term referring to a downward motion of air
19. The RAF Typhoon is a
 - a. Single-engine fighter
 - b. Twin-engine fighter
 - c. Twin-engine medium bomber
 - d. Four-engine bomber

20. Identify these aircraft. One incorrect, all incorrect:





FLYING SAFETY

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

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

FAULTY TAXIING CORRECTED

Proper taxiing should be one of the first things a pilot learns. Often, unfortunately, it isn't. Regional safety officers found one base where it had been necessary to change thirty brake assemblies in one month because P-39 pilots were using the brake-versus-power method improperly.

To combat the evil, the door was removed from an Airacobra and a temporary seat rigged along the catwalk. Now an instructor sits outside while he teaches the pilot correct taxiing habits.

LEARNING THE 'HARD WAY'

First Provisional Group, I Troop Carrier Command, has developed a novel method for correcting pilots who improperly fill out AAF Form 23.

Two offenders were required to pass an examination on proper completion of the form and on instrument and contact flight rules. Then each had to lecture on the subjects to other pilots in the group.

BRIEFING RECORD

A standard briefing check-list—a safeguard against incomplete compilation of essential data preliminary to a flight—has been devised by regional safety officers cooperating with training and operations officers at the B-17 Central Instructors' School, Lockbourne, Ohio, Army Air Base.

The Lockbourne form must be signed by the pilot and briefing officer for the flight concerned. It requires them to:

- (1) Check Form 23 for complete entries.
- (2) Check to ascertain that terrain altitudes along the route of the proposed instrument flight do not exceed the proposed flight altitude, but insure adequate clearance and a safety margin of at least 1,000 feet.
- (3) Check to see that forecast weather, especially the ceiling, is compared with the pilot's proposed altitude. (When the proposed altitude is above the forecast ceiling, flight must be classified as instrument. The classification should be made by the pilot, but must be checked by the clearing authority.)
- (4) Check route for correct altitudes

(even or odd) on specified airways or direction of flight (east or west).

(5) Check destination to determine that runways are of sufficient length and strength for the type of aircraft involved.

(6) Check to ascertain that the ETE leaves twenty percent of fuel capacity available.

(7) Check alternate airfield. (On instrument flight, does airplane carry sufficient fuel to reach destination and alternate, plus 45 minutes?)

(8) See that pilot has filed list of check points as recommended by Pilots' Advisory Service.

(9) See that the weight and balance certificate has been signed.

(10) See that the pilot has certified he will instruct crew in emergency procedures before take-off.

The form includes the name of the

station, type of activity and the date, and it may be retained as a permanent record of the flight. While it was developed for a particular base, OFS recommends that the form be adopted by other bases which do not use briefing check-lists or records. With slight variations it may be adapted to any type of activity.

OFS SERVICE FOR NAVY

At the Navy's request, all its plane flights in the continental United States have been receiving the Pilots' Advisory Service of the Office of Flying Safety since March 15. Six key Flight Control centers reported that Navy operations represented 35 percent of all military flights in their areas during a recent two-week period.

NEEDLESS DELAY

The pilot who delays radioing a request for a weather report, change of flight plan, clearance or other information often makes it tough for himself as well as the men on the ground.

If he waits to contact a range station until he is directly over it, the flyer may be out of range by the time a reply is framed, thus necessitating forwarding the message to other stations.

By radioing a range station as far out as possible, the pilot gives Army Flight Control or CAA Airways Traffic Control, or both, a chance to have a reply waiting. Such promptness on the flyer's part not only assures him undelayed clearance but relieves overworked communications facilities of the extra effort of locating him.

WEAR THAT CHUTE!

For years, the AAF has counselled its airmen to wear parachutes whenever and wherever possible. In that connection, 2nd Air Force's Aircraft Accident Analysis Council, a wide-awake safety outfit, reports this one for the what-might-have-been book:

A sergeant-gunner, sketching an airport from the nose of a B-17, spotted another ship rising speedily toward the Fortress. The next thing he knew the planes had collided and he was out on a wing holding for dear life to the shock cord from



Here's what happens to a piston when power limits are carelessly exceeded. The rings and sidewall are burned through completely and the entire assembly is pitted and scored. To impress pilots with the hazards of detonation, a heavy bombardment replacement training unit at Westover Field, Mass., posted an enlargement of this photograph in the ready room. It may be viewed with profit by every pilot who is inclined to use a heavy hand on the throttle.

the nose gun. He was wearing his harness, but his chute was still inside the plane.

The pilot and engineer managed to drag him to safety through the window of the pilot's compartment. But what if he had fallen free?

MORE ON WHEELS-UP LANDINGS

Commenting on the Hendricks Field procedures for wheels-up landings with B-17s, the 8th Air Force comes up with a couple of recommendations based on experience in England.

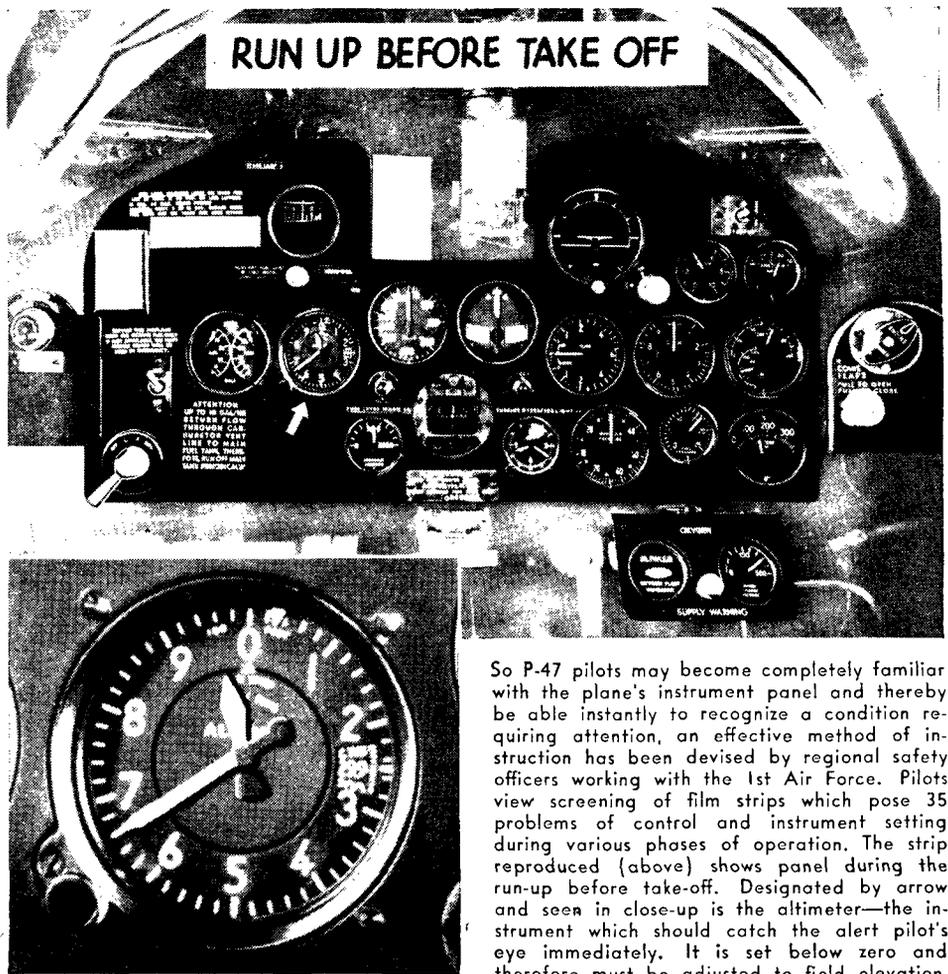
The comment deals with landings when both main wheels are retracted.

(A description of the Hendricks Field methods was distributed by the Office of Flying Safety.)

The 8th Air Force agrees that the tail wheel should be lowered for such landings—except for planes equipped with a chin turret. With such equipment, the 8th recommends that the tail wheel be left in the well.

The recommendation grew out of a near-perfect wheels-up landing by a B-17G which was SNAFUed when the extended tail wheel raised the tail and depressed the nose of the ship sufficiently to cause the turret to strike the runway. As a result, the nose section was ruined.

The 8th Air Force believes that prior to a belly landing the ball turret should be jettisoned if possible to eliminate the danger of damage to the plane by the ball being forced up into the interior. ☆



So P-47 pilots may become completely familiar with the plane's instrument panel and thereby be able instantly to recognize a condition requiring attention, an effective method of instruction has been devised by regional safety officers working with the 1st Air Force. Pilots view screening of film strips which pose 35 problems of control and instrument setting during various phases of operation. The strip reproduced (above) shows panel during the run-up before take-off. Designated by arrow and seen in close-up is the altimeter—the instrument which should catch the alert pilot's eye immediately. It is set below zero and therefore must be adjusted to field elevation.

P. & I. SAYS:



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

GARDNER FIELD, Calif. — A dead stick landing necessitated by engine failure badly damaged a BT-13. Preliminary investigation indicated that inner parts of the engine gave way because of excessive compression brought on by oil or gas having partly filled the cylinders while standing idle.

P & I COMMENT: This is a good example of what can happen when an engine is not "pulled through" before it is started. Cylinders must be cleared out before power is applied. Oil does not compress, and something has to give way when it blocks moving parts. Although TOs require that engines be "pulled through," the importance of this operation must be stressed constantly, particu-

larly in view of the presence in the AAF of many new maintenance men.

LOVE FIELD, Texas — A pilot in an AT-6 taxied under the wing of a parked B-24. The propeller cleared the leading edge, but struck amidship and chewed the rest of the way through the wing.

P & I COMMENT: This pilot made no effort to make sure he could clear the B-24's wing. He guessed. In this business you can't guess.

BARTOW, Fla. — One pilot was killed and two P-51s were demolished when the planes collided during unauthorized simulated combat.

The pilot who parachuted to safety was charged with complete responsibility for the accident. Both pilots, during briefing, had been specifically instructed to maintain distance from other aircraft.

P & I COMMENT: Too many fatal accidents have occurred during the past three months due to this type of violation of orders. In the first place, men still in training aren't full fledged combat pilots and shouldn't engage in maneuvers requiring a high degree of skill except under prearranged conditions. The little that the one pilot still alive learned about

combat was more than offset by the loss of the life of a buddy and two expensive airplanes. In flagrant cases, perhaps a court martial is the only answer.

WILL ROGERS FIELD, Okla. — An A-20B was completely wrecked when the pilot made a forced landing after running out of gas.

Though the pilot signed the Form 1-A, he failed to notice or ignored the fact that the plane hadn't been serviced with gas following the previous flight.

P & I COMMENT: For whom is this pilot working?

EL PASO, Tex. — In an attempted take-off, a pilot retracted his landing gear too soon. Although he thought he had sufficient flying speed, the ship settled back on the runway causing major damage to the airplane.

P & I COMMENT: The altitude of this airfield is nearly 4,000 feet. Pilots should take into consideration the altitude of the runway and the flying characteristics of the airplane, then make sure it is airborne before retracting the gear. At 4,000 feet, much more speed is needed to sustain the airplane than is required at sea level. ☆



MEET

BURMA

Prepared by the Arctic, Desert and Tropic Information Center

ANY road to Tokyo from southwest Asia must move across Burma. In many respects, this country sandwiched roughly between India and China holds the key to success of Allied drives to wash the Asiatic continent clean of the Jap.

But for military forces, Burma presents numerous operational problems, both as a fairly representative tropical area and as a peculiar combination of wet and dry, mountain and plain. Burma lies roughly in the same latitudes as Mexico, and the area covered is slightly smaller than Texas. Last spring's fighting took place in the rainy border mountains between the Assam-Bengal section of India and northwestern Burma. To the northeast, across the northern hill ranges, lie the Chinese Sikang and Yunnan provinces. Farther south, in the dry middle plain of Burma, is Mandalay, an important Irrawaddy River and railroad junction. To the east and southeast lie French Indo-China and Thailand, dominated by Japan, and on the southwest is the Bay of Bengal.

The climate is "tropical"—meaning warm and wet—but there are important variations, depending on time of year, location and altitude. The basic weather factor is the "monsoon," or prevailing wind, dry in winter, wet in summer. ("Winter" does not imply cold but rather the time of year.) The coastal areas are wetter than the back country, and the hills are both cooler and wetter than the plain and plateau country.

Monsoons should not be confused with storm winds. They are steady movements of air along the surface, resulting from variations of temperature between land and water areas. From December through February, the Asiatic land mass to the north cools, developing a high pressure atmospheric area. The cool air flows southward toward a low pressure area, the equatorial Indian Ocean, where warmer, lighter air is rising. This flow is the *winter monsoon*. Later in the spring, the

This key country in our drive against the Japs in Asia holds plenty of natural hazards for air and ground operations.

earth becomes warmer than the ocean, creating a low pressure area, and by the end of May thunderstorms mark the reversal of air flow. Soon the *summer monsoon* begins, bringing moist air and rain from the south. Roads are bogged and land movement becomes difficult. Along about October, the rains decrease but the air remains depressingly humid.

The amount of rain brought by the monsoon depends on the altitude and the position of mountains. The wettest area in the world is the southern slope of the Khasi Hills in Assam. There rainfall averages over 400 inches a year and has been known to reach 900 inches. Akyab, a key strategic position on the western coast to the west of the Arakan Yoma range, may receive more than fifty inches in July alone, about what New York City averages in a year. The central Burma basin, including Mandalay, receives between twenty and forty inches, comparable to the average of our middle west. It may suffer from drouth in the dry season.

The hill area between Imphal and Myitkyina, the scenes of the Japanese attack and the Allied airborne invasion last spring, is well watered and covered by thick teak and oak forest. Military movement is dependent on roads and is easily disrupted by road blocks. The Arakan coast to the southwest tends toward thick rain forest—the typical "jungle" of the books and movies. Eastward, the Arakan Yoma range cuts off rainfall from the central basin where there is grassland and dry forest which loses foliage in the dry season.

Cloudiness, of great importance to flyers, is associated with rainfall. From Oc-

tober to April the skies are relatively clear, averaging less than ten percent overcast in central Burma and thirty or forty percent in Assam, lower Burma and Tenasserim, the long coastal strip bordering Thailand.

Cloudiness is greatest during the morning. During the summer monsoon, June to October, seventy to ninety percent of the sky is overcast most of the time. Low ceilings are fairly common along the coast. One morning out of four or five is likely to have a ceiling below 1,000 feet. Afternoon ceilings below 1,000 feet are most likely to occur in late spring. During the summer monsoon, ceilings below 2,000 feet can be expected about half of the days and are most common in the afternoon. Two-thirds of the summer days have ceilings below 3,000 feet. Mandalay, in the dry central basin, has an average of fewer than fifteen days a year when ceilings are below 2,000 feet. Over mountains, however, low ceilings are common in summer.

Visibility is good in most of the area during the cool months; it is less than 3,000 feet only about two or three days a month. Ground fogs on winter mornings are fairly frequent over the rivers and lowlands, and most frequent in central Assam, where they number about twenty a month. Mists and fogs may occur over some of the more humid forests and valleys during mornings of the rainy season. Fogs will form throughout the year on the windward mountain slopes at higher elevations because the winds carry moisture.

Dust storms are likely in the Irrawaddy basin, or central plain, between December and May when ground water is at a minimum. Elsewhere, they cause little concern. During spring, a smoke haze, caused by the native custom of burning over the land, forms over much of the area.

ANOTHER visibility factor is the occurrence of violent rain storms during the summer monsoon. These will often reduce ceilings to zero and horizontal visibility to twenty or thirty yards. These storms are usually localized, however, and can be avoided.

Icing of wings and control surfaces is not much of a problem at lower altitudes since frost occurs nowhere in the area below 3,000 feet. During the winter, when temperatures at greater altitudes are low enough for icing, water vapor in the air is at a minimum. During local storms in the cool season, temperatures may be low enough to cause icing trouble. In summer, water vapor concentrated by the cold masses of the monsoon may create icing danger above 10,000 or 12,000 feet in northern Burma. Destructive local hailstorms occur in Assam during April and May.

The small village is a key to many

characteristics of the people and the land. There are few isolated dwellings like the American farmhouse in the midst of the farmer's acres. As is the custom in many countries, the people walk out from the village to their fields every day. The comparative difficulty of travel and communication and the sociable nature of the valley peoples work against individual dwellings.

Villages are likely to be self-governing and fairly self-sufficient economically. The people choose their own headman and sometimes a village council, too. Another important factor in the general well-behaved quality of the Burman people is a tradition of strong family pride. Women have a place of respect unusual for Asiatic countries, and they wield some political influence. These conditions applied before the Japanese occupation, of course.

The prevalent democratic tone of the villages was supported by a level of literacy markedly higher than in other oriental lands. Public education for both sexes was encouraged by the British government. The majority of Burmans are Buddhists, and Buddhist writings are the

basis of education. The Burmans themselves are free of the caste system, unlike the immigrants from India.

There is a tradition of craftsmanship among the Burmans; their finest crafts include lacquer painting, sculpture in stone, wood and ivory carving, metal working and casting, and silk weaving. They are independent about their work, and they will not haggle over prices. They are not lazy, but they see no point in working harder than is necessary.

The teachings of Buddhism tend to induce personal restraint and a soft-pedaling of ambition. Local good works, such as charity to each other and contributions to the yellow-robed monks (pongyis), who are respected as wise men, are considered part of a good citizen's duty. Every village has a temple on a prominent site.

The hill people with whom our soldiers came in contact in the spring campaign are quite distinct from the more advanced valley-dwelling Burmans. Such tribes as the Kachins, Chins and Nagas are more warlike than the Burmans, and they have been of good help as guides and fighters on our side.

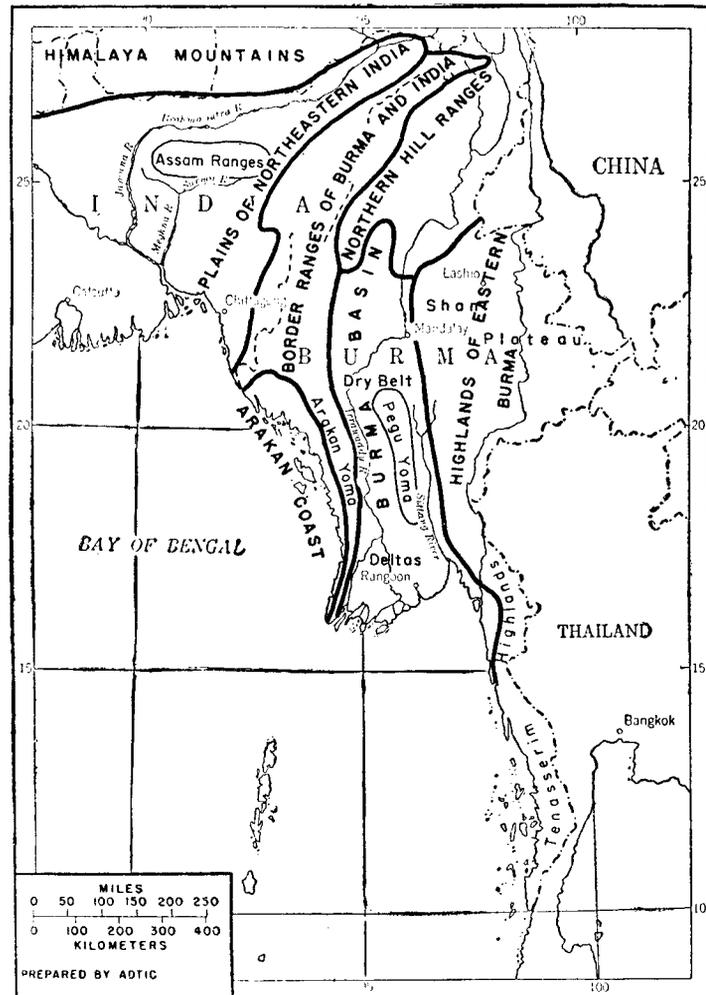
The northeastern Indian provinces, Assam and Bengal, are important as the jumping off place for any attack on Jap forces in Burma. Of the eight and a quarter million Assamese, more than half are Hindus, with caste traditions. The majority of the 51 million Bengali, however, are Mohammedan. Both of these provinces share the political and religious tensions which have been coming to a head in India, aggravated last winter by the Bengal famine.

Rice is the staple food all over Burma, Assam and Bengal. Of course there are other foods, such as fish, millet, maize and vegetables, but the various kinds of rice cultivation occupy the majority of the population. In the past, Burma exported rice to India. Orthodox Hindus eat no meat, and Moslems abstain from pork products.

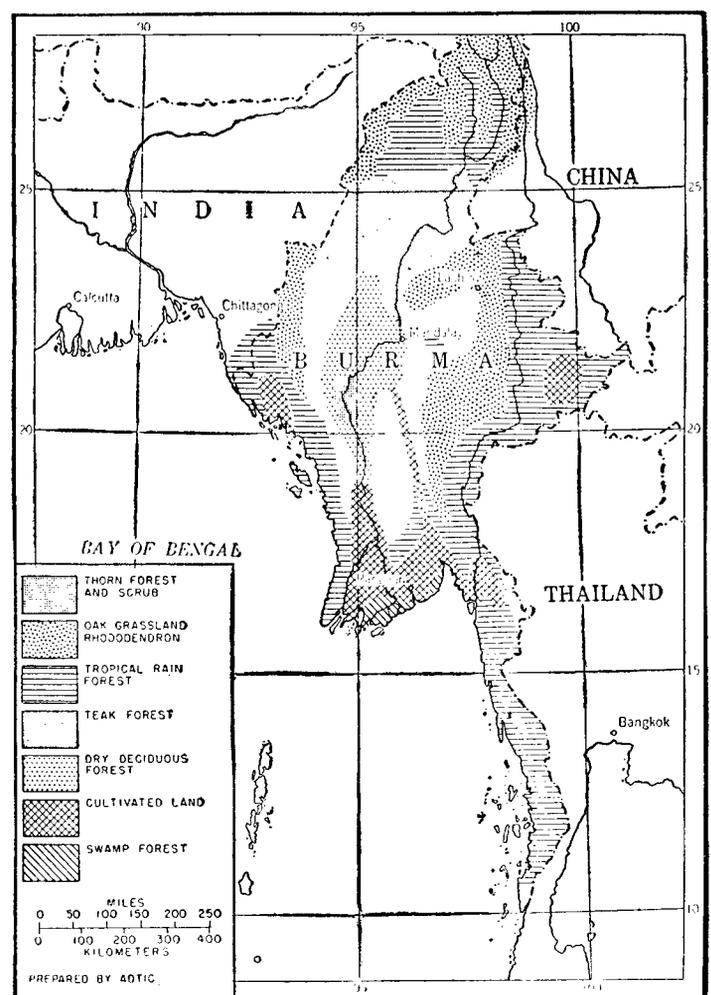
Most of the western coast of Burma, the Arakan, was once covered by a dense tropical forest, which has since been largely cut down. There are still considerable areas of rain forest on the coastal plain, in the Tenasserim peninsula, in the Pegu Yoma hills and in well watered parts of the north.

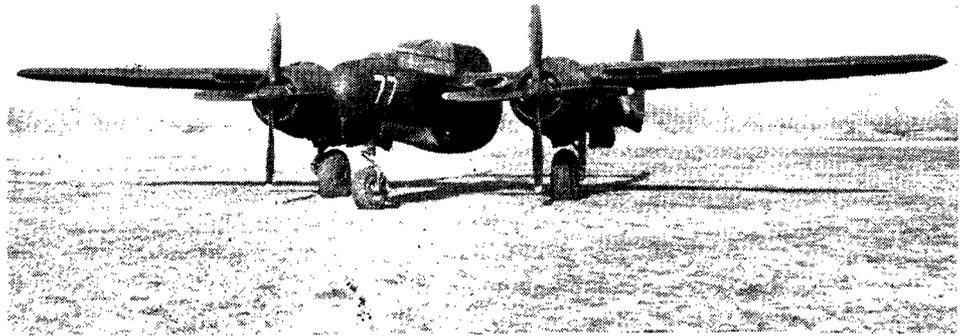
(Continued on Page 64)

Burma's mountain and river structure follows a definite north-south pattern. The average Burma range (yoma), even the Northern Hills, is much lower than the Himalayas. This map indicates the relation between the hills and rivers. Many of the latter cut through deep gorges.

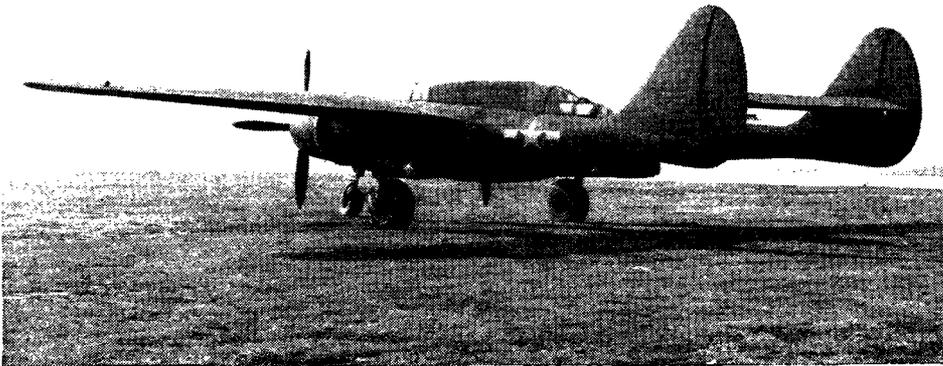


What grows in Burma—and where—depends on rainfall, soil and relation of the area to mountain ranges. Burma's vegetation is plentiful but there is less jungle than popularly believed. The vegetation and agricultural zones of the country are depicted on this shaded-area map.





Two views of the Black Widow night fighter reveal its similarity to the Lightning, with several other features distinctive from all other planes in combat. It is larger and has greater firepower than any AAF fighter craft.



The Black Widow

THE P-61 Black Widow is the largest fighter plane ever built in this country.

A twin-tail, twin-engine fighter that looks like an overgrown P-38, the P-61 came into being as a result of action in the early days of the war when London was the bombing target and not Berlin. The Luftwaffe's raids under the protective cover of darkness had brought home the great need for a fast night fighter plane with plenty of firepower to be employed as defense against night bombings.

We had no such plane, but in the spring of 1941 one was put on the design boards. Little more than a year later, it was flying over California. This was the P-61. Originally, two experimental airplanes were built, followed by the usual thirteen service test airplanes. The P-61s now are in production.

Built by the Northrop Aircraft Corp., Hawthorne, Calif., the P-61 is the first functional night fighter to come out of this war. Planes previously used for such tactical missions have been modified versions of aircraft originally planned for other types of operations. There are, for example, the A-20s and the A-29s, light bombers, used for attack missions. Naturally, these airplanes lacked some refinements necessary for top efficiency in night fighter tactics. These characteristics or refinements the P-61 has in its unconventional design, high horsepower and heavy firepower.

Classified as a fighter aircraft, the P-61 is larger and weighs more than either the A-20 or the P-70, night fighter version of the Boston.

Inside the P-61's low-slung engine nacelles, that taper off

with streamline effect into the thin tail-booms supporting the elevator and rudder surfaces, are two powerful Pratt & Whitney engines. Developing high horsepower at take-off, the engines, turning four-bladed Hamilton Standard propellers, pull the ship into the air in a comparatively short take-off run, give it good climb and maneuverability.

Because night landings on war-time fields are hazardous for fighters, new flaps and ailerons have been incorporated into the P-61. It has full span landing flaps which run almost the whole length of the outer wing panels, leaving no room for conventional ailerons. A unique system of "spoiler type" ailerons was developed. These actually are small "gates" which lift up out of the top surface of the wing and break the airflow thus "spoiling" the lift and dropping the wing, causing the airplane to tilt in one direction or the other—basically the same effect produced by the conventional aileron.

In profile, the P-61's fuselage looks like a bloated jelly fish. It is very narrow and, although the nose section sticks out in front several feet ahead of the propeller hubs, the fuselage tapers down and quits almost with the trailing section of the big wing. Its speed, of course, is still secret, but it can hold its own with some of our fastest medium altitude fighters.

All crew members are protected by armor plate deflector shields and bullet-resistant glass. The ship also has self-sealing gasoline and oil tanks and lines.

The airplane is a good performer. One pilot, who has flown the ship extensively since the first "X" models explains: "The P-61 is an honest airplane. It has no mean tricks. In acrobatics such as loops, spins, Immelmans and fast turns, it behaves as a pursuit should and its stalling features are near perfect." — **Maj. F. P. Jenks, Production Division, Materiel Command, Wright Field.**

Automatic Pilot for Gliders

Gliders can now negotiate blind flying or self-controlled flight with the aid of a new automatic pilot developed by the glider branch of the Aircraft Laboratory at Wright Field. Officially the instrument is called the D-1 automatic pilot, an adaptation of the famous A-3 type used for some time on many bomber and transport planes.

The automatic pilot for gliders is a standard type used in many of our powered aircraft, with slight modifications. In the power ship, for example, the pilot must operate the automatic pilot manually in order to accomplish turns, ascent or descent. In the glider this is accomplished by the transmitter arm, a steel rod affair which extends from the nose of the glider, thus eliminating the human element.

When the rope is attached to the tow-plane and glider, the end of the transmitter arm is placed on the tow-rope where it rides during the flight. As the tow-plane changes direction, the attitude of the rope is picked up by the transmitter arm and relayed by a series of pulleys to the controls and sensitive mechanisms of the automatic pilot. These "impulses," or activated motions, are then reflected by the automatic pilot which, in turn, changes the controls of the glider so that the ship is in relatively the same position as the tow-plane.

There are many tricks in the operation of the D-1. For instance, before engaging the automatic pilot the glider pilot gets the ship into the best position for tow. He then sets trimming devices and engages the automatic pilot. He probably will have to make a few minor corrections, but from then on the automatic pilot will take over. Even in rough air the automatic pilot will do the same thing in a glider that the A-3 will do in a powered aircraft. — **Staff Sgt. Douglas J. Ingells, AIR FORCE Staff Correspondent, Wright Field.**

Spinning Runways

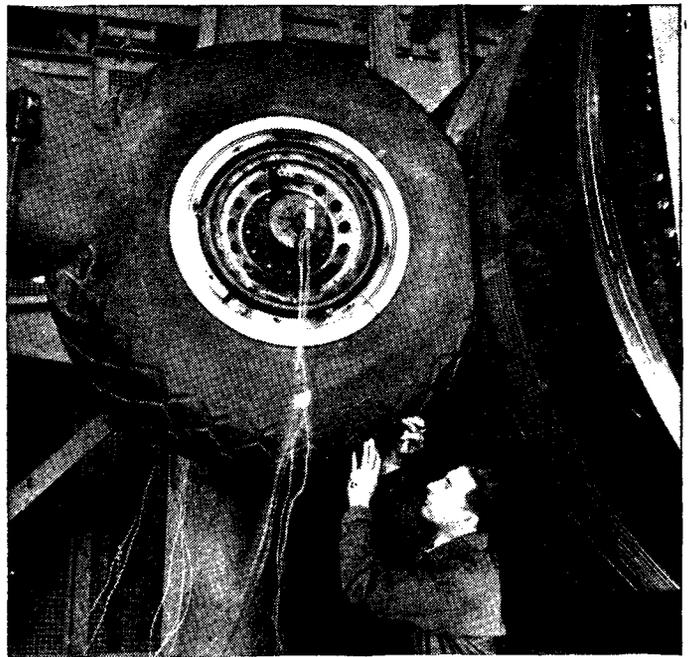
Huge inertia wheels, capable of testing tires twice the size of the XB-19's — world's largest — have been installed at Wright Field to assure safety in withstanding the impact of 60,000- to 120,000-pound airplane loads on all types of runways.

The tests conducted by AAF engineers are highly unorthodox. With the airplane wheels at a standstill, the "runway" is moved at speeds equivalent to the landing speeds of a fighter or bomber depending on the test in progress. The "runway" in this case is a gigantic flywheel turned by an electric motor. When it reaches a specified rpm, the aircraft wheel, tire and brake under test, are rammed against it hard enough to simulate the impact of an airplane's undercarriage against the ground in a normal landing.

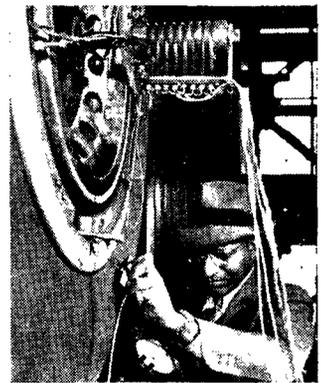
With sensitive strain gauges, thermometers and other recording devices attached to the wheel, tire and brake mechanism, data are obtained which would be impossible to get from actual landing tests.

Purposes of these tests are to develop brakes that will stop an airplane in as short a landing run as possible and to perfect tires and wheel structures capable of withstanding the intense frictional heat generated by sudden acceleration of the tires on impact and by brake application. Efficiency of original wheel installation designs frequently has been nearly doubled as a result of such tests.

On B-17s, for instance, the original wheel and brake design was built to stop the airplane in a limited landing run with a normal gross load of 38,000 pounds. Inertia wheel tests have



Inertia wheel tests such as this provide necessary information for improvement of aircraft brakes and tires. Below, a workman, using a hypodermic needle, checks the heat generated between tire and wheel.



led to the development of brakes that, with the same size airplane tire and wheel, will stop the bomber at combat gross weight of 60,000 pounds.

Similarly a P-40's braking efficiency was increased by 33 percent. Translated into combat terms, better brakes and lighter-weight wheel assemblies permit more effective operation from small landing fields in combat theatres.

Responsible for many of these developments is the wheel and brake unit of the Materiel Command's aircraft laboratory. Basically the experts have their work divided into four major categories: (1) Improving brake linings and other rubbing surfaces, (2) strengthening wheel structures, (3) obtaining more efficient heat dissipation from brake drums, and (4) reinforcing tires to stand the additional loads. The formulae that guide them to these improvements are obtained from the tests on the big inertia wheels.

These brake-testing machines can test wheels and tires that range in size from the small main wheels on a Piper Cub (twelve inches in diameter) to gigantic fifteen-foot diameter tires to go on any such bomber that may be designed in the future to warrant tires of such size. Fitted with special arms and brackets, the machines also can be used for testing tractor-type landing gears now in use experimentally.

The smallest of the test rigs has a 66-inch diameter flywheel capable of building up 5,000,000 foot pounds of kinetic energy. It can test wheels and tires up to 44 inches in diameter, or those comparable to the wheels on the A-20. Next in size is the 120-inch inertia wheel which will test wheels up to 96 inches in diameter. Used to run the tests on the B-19's tires, this machine stores 25,000,000 foot pounds of kinetic energy—almost double the amount of energy exerted on the wheels of a B-17 (14,000,000 pounds) when they strike the runway in a normal landing.

The newest inertia wheel is 192 inches in diameter and is

capable of storing 200,000,000 foot pounds of kinetic energy; enough to cause a blow-out instantly in one of the B-19's tires.

Immediately after a test, when tires are blistering hot and there is danger they might explode momentarily, engineers jab the tire with a hypodermic needle to obtain a temperature reading of the internal tire casing.

This is extremely dangerous; if they should hit the tube with the needle, they would "blow up with the tire." Results are making it possible, however, to get better material for aircraft tires, to know the heat resistant qualities of existing synthetics and natural rubber, and determine other important related factors.

Tests can be run at the rate of four an hour, equal to the number of landings that can be made in that time with an airplane under normal conditions. It takes approximately fifteen minutes to run a complete test, including the time that it requires to get the big inertia wheel up to sufficient speed. After each test, big fans cool the wheel and tire before another test can be run.

Great care is taken that the giant flywheels are perfectly balanced. Their solid steel bulk on the running surface is as smooth as a turret's glass. This prohibits roughing them up to simulate rough-surfaced runways.

Rolling tests are conducted on the same machines. For this test, instead of applying brake forces, the wheels are allowed to roll to a stop. Such tests reveal that tires can last for more than 2,000 miles, equivalent to about 500 landings. — **AIR FORCE Staff Correspondent, Wright Field.**

WHAT'S NEW

AUTOMATIC STABILIZER FOR AERIAL CAMERAS—Accuracy of topographic mapping is being simplified by developments of Materiel Command's photographic engineers. To keep the aerial camera on an approximately level plane, despite the rolling and pitching of an aircraft, an automatic stabilizing unit has been perfected. Two pendulums, one for tip and one for tilt, actuate an electro-magnetic circuit when the plane pitches or rolls. This, in turn, controls the levelling motors that return the camera mount to a level position relative to the ground. The new device increases the accuracy of picture taking over extensive areas and facilitates the fitting together of the many photos required for a comprehensive mosaic.

AIRBORNE FUEL SERVICING TRAILER—Designed for easy transportation in a C-47, a new 220-gallon fuel servicing trailer which can be towed in tandem trains has been standardized for allocation to AAF units. (AAF Reg. 65-39 for allocation.) The three-wheel unit can be towed in train by a jeep at twenty miles an hour over rough terrain. Nozzle capacity of thirty gallons a minute is provided by an efficient hand pump, which also incorporates a segregator float to eliminate water from the gasoline. With the new unit, use of five-gallon cans and 53-gallon drums is no longer necessary. Several of these units can make possible the simultaneous servicing of an entire squadron of fighters in their dispersal areas. Official name is Fuel Servicing Trailer Type A-2A.

CUSTOM-BUILT RESCUE KITS—Special emergency equipment is available at Wright Field's equipment laboratory for AAF units operating over unusual terrain. ATC's India-China Wing, for instance, needed a complete, but specialized, rescue kit containing both arctic and tropic accessories for crews that might have to bail out over the snow-covered mountains or tepid jungle valleys of the Hump run. On ATC's specifications, 250 of these kits were assembled and dispatched to India in a period of a few weeks. Because 100-foot high jungle growth completely swallows up parachutes, a 300-foot red and white streamer was attached to the kit to facilitate spotting of the supplies by survivors on the ground.

FREE-FALL AERIAL DELIVERY BOX—A specially constructed wood box that can be dropped from 1,500 feet without a parachute has been designed by the Materiel Command for use when parachute aerial delivery containers are not available. Tests indicate that breakable items, such as bottled medical supplies, can be dropped in this box with a normal recovery of 70 to 100 percent. Pyramidal ends help absorb the shock of hitting the ground; it is nailed and glued

New Engine Cooling Fan

A multi-bladed cooling fan which sucks air into the engine from around the propeller hub soon may be adapted to some AAF airplanes. This fan, by forcing more air through the engine cowling, is expected to improve performance of planes powered by air-cooled engines.

Main limiting factor in full-power operation of some aircraft engines has been excessive heat at low speeds or during warm-ups. More efficient cooling, however, permits the development of greater horsepower in such engines and this means increased rate of climb, cruising speed, and high altitude performance as well as gross load capacity.

Developed by the Wright Aeronautical Corp., the new cooling fan now is being tested by the NACA and Materiel Command.

Because propeller blades are well out from the hub, they force very little air through the engine cowling. At high air speeds, airflow is accelerated but at low air speeds, such as during long take-off runs or steep climbs, airflow through the engine is limited and danger of overheating may prevent maximum power output.

By maintaining a constant flow of high-pressure air through the engine cowling, cooling fans in Wright Aeronautical tests have enabled engines to develop enough additional horsepower to increase rate of climb as much as twenty percent and to increase the pay load of some types of twin-engine planes as much as 10,000 pounds. ☆

together and reinforced in the corners with quarter rounds; the outside is bound with four pieces of wire. Such boxes can be made from scrap materials. Construction directions have been published for use of overseas squadron engineering officers.

EVACUATION GLIDER—Conversion of a standard CG-4A glider into an evacuation hospital unit has been completed by the Materiel Command. The glider contains six litters, six seats for walking patients and a ground pick-up station. The pick-up station is packed in a kit and can be set up easily when the glider is ready to be picked up by a tow plane. Although designed primarily as a glider ambulance, the secondary rescue function may increase further the value of this converted CG-4A which can land and be towed off in a 500-foot clearing.

FLUSH STATIC TUBES—A new type of flush mounted static tube installed on an airplane's fuselage now is being used on AAF planes. The device, originally developed by the British, incorporates design modifications and a new disc mounting engineered by the Materiel Command's equipment laboratory. Because of its location, flush against the fuselage, the new installation materially reduces the fractional errors in air speed recordings that resulted from air turbulence around the conventional type pitot-static tube, normally suspended from the fuselage or wing on a long pitot boom. The static tube plates or mounting flanges are about two inches in diameter and have seven small holes in the center to pick up static pressure, i.e., the variations of air density with altitude. Flat, with extremely smooth surfaces, these plates are flush with the airplane's skin thus permitting a smooth flow of air over the fuselage. They pick up minute variations in air speed and static pressure which the conventional type of tube might not obtain.

FUSELAGE REINFORCED WITH GLASS—A glass reinforced plastic fuselage, side panels and tail cone have been fabricated by engineers of the aircraft laboratory and successfully flight tested at Wright Field on a modified BT-13. Tests of the sandwich construction—balsa wood core between an inner and outer skin of plastic reinforced with fibrous glass cloth—indicate that on a strength-weight basis, the new fuselage construction is fifty percent stronger than the metal fuselage and eighty percent stronger than the wood fuselage now in service. When subjected to gunfire, the material did not flatter, and explosive projectiles passed through without detonating because of the low density of the wood-plastic-fibrous glass cloth material. ☆



NOTES ON WOMEN'S ACTIVITIES IN THE AAF

NEW HEADQUARTERS FOR NAAFW

Applications for membership in the National Association of Air Forces Women, the formation of which was announced in the March issue of AIR FORCE, have been so numerous that another headquarters has been obtained to handle the flood of mail arriving daily from all parts of the country.

The new headquarters address is: National Association of Air Forces Women, 1702 K Street, N. W., Washington, D. C. The office is small and unpretentious but the enthusiasm of the air force women volunteers who work there makes up for the lack of usual office trappings. They work long hours daily, taking care of the enormous number of requests and suggestions that come from enlisted men, officers, Wacs and AAF wives everywhere.

A man in the jungles of New Guinea writes that his wife can and would like to help. A letter is received from the wife of a man on duty in England; her husband had read of the association at his base. Wives of new cadets write in. So do the sisters, mothers and widows of thousands of AAF men. Many of the letters carry helpful suggestions for use in later NAAFW plans; most of them enclose the \$1.00 dues for members-at-large, and scores are letters of appreciation and enthusiasm for the concrete plans of service the NAAFW will give to AAF personnel and their families.

First on the list of jobs to be done at the new headquarters was the revamping of the NAAFW's constitution to provide

for this sudden expansion—a move which many of the group's organizers had hoped might come later but the need for which none had believed would be so instantaneous or widespread.

One change makes possible the inclusion of "clubs," in answer to a large number of requests for information that came from mothers' clubs and similar groups. The initial plan included only those AAF women's clubs composed chiefly of AAF wives, which are set up at each AAF station. Now, however, any club whose membership is composed exclusively of AAF women is eligible for membership as a group upon application to and approval by the NAAFW executive board.

Such clubs must be non-political, and any infraction of this provision will be cause for immediate termination of affiliation with NAAFW. Dues for these clubs will be 25 cents for each member on the basis of the average membership of the club. Groups are requested to send this amount in an annual lump sum to the treasurer, NAAFW, at the K street address.

A further change provides that any wife, mother, sister, daughter or widow of any man who is, or has been, on active duty with the AAF may if no member club is available, become a member-at-large of NAAFW upon application and approval by the board. Women wishing to join are instructed to include with their application \$1.00 for annual dues, together with the name, address and Army serial number of the man in whose inter-

est they are making application. This will facilitate prompt action and prevent confusion in recognizing the applicant's right to membership.

VOLUNTEER TAILORS

A stitch in time saves not only nine but at many of our fields, it saves dollars and cents—and plenty of time—for the government and the men in the AAF.

A statistically-minded quartermaster at the Ontario (Calif.) Army Air Field, compiled figures on the savings resulting from the mending and repair work done there by AAF officers' wives serving in the women's volunteer branch of the Personal Affairs Division. His compilations show that from November, 1943, to February, 1944, the reconditioning of clothing, thereby obviating replacement issue from GI stocks, saved \$249.25. Slacks and blouses, field jackets and overcoats, and even the lowly sock, were put in excellent condition by these women.

When 3,000 men who were being shipped within two days suddenly needed chevrons and insignia sewed on at Logan Field, Colo., the CO appealed to the field's Red Cross volunteers. Enlisted men volunteered to bring in sewing machines and check bundles, and the AAF women kept needles humming until 0230 the first night. By 2330 the next day the job was finished—five garments for each man, 15,000 in all. Since then, the women have done a repeat job on this order—twice.

SERVICE, COMPLETE WITH "SITTERS"

The information desk at post headquarters, Morris Army Air Field, N. C., is practically the last word in service for new arrivals. Manned by AAF women volunteers, this office supplies information on schools, churches, clubs, employment agencies, bakeries, dairies, names and addresses of all post personnel, lists of committees and post activities—and for all we know, advance dope on bargain basement sales. Most in demand is their list of "sitters" who will come and stay with baby while you and the wife take in that bridge game at the Wallaces' next Friday. ☆



ROLL OF HONOR

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

DISTINGUISHED SERVICE CROSS

Barbiero, Samuel S., T/Sgt.
Barks, Arthur E., Lt.
Burdue, Clayton C., S/Sgt.
French, Lifford E., T/Sgt.
Geiser, Anthony W., Capt.
Henry, Maurice V., T/Sgt.
Johnson, Thomas E., S/Sgt.
Moore, Carl W., Sgt.
Petty, Charles A., Lt.
Price, Herbert M., Lt.
Radtke, Dean M., Lt.
Ray, Charles P., Lt.
Ridolfe, Peter J., S/Sgt.
Spencer, Charles W., Lt.
Storovich, Robert D., S/Sgt.
Troy, Edward P., S/Sgt.
Vitale, Chester A., Lt.

LEGION OF MERIT

Good, Lloyd T., S/Sgt.
Howard, Thomas G., T/Sgt.
Rainey, Leroy A., Col.
Romerman, Jack, Lt. Col.
Snavelly, Ralph A., Col.

SILVER STAR

Bradley, Frank E., T/Sgt.
Burrell, Harry R., Maj.
Butler, Gilbert E., Capt.
Byerly, Jean R., Col.
Colbert, Martin S., Sgt.
Collins, Frank J., Maj.
Daniel, Wesley L., Capt.
Donovan, Eugene S., Sgt.
Fennessy, James D., Lt.
Forbes, Thomas C., T/Sgt.
Fletcher, Leo W., Lt.
Froning, Alfred C., Lt.
Georgi, William F., Capt.
Graft, Theodore, Lt. Col.
Hagenback, James J., Capt.
Horton, Lewis T., T/Sgt.
Hull, Charles T., Maj.
Knox, Robert T., Lt.
Litchfield, John S., Capt.
McCarroher, Edward R., S/Sgt.
Merrick, Raymond L., S/Sgt.
Meyer, Richard J., Lt.
Moye, Otis B., S/Sgt.
Nemeth, Stephen, S/Sgt.
Pelletier, Mark C., Jr., S/Sgt.
Perryman, Jack L., S/Sgt.
Pollard, Clyde A., S/Sgt.
Putek, Henry, Lt.
Rex, Joseph, Sgt.
Robertson, Bodie F., S/Sgt.
Rohichaud, Joseph E. R., S/Sgt.
Rogers, Elmer J., Jr., Col.
Spencer, Charles R., Maj.
Sternfels, Robert W., Capt.
Taylor, Oliver, Col.
Temple, William W., F/O
Thurman, Wayne E., Lt. Col.
Webster, Robert N., Brig. Gen.
Welch, Mack D., Jr., S/Sgt.
White, John F., S/Sgt.

OAK LEAF CLUSTER TO SILVER STAR

Athey, Carl T., Sgt.
Eckhoff, David J., Pvt.
Madison, Willard R., Pfc.
Massing, Daniel G., Lt.
Olson, Harlan H., Capt.
Osborn, Arnold G., Pfc.

DISTINGUISHED FLYING CROSS

Aalto, Reino L., Lt.
Abbott, William G., Lt.
Abel, Dunstan, Lt.
Abeloff, Lester G., Capt.
Aberson, Albert D., Lt.
Abeysa, Isaac, Sgt. (& OLC)
Able, John J., S/Sgt.
Abney, Howard L., S/Sgt.
Abraham, Jake L., Lt.
Abramovich, Peter P., S/Sgt.
Abrams, Phillip, Sgt.
Abramski, Emilio J., Sgt.
Ackerman, Harry, Capt.
Ackley, Coburn E., Lt.

* Posthumous

Ackley, Duncan B., Lt.
Adair, Asa A., Lt.
Adamczyk, Theodore S., Sgt. (& OLC)
Adamen, Stanley, S/Sgt.
Adams, Alva T., Jr., Lt.
Adams, Benjamin C., Lt.
Adams, Carl F., Lt.
Adams, Charles J., S/Sgt.
Adams, Clifford B., Lt.
Adams, David A., Lt.
Adams, Edward Bowie, Lt.
Adams, Grady, S/Sgt.
Adams, Job M., Lt.
Adams, Joseph A., Lt.
Adams, Julian R., Jr., Capt.
Adams, Lionel E., S/Sgt.
Adams, Luther A., Lt.
Adams, Lyle M., Capt.
Adams, Michael E., Lt.
Adams, Richard A., Lt. (& OLC)
Adams, Robert G., S/Sgt.
Adams, Robert H., Lt.
Adams, Robert P., S/Sgt.
Adams, Robert W., F/O
Adams, Urban S., Capt.
Adcock, Roy D., Lt.
Addison, Richard E., S/Sgt.
Aden, Burton E., T/Sgt.
Adkins, Edwin W., Capt.
Adkins, Woodrow W., S/Sgt.
Adler, Irving, Lt.
Adler, Monroe A., Lt. (& 3 OLC)
Adler, Paul, T/Sgt.
Adler, Robert T., Lt. (& OLC)
Adriance, Lyle A., Capt.
Aenchaeker, Arthur Eugene, Lt.
Affronte, Samuel J., Pvt.
Agronoulos, Theodore, Capt.
Aguirre, Richard U., Lt.
Albert, Edgar J., Lt.
Albine, Robert L., S/Sgt.
Albrecht, Rudolph W., Lt. (& OLC)
Albright, Charles O., T/Sgt.
Albright, Charles W., S/Sgt.
Albright, Clarence L., S/Sgt.
Albright, Robert H., S/Sgt.
Aldworth, Donald L., Lt.
Alesauskas, John S., S/Sgt.
Alexander, David W., Lt.
Alexander, Chester R., T/Sgt.
Alexander, Jack D., Lt.
Alexander, James H., Capt.
Alexander, James R., Jr., Lt.
Alexander, James W., T/Sgt. (& OLC)
Alexander, Lester J., T/Sgt.
Alford, Homer W., T/Sgt.
Alford, Perry C., Jr., T/Sgt.
Alger, Martin P., Capt.
Alison, Robert F., Capt.
Allard, Robert H., Lt.
Allbright, William F., Lt.
Allen, Aaron L., S/Sgt.
Allen, Arthur H., Jr., Lt.
Allen, Benjamin H., Lt.
Allen, Brooke E., Col.
Allen, Clayton F., Lt.
Ansel, James A., Capt.
Annellini, Joseph S., T/Sgt.
Anselmi, Raymond E., Lt. (& OLC)
Anker, Norman H., T/Sgt.
Anspurger, Constant, Lt.
Anthony, Charles E., Sgt.
Antonelli, Daniel J., S/Sgt.
Antonik, John C., Lt.
Apari, Robert G., Lt.
Applee, Frank H., S/Sgt.
Applewhite, Thomas B., Lt.
Appold, Norman C., Maj. (& 2 OLC)
Apy, William A., S/Sgt.
Aqualino, Julio J., S/Sgt.
Arant, John R., Lt.
Arasin, John C., S/Sgt.
Arbon, Paul, Lt.
Arbuthnot, George S., Lt.
Archer, Ripley B., Lt.
Archibald, James H., Jr., Lt.
Arciero, Bernard E., S/Sgt.
Arens, Vincent, S/Sgt.
Arens, Herbert W., Lt.
Argentos, James, S/Sgt.
Ariano, Richard A., Lt.
Arkin, Sanford L., Lt.
Armagost, Donald V., S/Sgt.
Armes, William, S/Sgt.
Armstrong, Emerson, Lt.
Armstrong, Herbert W., S/Sgt.
Armstrong, Lorraine F., Capt. (& OLC)
Armstrong, Melvin T., T/Sgt.
Armstrong, Robert Emile, Capt.
Armstrong, Robert Emerson, Lt.
Arneson, Arlie G., S/Sgt.
Arnold, Albert G., Lt.
Aschenbrenner, Robert W., Lt. (& 2 OLC)
Ashbrook, Truman R., F/O
Ashcraft, Lawrence J., S/Sgt.
Ashcroft, Fordyce G., Lt.

Ashley, Frank N., Lt.
Ashton, Burton S., Sgt.
Ashworth, George S., Jr., S/Sgt.
Ashworth, George W., T/Sgt.
Askelson, Howard S., F/O
Asper, Orlando C., Lt.
Astrologo, Rocco M., Lt.
Astyk, John F., S/Sgt.
Atchison, Delmar W., Capt.
Alchue, Henry W., S/Sgt.
Atherton, Clinton E., Lt.
Athey, Vert C., Lt.
Atkeson, James B., T/Sgt.
Atkinson, John M., Capt.
Atkway, James A., Lt.
Atteberry, Lloyd E., Lt.
August, George E., Pvt. (& 2 OLC)
Augustyn, Leo J., Pvt.
Aune, Rudolph, S/Sgt.
Auner, Thomas W., Lt.
Austin, Horace W., Jr., Lt.
Austin, Odie C., T/Sgt.
Austin, Omar A., T/Sgt.
Averdano, Joseph, Lt.
Avery, Earl H., Lt.
Avery, Hamilton K., Lt.
Axt, Harold, S/Sgt.
Aycock, Jesse D., Jr., S/Sgt.
Ayers, James W., S/Sgt.
Ayers, John T., Lt.
Ayers, Samuel E., S/Sgt.
Ayling, Edward C., S/Sgt.
Ayres, Arthur B., S/Sgt.
Baird, James C., S/Sgt.
Baber, John S., Lt.
Babich, John A., Sgt.
Baca, Frank C., S/Sgt.
Baca, Julius A., Pvt.
Baeha, Elias, Lt.
Baehner, Raymond C., Lt.
Baehner, Roy W., S/Sgt.
Baehrach, Robert L., Capt.
Bacon, Warren F., Lt.
Baesik, George, Lt.
Bader, Don C., Lt. (& OLC)
Bader, James F., Capt.
Bader, Joseph C., S/Sgt.
Badois, John J., S/Sgt.
Baer, Charles R., Capt. (& 2 OLC)
Baer, Donald P., T/Sgt.
Baer, Edward L., S/Sgt.
Baganz, Paul C., Lt.
Bagwell, Clayton R., S/Sgt.
Bahnmiller, Melvin C., S/Sgt. (& OLC)
Bailey, John J., S/Sgt.
Bailey, Brunel F., S/Sgt.
Bailey, Clark G., T/Sgt.
Bailey, Dennard J., Cpl.
Bailey, Felix R., Lt.
Bailey, George W., Lt.
Bailey, Harold M., Lt.
Bailey, James A., Lt.
Bailey, Neil Q., Lt.
Bailey, Richard G., S/Sgt.
Bailey, Richard H., Lt.
Bailey, Robert G., Lt. (& OLC)
Bailey, Walter C., T/Sgt. (& OLC)

Bailey, William B., Maj.
Bailey, William H., Lt.
Bair, Charles L., Lt.
Baird, Archer M., Lt.
Baird, Elmer S., Lt.
Baker, Leroy E., S/Sgt.
Baker, Robert H., Lt. (& 2 OLC)
Baker, Robert N., Lt.
Baker, Royal N., Lt.
Baker, Wylie G., S/Sgt.
Balason, John M., Lt.
Balazovich, Michael J., S/Sgt.
Baldry, Gordon L., Lt.
Baldwin, Ivan D., Sgt.
Baldwin, Raymond W., Jr., Lt.
Bale, Jewett A., T/Sgt.
Bales, James Y., S/Sgt.
Baikie, Darrel L., S/Sgt.
Ball, Harry C., Lt.
Ball, James D., F/O
Ballard, Roy D., Capt.
Ballard, Charles E., S/Sgt.
Ballard, Clair C., Lt.
Ballard, Roy M., S/Sgt.
Ballert, George E., Lt.
Ballwe, Oscar E., T/Sgt.
Balls, Butler, Lt.
Ballou, John D., T/Sgt.
Ballteizer, Jesse N., F/O
Balton, Bradford E., Lt.
Baltusaitis, William J., Capt.
Banack, Stanley F., M/Sgt.
Banbury, Richard D., Capt.
Baneroff, George, Lt.
Baneroff, Harvey C., S/Sgt.
Bank, Harold L., Lt.
Bankhead, Heber B., Lt.
Banks, Clyde M., Lt.
Banks, David H., Lt.
Banks, Raymond K., S/Sgt.
Bard, Howard W., T/Sgt.
Barfoot, Thomas W., Maj.
Barker, Douglas S., Lt.

Barker, Forrest H., Maj.
Barker, James W., Sgt.
Barker, John C., Lt.
Barkhurst, Andrew L., S/Sgt.
Barkley, Ulyss Q., S/Sgt.
Barlow, Benjamin, T/Sgt.
Barlow, James D., Maj.
Barnett, Harry J., T/Sgt.
Barnaby, Harold T., F/O
Barnard, Lester L., Lt.
Barneby, Lauren R., Lt.
Barnes, Aurben C., Lt.
Barnes, Clayton J., Sgt.
Baseret, Robert L., Lt. Col.
Bass, Bernice S., Lt.
Bass, Milton K., Sgt. (& OLC)
Bassett, Lloyd M., Jr., T/Sgt.
Bassett, Wilmer H. C., Lt.
Basye, William E., Lt. Col.
Batchelor, Barnes H., Sgt.
Batdorf, Gordon E., Lt.
Batdorf, Kenneth M., T/Sgt.
Bates, Clifford S., Sgt.
Bateson, Charles E., III, Lt.
Baugh, Cloyd, Cpl.
Baughn, Harry G., S/Sgt. (& OLC)
Baum, Samuel L., Lt.
Baum, Thomas F., O
Bauman, Rexford G., Lt.
Bawol, Chester M., Lt.
Baxter, Jack S., Sgt.
Baxter, Lloyd M., T/Sgt.
Bayer, Arthur L., S/Sgt.
Bayley, Edwin, Lt.
Beach, English F., S/Sgt.
Beal, Thomas W., F/O
Beall, Clyde F., F/O
Beard, William A., Lt.
Beardsley, James C., Capt.
Beard, Karel E., S/Sgt.
Beaton, Ernest D., Lt.
Beatty, Clyde W., Jr., Lt.
Beatty, Francis S., S/Sgt. (& OLC)
Beatty, Joseph R., S/Sgt.
Beauchamp, John W., Lt.
Beauchamp, Newton E., T/Sgt.
Beaumont, Willis R., Lt.
Beavers, Albert T., S/Sgt.
Behout, Charles R., S/Sgt.
Behout, Lester V., S/Sgt.
Becht, Cletus A., Lt.
Bechtel, John R., Capt. (& OLC)
Bechtel, Ray M., S/Sgt.
Bechtel, Kenneth S., S/Sgt.
Beck, Abe J., Maj.
Beck, Howard K., Lt.
Beck, James H., T/Sgt.
Beck, Richard W., Lt.
Bell, Raymond J., S/Sgt.
Bell, Richard T., S/Sgt.
Bell, William L., S/Sgt.
Bell, William H., Lt.
Belloway, Steve, Jr., Lt.
Bellows, Charles E., Lt.
Belser, Joseph H., Lt. (& OLC)
Bement, Barry W., Sgt. (& 2 OLC)

Bender, Elmer S., Lt.
Benecki, William A., S/Sgt.
Benedict, Roy, T/Sgt.
Benedict, William P., Lt.
Benham, Edward D., Lt.
Benish, Thomas J., S/Sgt.
Benjamin, Floyd S., Lt.
Benke, Arthur L., S/Sgt.
Benna, Michael A., S/Sgt.
Bennett, Charles A., Lt.
Bennett, Earl B., S/Sgt.
Berchulski, Victor J., S/Sgt.
Berecz, Albert W., Lt.
Berg, Arnold M., T/Sgt.
Berg, Gordon H., Capt.
Berg, Lowell T., T/Sgt.
Berg, Maurice A., Lt.
Bergan, Bill J., Lt. (& OLC)
Berge, Olaf A., Lt.
Bergen, Luther, Lt.
Bergendahl, Robert E., S/Sgt.
Berger, Robert O., Lt.
Bergan, Dorey A., T/Sgt.
Bergstrom, Don J., Lt.
Berinati, Leo G., Lt.
Beringer, Edward R., T/Sgt.
Berkeley, William R., Capt.
Berklund, Almon L., S/Sgt.
Bessett, Bob, Lt.
Best, Albert A., S/Sgt.
Bevan, John R., Lt.
Beven, William A., Lt.
Bevins, Beuford C., Lt.
Beyette, Horace H., Lt.
Bezack, Andrew T/Sgt.
Bezack, Miroslav A., Sgt.
Bialo, Albert, Lt.
Biddle, John C., Lt.
Biddle, Loran C., T/Sgt.
Bielinski, Edward A., Lt.
Bielska, Walter J., S/Sgt.
Biernag, Leonard B., Lt.
Bigler, Charles R., Lt.
Bill, Walter E., Lt.

Billington, Herbert M., Sgt.
Bilyen, Emmett, S/Sgt.
Bingaman, John W., T/Sgt.
Bineham, Bill B., Lt.
Binus, Walter J., Lt.
Blackins, John T., Lt.
Blackshear, Thomas E., F/O
Blackwelder, Bruce K., Lt.
Blair, Sheldon N., S/Sgt.
Blair, Samuel B., Sgt.
Blair, Frederick O., Lt. (& OLC)
Blair, Hubert M., Lt.
Blair, Robert S., S/Sgt.
Blake, John E., Sgt.
Blakes, Ewerett E., Capt.
Blanchett, Lloyd D., T/Sgt.
Blanchard, Melvin R., S/Sgt.
Bland, William J., S/Sgt.
Blanding, Leon M., Lt.
Blaney, Fred E., Jr., Lt.
Blankinship, John J., Lt.
Blansitt, Roy G., Sgt.
Blatt, Roy H., S/Sgt.
Blare, George O., Lt.
Blasco, Henry J., Sgt.
Blaszczak, Edward M., S/Sgt.
Blatchford, Samuel N., T/Sgt.
Blau, Louis C., Maj.
Blauer, Dorey A., T/Sgt.
Blazack, Norman D., T/Sgt.
Bleakman, Melvin J., Lt.
Blomquist, Oscar M., Maj.
Bloodsworth, Robert E., S/Sgt.
Bloom, John P., Jr., S/Sgt.
Bloomer, Joseph A., Jr., Capt.
Bloomfield, Stewart M., T/Sgt.
Blount, Withour E., Lt.
Blue, John C., S/Sgt.
Blur, Wayne L., Lt.
Blum, Allen H., Lt.
Blum, Franklin A., T/Sgt.
Blumenfeld, Charles A., Lt.
Boals, Charles C., S/Sgt.
Boatman, Hiram D., T/Sgt. (& 2 OLC)
Boatman, Clifford O., Sgt.
Boatwright, Lewellyn T., Jr., Maj.
Bobbett, James A., S/Sgt.
Bock, Frederick C., Lt.
Bockman, Clarence W., T/Sgt.
Borne, Irvin L., Lt. (& 2 OLC)
Borstein, Wilbur L., S/Sgt.
Borowski, Stanley, Lt.
Borsodi, Frederic A., Capt.
Boss, William H., S/Sgt.
Bosh, Jay R., Sgt.
Bosquet, Donald H., Pvt.
Bost, Murray D., Lt.
Bostaph, Anthony W., S/Sgt.
Bostick, George F., S/Sgt.
Boswell, Irving W., Capt.
Boswell, Joe S., F/O
Bothwell, Wells M., T/Sgt.
Bottarini, Joseph E., T/Sgt.
Boucher, Andrew H., Lt.
Boufford, Robert A., T/Sgt.
Bouquet, Arthur W., Jr., Lt.
Bourgeois, Clarence P., S/Sgt.
Bourne, Clifton S., S/Sgt.
Boutelle, Winston E., Lt.
Boutross, Ferris T., Cpl.
Bowcock, Robert, Lt.
Bowden, Edward F., S/Sgt. (& OLC)
Bowll, Douglas O., S/Sgt.
Bowen, Ferrell L., Maj.
Bowen, Henry, Sgt.
Bowen, Lawrence W., T/Sgt.
Bowen, Lewis L., Lt.
Bower, James E., Lt.
Brannan, Richard P., Lt. (& 2 OLC)
Brannon, Ted, Lt.
Branstetter, Lyle R., Lt.
Branstetter, Ralph A., T/Sgt.
Brassell, Bobby G., Sgt.
Bratton, Andrew H., Jr., Capt.
Brauer, Karl H., Lt.
Braun, Hilbert W., S/Sgt.
Brauns, Robert L., Lt.
Braverman, Myron B., Lt.
Bray, James A., Lt.
Bray, Robert E., Lt.
Brewer, Robert T/Sgt.
Breckie, Robert T/Sgt.
Brecht, Harold M., Capt. (& OLC)
Breedlove, Paul L., Jr., S/Sgt.
Brendel, George J., Lt.
Breitschopf, Kenneth J., Capt.
Brendemoen, Cy H., T/Sgt.
Brendon, Charles O., S/Sgt.
Brennan, David T., Lt.
Brennan, Joseph K., Lt.
Brennan, Robert J., S/Sgt.
Brennan, Robert J., S/Sgt.
Brenner, Francis E., Maj.
Brewer, Benjamin C., Lt.
Brewer, Charles D., Jr., T/Sgt.
Brewer, Frank G., Jr., T/Sgt.
Brewer, James E., Lt.
Brewer, Samuel J., Capt.
Breyfogle, Howard V., S/Sgt.

(Continued on Next Page)

Roll of Honor

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

(Continued from Preceding Page)

Britton, John F., Capt. (& OLC)
Britton, Marion P., Sgt.
Britts, Bernard A., Lt.
Brode, Nelson B., S/Sgt.
Broemelsiek, Eugene V., Lt.
Brokroh, Alvin H., S/Sgt.
Broman, Eldon T., S/Sgt.
Brookfield, Donald S., Lt.
Brookman, Gerald W., S/Sgt.
Brooks, James P., Sgt.
(& OLC)
Brooks, John P., Capt. (& OLC)
Brooks, Norman E., Lt.
Brooks, Raymond E., Lt.
Brooks, Thomas P., Capt.
Broome, William C., Lt.
Brophy, Edward G., Lt.
Brophy, Donald J., Cpl.
Brosehart, Joseph F., S/Sgt.
Brosie, Joseph A., Jr., S/Sgt.
Brotzman, Elwood H., S/Sgt.
Brown, Billy S., T/Sgt.
Brown, Charles W., S/Sgt.
Brown, Chester L., Lt.
Brown, Clarence A., Sgt.
Brown, Cleve M., Jr., Lt.
Brown, Clifford, T/Sgt.
Brown, David O., S/Sgt.
Brown, Dean L., S/Sgt.
Brown, Edgar W., Jr., Lt.
Bryan, Donald W., T/Sgt.
Bryan, James N., Capt.
Bryan, Merle G., Lt.
Bryan, Robert A., Lt.
Bryant, Byron C., Lt.
Bryant, Donald D., Lt.
Bryant, John H., M/Sgt.
Bryant, John P., Lt.
Bryson, Robert E., T/Sgt.
Bryson, William C., Capt.
Bucezowy, Adolph Edwin, S/Sgt.
Bucey, Lester E., T/Sgt.
Buchanan, Beaufort A., T/Sgt.
Buchanan, Frank H., Capt.
Buchanan, Jim Bright, Lt.
(& OLC)
Buchanan, John S., Lt.
Budarek, John J., Sgt.
Budde, Joseph M., Sgt.
Budeska, Paul G., Lt.
Bugyie, Steve F., S/Sgt.
Buk, Ross H., Lt.
Bukovich, Joseph, Jr., T/Sgt.
Bulgarelli, Henry, Lt.
Bull, Henry E., T/Sgt.
Bull, John E., S/Sgt.
Bullington, Ray W., S/Sgt.
Bullis, George J., S/Sgt.
Bullis, Robert E., Lt.
Bullock, Carl, S/Sgt.
Bumala, Eino, S/Sgt.
Bumgarner, Willis C., Capt.
(& OLC)
Bunch, Melvin E., Lt.
Bundick, Paul S., Lt.
Bunke, Harvey C., Cpl.
Bunker, Richard T., Lt.
Bunte, Allen F., Lt.
Bunting, Frank W., T/Sgt.
Burrell, Harry R., Capt.
(& OLC)
Burrell, Robert M., Lt.
Burtch, William P., S/Sgt.
Burtch, John R., Lt.
Burton, Gerald C., S/Sgt.
Burton, William H., T/Sgt.
Busby, Robert K., T/Sgt.
Busch, Francis, Sgt.
Bush, Clinton A., F/O
Bush, Walter L., Lt.
Butchardt, James A., Lt.
Butcher, Grant L., S/Sgt.
Butler, Daniel A., S/Sgt.
Butler, Donald H., Lt.
Butler, Gilbert E., Lt. (& OLC)
Butler, James E., S/Sgt.
Butler, Robert H., Lt.
Butler, Walter S., Lt.
Butler, William E., T/Sgt.
(& OLC)
Butt, Byron K., Capt.
Butterfield, Clyde C., T/Sgt.
Buxton, Grover H., Lt. (& OLC)
Byars, Donald N., Capt.
Byas, Tucker W., Sgt. (& OLC)
Bycott, Andrew T., Lt.
Byers, John P., S/Sgt.
Byers, B. Z., T/Sgt.
Byrd, Bacchus B., Jr., Lt.
Byrd, James F., Sgt.
Byrd, William J., Lt.
Byrne, Joseph E., Lt.
Byrne, Robert J., Lt.
Byrne, Thomas I., Sgt. (& OLC)
Byrnes, Thomas A., S/Sgt.
Cabral, William M., Lt.
Cady, Chester C., S/Sgt.
Caffrey, William F., Sgt.
Cage, Rueben W., Lt.
Cagle, Henderson, Lt.
Cahill, Harold K., Lt.
Cahill, James E., Sgt.
Cahill, Thomas J., T/Sgt.
Cahow, William A., Lt.
Caillier, James E., T/Sgt.
(& OLC)
Cain, Orville R., T/Sgt.
Cain, Thomas G., Lt.
Cain, Wilson W., S/Sgt.
(& OLC)
Calvano, Albert F., Sgt.
Cakert, Thomas F., X., Lt.
Calame, Harvey W., Cpl.
Calcaterra, Angelo E., M/Sgt.
Calderbank, John J. B., Maj.
Calderson, Moses R., M/Sgt.
Caldwell, Francis E., Sgt.
Caldwell, Henry J., S/Sgt.
Caldwell, William J., S/Sgt.
Calhoun, Robert B., S/Sgt.
Callitri, Louis J., T/Sgt.
Calla, John W., S/Sgt.
Callahan, Curtis W., T/Sgt.
Callahan, Hayes B., S/Sgt.
Callahan, Robert E., T/Sgt.
Callender, Alvin D., Lt.
Callihan, Marvin O., Maj.
Calvert, Edward H., Lt.

Campbell, David A., Maj.
Campbell, Donald R., F/O
Campbell, Donald J., Lt.
(& OLC)
Campbell, George T., S/Sgt.
(& OLC)
Campbell, William J., Lt.
Campbell, Woodrow R., Lt.
Candy, William R., Lt.
Caney, Albert L., Capt.
Canfield, Iva L., Lt.
Canham, Arthur Eldridge, Capt.
Canham, Dick M., F/O
Canine, Garland G., S/Sgt.
Canning, Douglas S., Lt.
Cannon, Charles J., T/Sgt.
Cannon, Clyde C., Lt.
Cannon, Lester R., S/Sgt.
Canterbury, Arnal J., Jr., S/Sgt.
Cantrell, Jack R., S/Sgt.
Capen, Paul N., Sgt.
Capener, Vern K., Capt.
Caporusso, Louis, T/Sgt.
Cappo, John B., Lt.
Caparotta, Francis, T/Sgt.
Capuano, Frank G., T/Sgt.
Carr, Edwin F., Jr., S/Sgt.
Carr, Joseph P., Lt.
Carr, Lee D., Lt.
Carr, Roy L., Capt.
Carroll, Ralph L., S/Sgt.
Carroll, James G., Capt.
Carrwright, Roger A., Lt.
Casey, Francis W., Lt.
Castle, Frederick W., Col.
Caton, Edward H., S/Sgt.
Caviness, Sanford, Cpl.
Chadwick, Wesley M., Sgt.
(& OLC)
Chapman, Norva C., Sgt.
Chapman, John H., S/Sgt.
Chapman, Thomas J., M/Sgt.
Chase, Levi R., Jr., Maj.
(& 2 OLC)
Check, Raymond J., Capt.
Chin, Wai S., Sgt.
Christensen, Horace H., Lt.
Christmas, Frederick A., S/Sgt.
Christopher, Robert T., T/Sgt.
Chudoba, Edward J., Lt.
Ciccon, Michael J., S/Sgt.
Claffin, Leigh A., S/Sgt.
Clancy, William E., Capt.
(& OLC)
Clapp, William C., Lt.
Clapp, John W., Capt.
(& 4 OLC)
Clark, Glenn W., Maj.
Clark, James A., Jr., Capt.
(& OLC)
Clarke, Howard A., S/Sgt.
Classen, Thomas J., Maj.
(& OLC)
Claxton, Arlie W., Lt.
Cleland, Carl E., S/Sgt.
(& OLC)
Clemens, Barner F., S/Sgt.
Clemens, Joseph B., Jr., Lt.
(& OLC)
Clemenson, Gerald O., S/Sgt.
Cleven, Gale Winard, Maj.
Clifford, Thomas A., F/O
Clifford, Wilbert L., S/Sgt.
Cluck, Clarence A., Sgt.
Clutter, Clyde M., Cpl.
Coburn, Bernard A., S/Sgt.
Cochran, Joseph W., Lt.
Cody, Wathen F., T/Sgt.
Cody, Oscar M., Jr., Lt.
Coen, Oscar H., Maj.
Cohen, Schiller, Sgt.
Cola, Robert W., Sgt.
Coleman, Elmer L., M/Sgt.
Coleman, Richard C., Lt.
Cook, Maxwell S., S/Sgt.
Cook, Vernon S., S/Sgt.
Cook, Walter N., Jr., Col.
Cool, Paul E., Capt.
Coomes, Clarence S., S/Sgt.
Cooper, Kenneth A., S/Sgt.
Couch, Robert E., S/Sgt.
Counts, Charles H., S/Sgt.
Coss, Walter L., Capt.
Courtney, Robert E., Lt.
Couture, Romeo S., Lt.
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Cox, Leonard L., Capt.
Cox, Roland B., S/Sgt.
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Crandall, Donald O., S/Sgt.
(& OLC)
Crandall, Arthur L., S/Sgt.
Crawford, John D., Lt.
Crawford, William, Jr., Lt.
Crumley, Jim M., S/Sgt.
Crump, Harry C., Lt.
Cunningham, Ralph W., Lt.
Cunningham, Aloysius G., S/Sgt.
Cutshell, Ernest J., S/Sgt.
D'Adamo, Domenico, Lt.
Darlington, Julian T., Lt.
Davis, George E., S/Sgt.
Davis, Melvin H., T/Sgt.
Davis, Thomas S., T/Sgt.
Dayberry, John J., T/Sgt.
Dean, John A., Lt.
Debusk, William R., Lt.
Dee, John T., Sgt.
Deem, Harry G., Jr., Cpl.
Demas, Merrill E., S/Sgt.
Denton, William J., Lt.
Devilwe, Ralph C., Lt.
Dickey, Raymond N., S/Sgt.
Dickson, Howard L., Lt.
Dieterle, Jack W., Lt.

Dillman, Phase, T/Sgt.
Ditullio, John A., S/Sgt.
Dodd, Herschel W., S/Sgt.
Doerner, William F., S/Sgt.
Domke, Carl A., T/Sgt.
Driver, Robert R., S/Sgt.
Duden, William T., Capt.
Dzadyk, John, T/Sgt.
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Farnam, John K., T/Sgt.
Ferguson, Earl F., Lt.
Fielegar, John B., S/Sgt.
Fisher, Louis G., T/Sgt.
Fleming, Lemuel D., S/Sgt.
Fletcher, Anthony W., Lt.
Flister, Henry D., S/Sgt.
Fogel, Ernest W., S/Sgt.
Ford, Herrel E., Lt.
Foster, Leslie J., S/Sgt.
Fowler, Lloyd T., T/Sgt.
Foy, Roy J., S/Sgt.
Franklin, Albert D., T/Sgt.
Franklin, Russell A., Lt.
Franks, Worthington A., Lt.
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(& OLC)
Freeman, Lloyd L., S/Sgt.
Fretwell, Boyd G., Lt.
Frieburg, Vernon W., Lt.
Fribley, Donald E., F/O
Fulfer, George W., T/Sgt.
(& OLC)
Fuss, Joseph, S/Sgt.
Galasso, Anthony L., T/Sgt.
Galusis, John J., S/Sgt.
Gallagher, Raymond E., Lt.
Gambrell, Jean W., Lt.
Garret, Charles E., T/Sgt.
Gearhart, Bill G., T/Sgt.
Gebhard, Norbert N., Lt.
Geith, Russell, S/Sgt.
Gearty, Homer S., F/O
Gerber, Ernest G., S/Sgt.
Germann, Oliver R., S/Sgt.
Geron, Alva J., Lt.
Gerrits, James F., Lt.
Gibbey, Gola G., S/Sgt.
Gibson, Howard S., S/Sgt.
Gill, Theodore N., III, Lt.
Girard, Louis V., Lt.
Gluck, Edwin L., Lt.
Gomillion, Elton L., T/Sgt.
Good, Arnold N., Lt.
Goodall, Edward M., S/Sgt.
Gormey, John H., S/Sgt.
Gotts, Howard F., Sgt.
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Green, Allen H., Lt.
Gregory, Cornelius K., T/Sgt.
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Grimes, Donald J., T/Sgt.
(& OLC)
Grimes, Eugene L., S/Sgt.
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Kish, Julius A., S/Sgt.
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(& OLC)
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Kuhn, Byron G., Sgt.
Labranche, Joseph W., Sgt.
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Leadingham, Arthur, T/Sgt.
League, Miles R., Lt.
Leard, Frederick A., T/Sgt.
(& OLC)
Leimbach, Bernard E., Lt.
(& OLC)
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Lindsay, Robert C., Sgt.
Little, William K., Lt.
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Long, Winfield V., S/Sgt.
Long, Worthly A., Lt.
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Moore, Chester W., S/Sgt.
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Morrison, Kelly L., S/Sgt.
Musser, Monroe F., Sgt.
Nalina, Stanley G., Sgt.
Nash, Robert D., Lt.
Nathe, Raymond J., Lt.
Naum, Albert C., Lt.
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Nelson, Hugh D., T/Sgt.
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Poulson, Ernest L., Lt.
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Rackey, Leo W., T/Sgt.
Rackey, John T., S/Sgt.
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Rangel, Manuel R., S/Sgt.
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(& OLC)
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Reback, Sanford A., Lt.
Reed, Jack S., S/Sgt.
Reed, Jack J., T/Sgt.
Reed, Ralph A., S/Sgt.
Reese, William L., Jr., Lt.
Reeves, Ray P., T/Sgt.
Reich, James W., Lt.
Reisch, Horn J., S/Sgt.
Rice, Earl D., S/Sgt.
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Richardson, Ralph E., T/Sgt.
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Ritton, John P., S/Sgt.
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Robbins, Charles D., S/Sgt.
Rockinson, Alexander P., T/Sgt.
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Root, Carl F., Lt. (& OLC)
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Slough, Frank D., Lt.
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Smith, Kenneth W., T/Sgt.
Smith, Lavell S., S/Sgt.
Smith, Nick B., S/Sgt.
Smith, Robert M., M/Sgt.
Smithdean, Edward O., Jr., Lt.
Snead, Harry R., Jr., T/Sgt.
Snow, Kenneth F., Lt.
Snyder, Clay E., S/Sgt.
Snyder, Eugene P., S/Sgt.
Spencer, Lyb, Capt. (& OLC)
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Sroubek, Pravidomil, Sgt.
Stahle, John F., Lt. (& OLC)
Stafford, Morton O., Jr., S/Sgt.
(& OLC)
Staluss, John B., Lt.
Starr, Charles L., F/O
Stevens, Gordon S., Lt.
Stewart, Theodore C., Lt.
(& OLC)
Stewart, Walter T., Lt.
Stout, William B., T/Sgt.
Stout, William W., T/Sgt.
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(& OLC)
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Toth, Andrew S., T/Sgt.
Toth, James J., T/Sgt.
Townley, Warren T., S/Sgt.
Townsend, Herman E., S/Sgt.
Traudt, Bernard G., S/Sgt.
Treicher, William E., T/Sgt.
Trick, Michael J., S/Sgt.
(& OLC)
Trumbley, Albert F., S/Sgt.

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COLONEL REYNOLDS

Can You Keep a Secret?

By Col. H. G. Reynolds

THE AIR PROVOST MARSHAL

In its capacity as our security agency, the Office of the Air Provost Marshal must depend on every man in the AAF for the successful completion of its mission.

IN a card game, a good hand isn't worth much if a crafty opponent knows what you're holding. Being able to anticipate your plays, he not only can thwart your scheme of action but can take full advantage of your slightest vulnerability.

Similarly in warfare, in which the elements of timing, deception and surprise are so important, the superiority of a fighting organization's strategy and physical assets normally is of little avail unless plans for operations and equipment are kept secret from the enemy.

As the AAF's mastery of the skies becomes more firmly established with every new day of successful combat abroad and increased production at home, the Axis knows it cannot hope to match us plane for plane and attack for attack. It realizes that its only hope for delaying total air defeat lies in knowing what next to expect from the AAF and in turning that information to advantage.

Helping to block the enemy's desperate design is the AAF's own security agency—the Office of the Air Provost Marshal. Although many other important responsibilities, such as the recruitment, training and assignment of military police and guard squadrons, are entrusted to this office by General Arnold, safeguarding AAF secret and confidential information on the home front is today its most vital job.

Our task is a most difficult one because the AAF must function under conditions that permit valuable secrets to be constantly in danger of disclosure unless extreme measures of precaution are taken.

No other branch of the service has so much classified technical equipment or such trying circumstances under which to protect it. Nor do the operations of any other branch require the tremendous amount of classified documentary material that is continually being exchanged by the

various Army Air Forces headquarters.

Complicating our problem is the fact that we must cope with a hidden enemy.

In aerial or ground warfare, the foe is easily identified but the enemy agent may be someone working in a vital job under the guise of U. S. citizenship.

The resourcefulness of enemy intelligence must not be underestimated. For years both Germany and Japan have operated espionage schools which teach a science advanced far beyond the Mata Hari stage of the last war. Students chosen for their base cunning have majored in the art of intrigue under the tutelage of shrewd masters.

As defeat of the Axis draws nearer, the attempts of these highly trained spies, saboteurs and subverters to detour the Allied march to victory can be expected to be increased. Only through a well organized system of education, inspection and police protection can we expect to combat the enemy fifth column at every turn.

AAF station commanders enforce local security with the advice and assistance of the Air Provost Marshal. The latter, in the exercise of staff supervision, assigns officers to make periodic inspections and surveys of the security situation at all AAF installations in the United States.

THERE is every reason to believe that all AAF personnel are genuinely loyal and trustworthy and that none would knowingly disclose military information to any person not authorized to possess it. What the Office of the Air Provost Marshal must constantly guard and preach against, however, is carelessness on the part of AAF officers, enlisted men and civilian personnel.

Leaks of information, which easily could lead to the compromise of military secrets, continue to occur within the AAF.

Among instances of security violation handled by the Office of the Air Provost Marshal are:

- (1) Failure to lock safes.
- (2) Leaving secret and confidential papers in desks and in file trays after normal working hours.
- (3) Failure of flying personnel to safeguard secret codes and other registered documents entrusted to their care.
- (4) Careless talk in public places and in homes concerning projected operations and movement of forces and equipment.
- (5) Careless discarding of memoranda on classified subjects.
- (6) Forwarding of unclassified letters and dispatches which contain both the code and geographical names of places.
- (7) Improper classification of papers and failure to show the authority for the classification of correspondence marked "Secret."
- (8) Efforts of officers to convey to their families in private code classified information regarding prospective movements and locations in a theatre of operations.
- (9) Discussion of secret and confidential matters by telephone.
- (10) Failure to report transfer of registered documents.
- (11) Furnishing classified information without investigating the right of the requester to receive it.
- (12) Mailing of classified correspondence in single envelopes.
- (13) Using other than registered mail for secret and confidential correspondence.
- (14) Marking the outer envelope as well as the inner envelope "Secret" or "Confidential" in transmitting classified mail.
- (15) Sending messages from plane to operations relative to important persons traveling by air.

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and morale of plant employes and the conditions under which they work.

Employment of aliens and alleged subversives as it affects the AAF is another problem. Through representation by officers of his staff, the Air Provost Marshal participates in the sessions of the Industrial Review Board of the Provost Marshal General's Office and the Japanese-American Joint Board.

The first-named body reviews the appeals of aliens and alleged subversives who have been suspended from or denied employment by plants engaged in classi-

fied war production contracts. It also reviews the appeals of persons who have been suspended from or denied employment by the War Department as a result of investigations revealing subversive activity or associations questionable from a security standpoint.

The Japanese-American Joint Board makes recommendations to the War Relocation Authority concerning the granting of indefinite leave to American citizens of Japanese descent, reviews all cases of Japanese-American employment and also has the power to grant or deny applications for Civil Aeronautics Authority licenses.

While his supervision of security is limited to the continental United States, the Air Provost Marshal investigates cases such as the loss overseas of registered documents, filing his report with the theatre commander for action the latter may deem appropriate.

But the home front presents so many problems that only through the exercise of constant vigilance by AAF personnel and our teammates—the men and women employed in aircraft plants and allied industries—can our mission be accomplished successfully. Security must be the concern of each of us. ☆

Wong and His Salvage Business

By Capt. Robert V. Guelich
AIR FORCE Overseas Staff

outs in one area, Wong succeeded in getting 25 back into commission—a saving of over one million dollars worth of aircraft. This complicated task was accomplished by thirty AAF and sixteen Chinese mechanics under Lieut. Wong's command.

SALVAGE forays, sometimes deep into enemy-held territory, usually are made by small units of four Chinese and one American enlisted man. Taking their food and shelter where they find it and carrying but a few wrenches and light tools, these small bands wend their way over mountain trails, wade through rice paddies and struggle through dense jungle growth to find our crashed planes and airmen. From each wrecked plane they salvage all repairable parts and start their long and tedious journey back to base with the dismantled

aircraft. Nothing seems impossible for these roving salvage experts.

Knowing the importance of fast work when Japanese troops are nearby, yet lacking adequate tools and facilities, salvage crews have dismantled a P-40 in a day and a half. Six days are usually required to tear down a P-38 and fourteen days for a B-25.

Lieutenant Wong's own career has been a daring and colorful one, even before his duty as a commissioned officer in the AAF began in June, 1942. He was the last of the AVGs to leave Burma, waiting until the last airplane had taken off to cross the mountain barrier into China. When all others had departed, Wong used his rifle to fire 6,000 drums of 100 octane gasoline and destroy fifteen P-40s which could not be evacuated for lack of repair parts and fifteen tons of medical supplies which had to be left behind. Then, climbing into a jeep, he headed for the mountains and safety on the Burma Road to escape the advancing Japanese.

Most GIs find it difficult to keep pace with him, particularly when traveling by foot and depending on Chinese food to sustain them. Early this year, however, one American soldier earned the outspoken admiration of Lieutenant Wong. "Staff Sgt. George deBois is one GI who can really take the travel in China," the salvage officer said. This tribute to deBois was well deserved, and other salvage crewmen have accepted the challenge of their Chinese commander. ☆

(16) Attempts to pass customs and AAF certifying (censorship) officers with classified documents, personal letters, diaries, photographs of overseas operations, etc.

(17) Improper handling and burning of classified waste.

Enforcement of the security program does not end within the AAF but extends to private industry producing AAF equipment.

While the primary responsibility for security at such industrial plants rests with private management, the Office of the Air Provost Marshal exercises close supervision to insure that adequate protection is provided. Technical improvements in AAF equipment are being made so rapidly that the enemy would go to any lengths to gain access to factories which are turning out fighting planes and component parts.

Civilian guards at the plants are made members of the auxiliary military police, which functions under the direction of the Air Provost Marshal. They are given necessary training and are required to maintain prescribed standards of efficiency.

To insure that production flows uninterrupted, the Air Provost Marshal concerns himself with the health, safety

THE war has brought no more alien life than that of Americans who live as wandering nomads in China. Living off the land and making their own decisions, these men salvage the airplanes which crash in the far reaches of China.

Leader of this band is Lieut. C. K. Wong, a mechanical engineering student at the University of California before the war. Under his leadership, American salvage men have learned to make their way and while the lieutenant is slow to pass them into his graduate ranks, he says the men are getting better all the time.

The success of their apprenticeship under Lieutenant Wong is indicated by their accomplishments last November and December when fifty crashed planes were gathered up from all parts of China, despite the rough terrain, Japanese patrols and the problems of transporting them hundreds of miles by sampan, coolie, burro, truck and railway to AAF repair bases. These planes are again flying combat missions against the Japs.

Lieutenant Wong, engineering officer at an advance AAF base and in charge of salvage work for all of eastern China, is a veteran of the American Volunteer Group which he joined in the early days of 1940. Because he understands Chinese people and knows the terrain of the country, the lieutenant has made an astounding record of recovering planes. Because he is an expert at salvage operations, he holds many commendations for his invaluable work. Of 28 planes reported as wash-



Like the chaplain, the flight surgeon really sweats it out with the men in his organization. At the moment, Major Lee is trying to overlook Colonel Darby's slight deficiency in the depth perception test in order to keep this veteran of 2,000 hours on assorted aircraft off the ground.



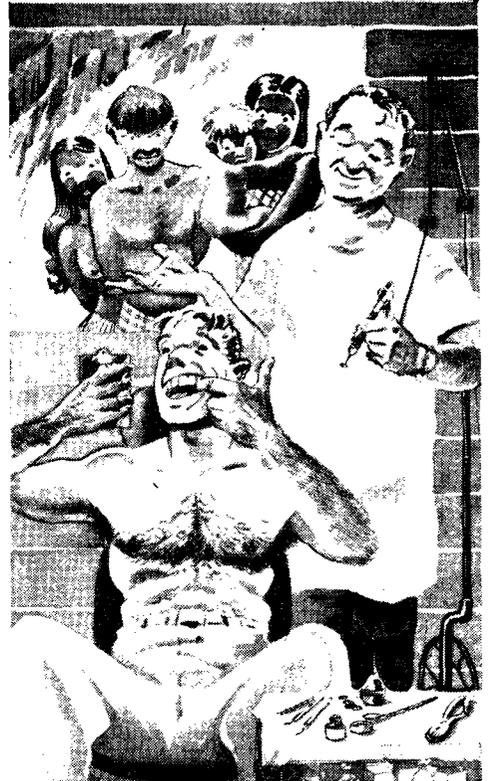
Since the "Angels of Mercy" were put on flying status there has been a marked improvement in the mental attitude of patients being removed from forward combat areas. A sick man's spirits automatically rise at the touch of a kindly and competent feminine hand. Flight Nurse Nelson is the pin-up as well as patch-up girl of each troop transport she boards these days.

AAF MEDICS

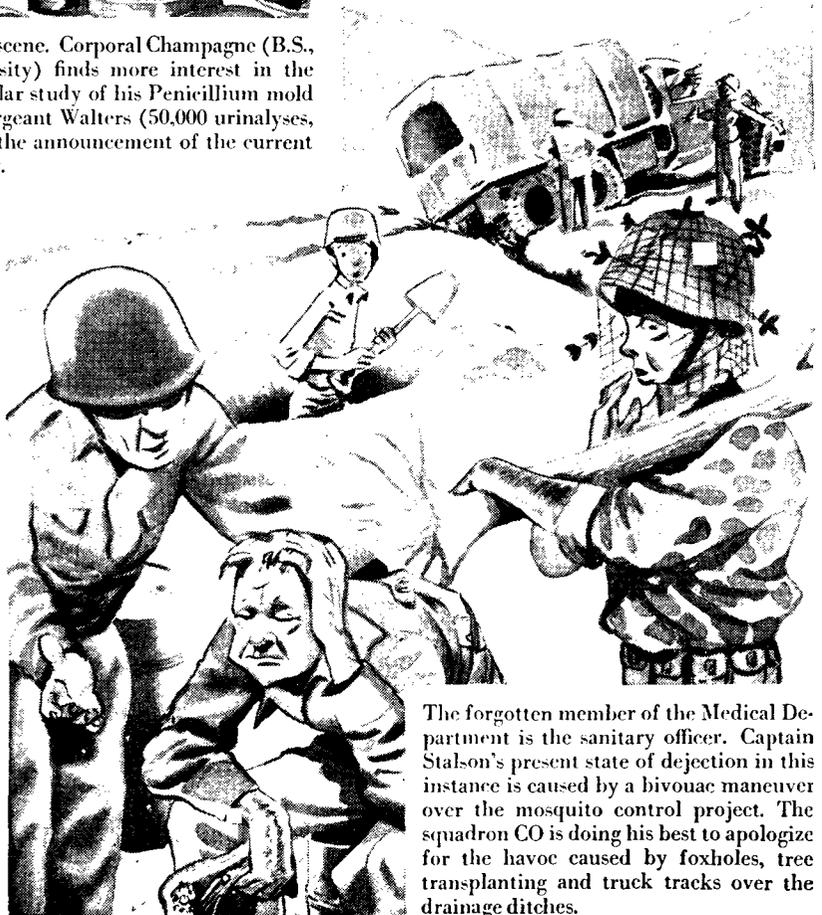
By Lieut. Wm. F. Lent



A typical lab scene. Corporal Champagne (B.S., State University) finds more interest in the extra-curricular study of his Penicillium mold than does Sergeant Walters (50,000 urinalyses, USAAF), in the announcement of the current USO gal show.



Gone are the days of the GI's mortal fear of the Army dentist. Today there is a well worn path leading to his door. At a south Pacific outpost, Private Reed inspects a beautiful inlay done by Captain Jones with the aid of his portable Kit 60. In his spare moments, the captain will administer to the dental needs of the awe-struck natives.



The forgotten member of the Medical Department is the sanitary officer. Captain Stalson's present state of dejection in this instance is caused by a bivouac maneuver over the mosquito control project. The squadron CO is doing his best to apologize for the havoc caused by foxholes, tree transplanting and truck tracks over the drainage ditches.

LAND AND LIVE IN THE DESERT

A dramatic story of survival is unfolded in "Land and Live in the Desert," a new training film (TF 1-3346) produced by the AAF First Motion Picture Unit, Culver City, Calif.

The film opens with the crash-landing of a B-24 in the desert. Injured crew members are given first aid, and an inventory is taken to determine the extent of equipment and supplies on hand which will aid in the survival of the personnel and facilitate their ultimate rescue. Plans are carefully worked out to stretch food and water stocks over the longest possible period.

Eventually, the pilot and one of his crew set out across the desert for assistance. Their procedure is depicted in detail in the film—how they carried along only the barest essentials, traveled by night to avoid the sun's heat, recorded their route with directional arrows and ultimately reached an oasis from which a rescue plane was directed to the scene of the crash. ☆



After B-24 crash-lands in desert, the ship's bombardier bandages the combat wounds of the navigator and the radio operator. Treatment of casualties is the primary consideration when a plane is forced down in wild territory and knowledge of first aid proves extremely valuable.



Gunners and bombardier unsuccessfully attempt to repair the plane's radio, damaged during the landing. Had a portable transmitter been carried on the mission, help could be summoned speedily. Now rescue must depend upon the chance of a friendly plane's passing overhead.



Uninjured members of crew decide at conference that best bet is for all to remain with plane and trust to luck. Pilot reads from the kit manual, designed to cover emergencies, and plans are made to ration scanty supplies of food and water over the longest possible period.



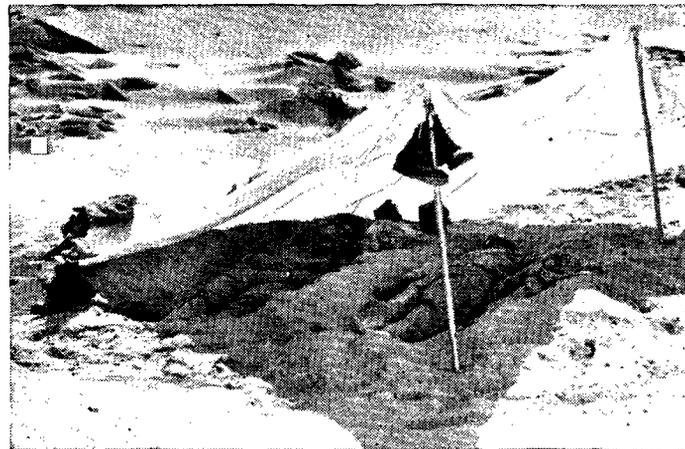
Plane's equipment is utilized to aid the crew's fight for survival. Ship's toilet is converted into a stove by filling it with sand and gasoline. Parachutes become awnings against the burning desert sun. Wings are scraped so sun's reflection may attract a rescue plane.



But as days pass and the situation becomes alarming, all agree that action must be taken. Determining from maps that the nearest oasis lies sixty miles distant, the pilot decides that he and one of the gunners will make the six-day trek across the desert to obtain help.



Carrying only barest essentials and wearing puttees improvised from parachute silk, the pilot and gunner are ready to depart. The pilot gives last minute instructions to remaining crew members on care of the wounded and on procedure for signals when rescue plane is heard.



Avoiding the sun's heat by traveling only at night, the pair rests during the daytime under a shelter constructed from parachute silk and pack frames, which serve also as walking staffs. Shoes are dried in sun to prolong their life. Water and food are consumed sparingly.



The expeditionists record their route with huge directional arrows, made of loose stones, so they may be located readily if rescue comes to the stranded crew before the journey is completed. But the oasis is reached and an RAF plane is sent to the site of the crash-landing.

AIR FORCE, July, 1944



When the engines of the British search plane are heard, the expectant Americans signal their exact location by lighting smoke fires and by shooting flares into the sky from a Very pistol. Cartridges for the pistol have been carefully preserved for this happy moment of rescue.



The Britishers revive the AAF men with food and drink before flying them to civilization. Assigned later to a new B-24, the crew profits by its lesson. On missions over desert terrain, it carries plenty of survival equipment—from canned fruit juice to portable transmitters.

AAF FIRST MOTION PICTURE UNIT

Culver City, California

WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, training devices and training publications may be obtained from the Chief, Training Aids Division, Army Air Forces, 1 Park Avenue, New York 16, N. Y., upon request through channels. AAF Regulation No. 50-19 explains fully the functions of the Training Aids Division.



A string of bombs from the first B-24s in a formation "walks" across the Jap airdrome at Hollandia, catching dozens of enemy bombers and fighters parked closely on the ground. The Japs must have seen AAF reconnaissance planes sizing up the target on previous occasions but they mistakenly assumed that Hollandia was beyond the range of bombers with fighter escort.

AIR blockade, as executed and perfected by the 5th Air Force, has been described by Col. Merian C. Cooper, chief of staff of the 5th's advance echelon, as "D to the 5th Power."

- (1) Destroy the enemy's air power.
- (2) Destroy his AA defenses.
- (3) Destroy his airdromes so no more power can come in.
- (4) Destroy the enemy's living quarters and areas of key personnel.
- (5) Destroy all of his stores and installations.

These principles of air blockade were practiced on Wewak early in 1944. On thirteen out of fifteen days in March, the 5th Air Force threw everything it had at this target, going after the objectives in the order named. Eighty-nine enemy planes were destroyed in the air and more on the ground. After the final strike on March 25, Wewak was finished. On March 23 the Jap forces began evacuating Wewak and hiking through the back country, for his barge line had been severed by constant air patrols.

Between March 30 and April 16 the air blockade was extended to Hollandia. In seven strikes the 5th Air Force paved the way for the invasion party so thoroughly that the infantry illustrated one of General Kenney's prime maxims:

"One of the essential purposes of air power is to land troops with rifles on their backs and to have the enemy so thoroughly demolished that the rifles are kept there as long as possible."

In those seven giant attacks, the enemy's air strength which he had been building for weeks was wiped out as thoroughly as a janitor clearing a blackboard with a wet rag. Three hundred and fifty-two Jap planes were destroyed or badly damaged in the air and on the ground.

Contributing to the success of this operation was that most important of all military elements—surprise. At Hollandia surprise came from the "long-legged" P-38s. For months the enemy was led to believe that he was safe at Hollandia because we would not attack without fighter cover and we had no fighters that could fly that distance and fight.

There had been some night raids and some photo-reconnaissance. These were designed to make the enemy believe that he was safe. The P-38s were kept under wraps and were flown only as far as Wewak—just over 300 miles from the nearest base. All of this caused the enemy to become careless in dispersing his planes and setting up his ground defenses. He was encouraged to believe that any attempted landing would be made at Wewak.

On March 30 the heavy bombers struck in force. Escorted by more than their number of P-38s, this was the first time the fighters had ever been that far from their home base. Of 150 enemy fighters on the airdromes, 40 came up to intercept. They had to climb and they were disorganized. Half of them were destroyed by the Lightnings while the B-24s went about the job of carrying out their share of phase Number 1—destruction of the enemy's air power.

The bombers carried incendiary clusters. The 5th Air Force has found these effective against enemy airplanes on the ground when used by high-flying bombers. However, in this type of work, the low altitude bombers and attack bombers use 100-pound parafrags and parademos.

MEANWHILE, at Aitape the same process was going on at Tadjil airdrome. It was being hit by B-25s with P-40s and P-47s as escort. In the days to come, Tadjil, though smaller, was to be a carbon copy of Hollandia.

On March 31 the same planes went back in practically the same numbers for a second attack on the dispersal areas at Hollandia, Cyclops and Sentani airdromes. Approximately thirty enemy fighters intercepted. Almost half of them were shot down. As a result of the two days' strikes, 219 enemy airplanes were destroyed or damaged. We lost one P-38.

Surprise is to air attack what mustard is to a hot dog. You can do without it but it makes a big difference. Another surprise on April 3 broke the Japs' back at Hollandia. In addition to B-24s and B-25s, the A-20s came swarming over the enemy airdromes like locusts. Up to this time the Jap had no idea the attack bombers had such range. Now it was too late for them to do anything about it. The order of attack that day was first, heavies, then mediums, and then the attack bombers.

The first step of the air blockade was completed. The second began April 5 when the bombers went after the AA using 1,000-pound demolition bombs. They kept after this target, meanwhile overlapping in the remaining three phases as the AA faded. On April 3, 5, 8 and 12, phase number two was accomplished. The remaining three steps were achieved on April 5, 8, 12 and 16 generally by means of 500-pound demolition bombs. Weather immobilized the 5th Air Force planes on the other days. But so great was the damage at Hollandia that the enemy did not have the strength to make

AND THE PRINCIPLES OF AIR BLOCKADE

By Capt. L. P. Bachmann

AIR FORCE Overseas Staff

Our operations against the enemy in the Southwest Pacific have resolved themselves into a 'D-to-the-5th-Power' routine, with surprise added for good measure.

repairs or materially change the schedule.

By April 16 the Japs' greatest remaining concentration at any one base south of the Equator—more than 300 planes—had been destroyed. This force was a potent factor, for it contained many long-range, fast bombers. But by the end of the seventh strike they were listed among the Jap planes demolished.

This total was composed of 68 fighters shot down during four diminishing interceptions and 284 planes destroyed on the ground. On the first day the enemy was caught by surprise. After that, even though he was ready, he was not anxious to do battle. Most of his aircraft were destroyed on March 30 and 31 and April 3. On April 12 the Jap made a final desperate stab with twenty fighters and lost eleven. That finished any interception.

From April 16 until April 22 the weather was bad. Our planes could make

only short strikes. The 5th Air Force kept after the Tadjai-Aitape area with the result that when a landing was made there our troops simply walked right in. Planes also kept the sea cleared of enemy shipping, so the retreating forces had to take to the back country. Meanwhile, the heavy bombers of the 13th Air Task Force under the command of Maj. Gen. St. Claire Streett pounded Woleai in the Carolines to prevent any enemy reconnaissance planes from this area coming down and spotting the Navy task force that was on its way.

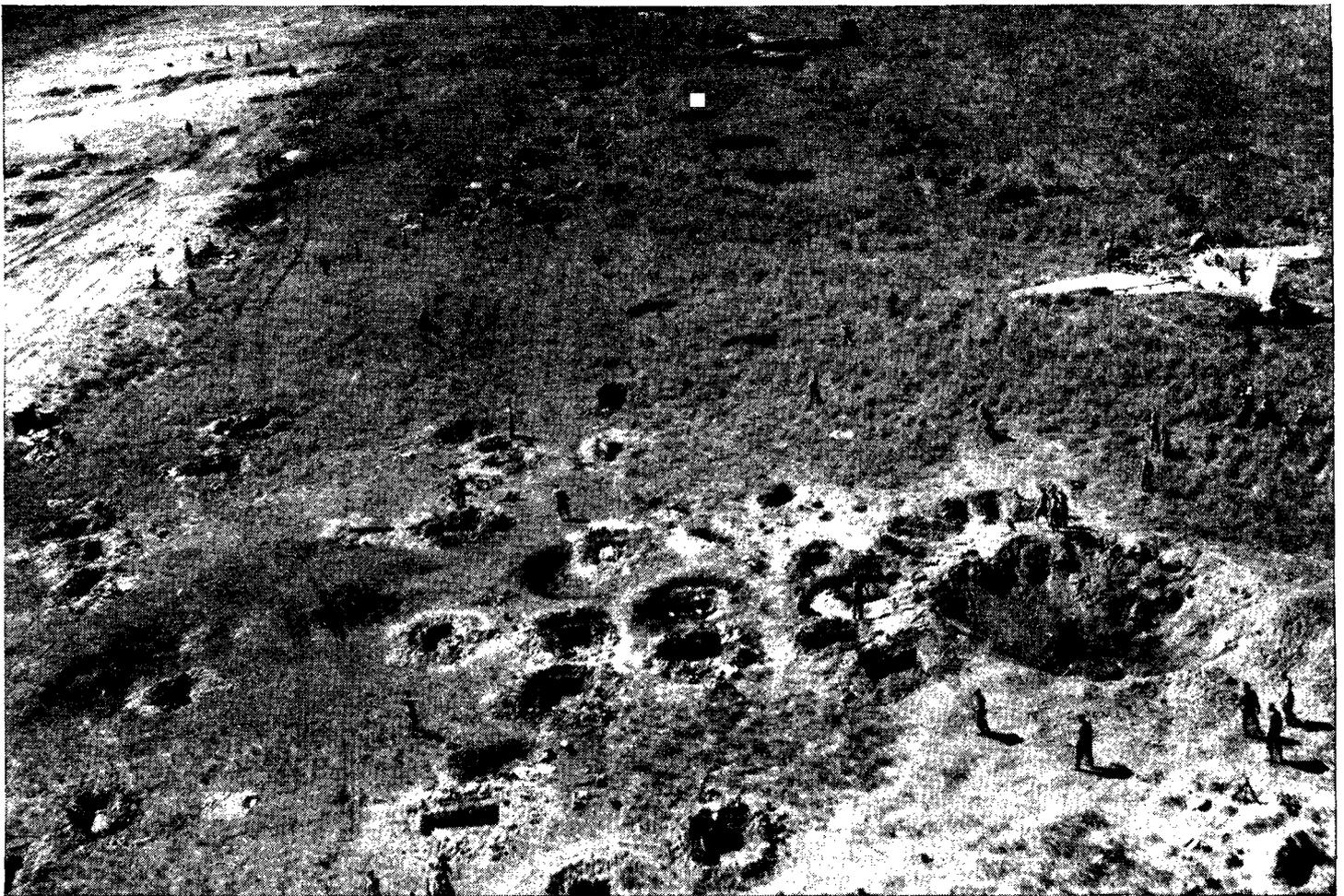
THIS task force, the largest ever assembled in this area, went ashore on a front of almost 150 miles between Aitape, Hollandia and Tanahmerah Bay on April 22. This 500-mile hop, the distance from Saidor to Hollandia, is greater than the distance the whole Southwest Pacific forces had moved in two years.

Moving in high gear, the troops captured Tadjai in 24 hours. In the landing farther north, two major beachheads were established, above and below Hollandia. The infantry raced to see which party would be first to the airdromes.

On April 25 a landslide on the only road cut the troops moving south from Tanahmerah Bay, from their supplies. They kept right on going; bombers of the 5th Air Force dropped food and supplies until the road was cleared.

Less than 100 hours after the Tadjai occupation all three strips at Hollandia were captured. Enemy resistance was light and our losses very low. Our troops discovered Jap breakfasts waiting on the table. The Jap general apparently was literally and figuratively caught with his pants down for those garments were found in his special clothes press. He must have made an incongruous sight tearing through the jungle dressed as a





Ground forces on one of the Hollandia airdromes take a good look at the job of reconstruction they have ahead of them. The huge craters in the foreground and along the runway indicate the thoroughness with which the 5th Air Force softened up Hollandia for invasion with

attacks on March 30 and 31. The shattered Jap planes in this photograph are but two of 219 destroyed in the two raids. This picture was taken on April 27 from a B-24 which had just dropped its cargo of supplies by parachute along the dispersal area and pocked runway.

general only from the waist up—a terrible loss of face.

The enemy followed their leader into the back country. As at Saidor, they attempted to march around our troops. We quickly consolidated our positions. While the air engineers got the fields into operation, the infantry set up perimeter patrols and began pushing back the Jap stragglers. But the enemy, no matter where he was in the area, was finished.

The land in those parts of New Guinea is too poor to offer a living. Early settlers could not make a go of it and certainly fleeing troops cannot. The Jap is assigned to starvation, and we do not have to waste our strength or lose men by frontal attacks. This was proven at Saidor when the enemy tried to march around our soldiers, following our capture of that area. Our patrols found thousands dead along the trails in the foothills. Those that did get through to rejoin their own men were ravaged by disease. They were finished as soldiers. And from Saidor to Bogadjim is a short distance.

Hollandia, the Japs' most important trans-shipping point for men, planes and material, was in Allied hands. The 5th

Air Force did not pause. During the short time it took to repair the fields and move up the operational units, they continued to hit the enemy at every possible point.

The gap between Saidor and Hollandia was pounded until there was nothing left at the former juicy targets of Wewak, Madang, Hansa Bay and other points. The barge traffic dropped off to zero. The heavy bombers moved ahead and for the first time, on April 28, hit Sorido strip, the important airdrome at Biak Island in the Shouten Island group at the northern end of New Guinea. Phase one of the air blockade was carried out. At least twelve enemy planes were destroyed on the ground and many others damaged while three enemy fighters were shot down and three more probably destroyed out of about forty intercepting.

THE campaign for Dutch New Guinea was started just as the long campaign for British New Guinea was ending. This campaign had cost the Japs over 200,000 of their finest men—veterans of China, Malay and the East Indies campaigns.

There were approximately 140,000

enemy troops trapped beneath the almost straight line we now hold, which stretches from Hollandia to the Admiralty Islands to Mussau Islands and across to Green Islands and the Solomons. There are approximately 50,000 Japs in New Britain, 10,000 in New Ireland, 20,000 in Bougainville and 60,000 in New Guinea. The enemy has lost from 150 to 175 percent of the planes he had at the outbreak of war. He started with about 4,000 first-line planes,—which means he has lost between 6,500 and 7,000 aircraft. About twenty percent of his merchant marine is gone and so many of his smaller naval craft have been sunk that it will be difficult for him to assemble a well-balanced naval task force.

As this is written, the enemy still has Wakde, Biak, Nabire, Manokwari, Moenri, Babo, Timocka, Utarom, Fakfak, Sorong and Waigeo and Halmahera islands, as well as other bases between us and the Philippine Islands. The principles of air blockade, "D to the 5th Power," will be used many times before we reach our objective. We know it works. The enemy knows it works. But we hold the trump card—surprise. ☆



Troops and trucks move in the dark; installations are made between nightfall and dawn, and the Owl's job is to get clear pictures of the enemy's doings.

Night photography was not easily perfected, and often great shadows blocked out the very scenes the Owl was hunting on its night reconnaissance missions.

By Maj. Arthur Gordon AIR FORCE Overseas Staff

NOT far behind the lines in Italy is an airdrome where a rather depressed looking B-25 sits all day at its dispersal point and glowers at the mountains. A student of feminine psychology, aware that nothing depresses a lady more than out-moded clothes, might assume that the old girl is disgruntled because she still wears the dusty pink war paint that camouflaged her in the Libyan Desert. But such is not the case. She is gloomy merely because it is daytime. This particular B-25 is a night owl. It says so on her faded nose.

The Night Owl belongs to a large and varied family known as the Mediterranean Allied Photo-Reconnaissance Command. For several months now, she has been flying over enemy territory experimenting with night photography. What she has learned and what she has accomplished may be of the greatest significance in future states of the European war.

It is no longer any secret that daylight photo-reconnaissance furnishes the great majority—some experts claim ninety per cent—of modern military intelligence. Armies do not move without it. Without it air forces could not assess bomb damage or select camouflaged targets to bomb. Yet up to now, generally speaking, the enemy has enjoyed virtual immunity from this aerial spying for twelve hours out of every twenty-four. During daylight he keeps his trains hidden in tunnels, his trucks concealed in woods. In darkness he moves materiel, repairs bridges, changes artillery dispositions, masses reinforcements—in



A crew member on the Owl inspects a camera used in after-dark photography.

short does everything which he wishes to conceal from his adversary.

The main reason why more progress hasn't been made in night photo-reconnaissance is simply that all the time, energy and equipment available have been used to keep up with the enormously expanding demand for day coverage. Some successful nocturnal reconnaissance missions have been reported from the Pacific, the RAF has recently made some good night pictures using American cameras, and during the African campaign some sorties occurred that were noteworthy more for excellent flying than for satisfactory photography. In all of these efforts the equipment used was not new, having been standard for at least two years. But until recently personnel trained in its use

This photo-recon unit is developing night aerial photography into a fine art.

simply did not exist. The crews of the Night Owl had to start almost from scratch. They are part of an extraordinary outfit comprising men and planes of at least four nations. On that one Italian airfield you can see Americans in Lightnings, Englishmen in Spitfires, South Africans in Mosquitoes, and Free French flying whatever they can get their hands on. The current CO of MAPRC is Col. Karl Polifka, affectionately known as "Pop." He's one of the best photo-recon pilots in the business, with vast experience in the Pacific and a DSC earned dicing Cassino and other dangerous targets in the MTO. His predecessor was Col. Elliott Roosevelt, now commanding the 8th Photo-Reconnaissance Wing in England. Both men are keenly interested in the possibilities of night photography, both having flown this type of mission themselves. It was largely due to their support and encouragement that the Night Owl's nocturnal activities were started.

The first sustained night effort in the MTO began last November. The spark-plug was and still is Maj. John L. McQuigg, a former advertising man and now assistant operations officer whose happiest moments are spent dangling out of the waist window of a B-25 photographing large sections of enemy-held territory.

From the start, the value, limitations and major problems of night photo-reconnaissance were clearly recognized in Major McQuigg's reports on the subject. In asking to have a B-25 assigned for experimental work, he pointed out that there would be innumerable headaches involved in determining proper fuzing and release of the flash bombs, in deciding shutter

speeds, camera tilt, aircraft speeds and altitudes—not to mention the hazards of enemy action and the problems of navigation and weather. But the Night Owl crews were ready for anything that involved flying. If anybody could make night photography pay dividends they said modestly, they were the boys to do it and have fun in the process.

Into their B-25 on these early missions they loaded a K-19 vertical camera and a dozen or so M-46 flash bombs. Dangerous playthings those magnesium bombs—57 pounds of potential cremation. If one is mishandled or hit by flak and goes off, no burial is necessary. This did not discourage the Night Owl crews. In fact, not content with a bomb bay full of magnesium, they did not rest until they had added wing racks for additional, and even more exposed, bombs. Then off they went over the enemy lines with every intention of bringing back pin-point target coverage.

There were some crack flyers on those early flights, men like Lieut. Col. Frank L. Dunn, famed for low-level "dicing" missions, Maj. George W. Humbrecht, an outstanding pilot who survived two crash landings after being shot up in combat, Maj. Richard H. Burnor, Lieut. Col. Leon W. Grey, Maj. Oscar M. Bloomquist, Lieut. Col. J. F. Setchell and Capt. John R. Hoover. Many of these men had completed sixty combat missions when they started flying night reconnaissance.

WITH flyers as experienced as these, the danger of accidents was reduced to a minimum. Still, results at first were far from satisfactory. Navigation was a major problem. Finding the target without the aid of radar proved no easy task unless there was considerable moonlight or unless it was situated near a main highway, a river or some other conspicuous landmark. The bombs were full of mechanical bugs. On mission after mission, good pictures failed to materialize because the bombs burst too high or too low or did not burst at all. Winter weather in Italy was another handicap; it tended to be clearer by night than by day, but even so a lot of time was wasted stooing around looking for holes in the clouds that blanketed targets. With flak occasionally bursting near the bomb-bay full of magnesium—a splinter came through the top turret one night and wounded the engineer in the head—and with an occasional night fighter buzzing past, the hazards were considerable.

The boys used to compensate for all this now and then by loading the wing-racks of the Night Owl with small fragmentation bombs and indulging in a little low-level road bombing when they had used up all their flash bombs. It was on one of these occasions that Lieut. Homer L. Webber got his nickname "Killer." Lieutenant Webber, who deserved most of the credit for the modifications that made the night work possible, announced after one mis-

sion that he had personally dropped a "frag" out of the windows squarely on a Nazi truck. This feat he described with such blood-thirsty enthusiasm that everybody began calling him "Killer," and the name stuck. Pretty soon, however, Pop decided that such goings-on hardly constituted decent behavior for a lady like Night Owl and passed word along to stop risking everybody's neck unnecessarily.

By the time the crews had flown twenty training missions and a few operational ones, experimenting with both British and American cameras and bombs, they were getting consistently good results with either of two methods. One was the "open flash" system. The cone of a K-19 camera, the body of a K-17B and an A-5 magazine were hooked up. The shutter was tied open. Film was exposed by the flash of the bombs, after which the film was rolled and ready for the next exposure. This technique produced good pictures, but was subject to interference from enemy searchlights and anti-aircraft fire.

In the "photo-electric cell" system a K-19 twelve-inch or a K-19A thirteen-inch vertical camera was used. A photo-electric cell was connected to the shutter control. The bomb flash at peak intensity—some 6,000,000 candle power—actuated the shutter and wound the film. This method was becoming standard with the night pioneers as spring brought better weather to the sodden Italian country-side.

M-111 mechanical fuzes were found to be most satisfactory with the B-25 bomb releasing mechanism. Dropped from approximately 12,000 feet, the bombs were timed to burst about thirty seconds later. A plate was attached to the rear section of the bomb to hold it behind the aircraft and keep it from bursting within range of the camera lens. As missions progressed, a tandem camera was set up in the Night Owl with approximately thirty percent sidelap. Bombs were dropped at fifteen-second intervals which, at 12,000 feet with an indicated air speed of 200 mph and ground speed of 245 mph, gave satisfactory running overlap for stereo vision. Once the quality of pictures improved to the point where useful interpretation was possible, requests began coming in from the American Fifth Army on the western side of the peninsula and occasionally from the British Eighth Army on the east for coverage of main roads and rails in the immediate battle area. Those requests are still being made with ever-increasing frequency. And they're being filled.

Early in the spring some specially equipped airplanes arrived from the States, and for a while it looked as if the Night Owl's faded pink nose might be out of joint. Developed by Dr. H. E. Edgerton of M.I.T. who accompanied the aircraft, the equipment—a self-contained electrical flash unit—was designed to eliminate two of the main drawbacks of the flash bomb technique: the hazards involved in carry-

ing any substance as dangerous as magnesium and the limited number of exposures determined, of course, by the number of flash bombs that the plane could carry.

Some of the pilots teased Dr. Edgerton, whom they promptly and inevitably nicknamed "Flash," about the aid his equipment might give to enemy flak gunners. "That light just says to those ack-ack gunners, 'Here I am! Here I am! Here I am!'" Actually, preliminary experiments indicated that the Edgerton equipment might be very valuable for coverage of roads and other targets in areas not too heavily defended. In battle areas, however, where night fighters and flak might be expected, a maneuverable aircraft flying at considerable altitude and capable of taking violent evasive action seemed to be better suited for the job. The Night Owl herself was a bit slow for the work; her successors were likely to be A-20s or the ubiquitous Mosquitoes. It did not take great imagination to visualize the day—or rather the night—when aircraft, equipped with the latest navigational aids, would make the Night Owl seem thoroughly obsolete.

Until that time arrives, however, the Night Owl is carrying on. She never knows what sort of trouble she will encounter next. One night when her navigator, Lieut. William Miskho, brought her back to base with one engine misbehaving badly, an ambulance on the field blundered into the flare path and knocked out one entire string of lights. An animated discussion ensued in the Night Owl as to which side of the remaining lights the runway was really on. Opinion was equally divided, but the pilot that night was Colonel Setchell, who had worked back in the States on night photography in the days when you held the camera with one hand and threw bombs out of the window with the other. He made up his mind and hit the runway with one engine coughing asthmatically and the engineer predicting dolefully that the other wouldn't last long.

THE "Night Owl" and her merry men realize perfectly well that in the not too distant future their work will seem crude and amateurish in comparison with the night coverage that their successors attain. They are aware that no one will remember the names of gunners like Johnston, Phillips, Nelson, Pucci, Personette, Rutledge or Cram. They agree that nobody, in all probability, will pin any medals on the cameramen: Furney or Brophy or De Marco or Phillips—let alone the ground crew that kept the Night Owl flying: Meeks, Arvin, Taylor, Ruchlman and Rell.

But they have the satisfaction of knowing that they were in at what really amounted to the birth of a new and highly important war tactic. And each one of them is convinced that, although night photography may still be in its infancy, it is going to be a very precocious child. ☆

ON THE LINE

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

8TH AIR FORCE ORDNANCE MEN MEET EMERGENCIES . . .

A requisition slip doesn't do the job. You can't tighten a bomb base plate, remove a distorted fin lock nut, loosen an Edgewater adapter or depress the oil buffer body tube lock spring and remove the oil buffer body with a sheet of paper. If the necessary tools aren't around when you need them, they're useless. Time lost in obtaining them is time gone forever.

Supplying men in the field with the proper tools the very moment they're needed is, in many cases, most difficult. Often the tools on hand are not sufficient or adequate, and sometimes the job requires tools which aren't even listed.

In any case, you can't call it quits. Instead, you do what 8th Air Force ordnance men have done and are doing every day—you make the needed tool.

Aviation ordnance men of the 8th have been confronted with many jobs when enough of the right tools were not around. Sometimes a slight alteration to an available tool has done the trick. At any rate, these men have been producing some special tools they needed in a hurry, merely by using common sense.

Unavoidable damage to bombs and bomb components, such as loosening of bomb base plates and distorted fin lock nuts, often occurs between the shipment of the bombs overseas and their arrival at an ammunition dump in the field. A

chain wrench, similar to one used by steamfitters, was designed in the field for the maintenance of bombs. Aviation ordnance shop men followed the designs and made a wrench with which the plates can be tightened and the fin lock nuts removed. It has a steel handle with shoulder notches cut in the handle head. Part of a discarded motorcycle sprocket chain is riveted to the head. The chain, its size varying according to the size of the bomb, hooks on the head projector and slack is taken up by cam action of the head. Previously a wrench with strap webbing attached to a metal handle had been tried unsatisfactorily. It slipped and depreciated rapidly. The chain wrench doesn't.

The job of taking off the Edgewater adapter from a .50 caliber waist machine gun and a 20 mm cannon had been a consistent headache until ordnance men in the field sent into the 8th Air Force ordnance shop plans for a wrench which would remove the adapter easily without damaging it. The shop men experimented with the plans, and the result was a wrench made from scrap steel which removed and replaced the adapters quickly.

It is a closed-end steel wrench serrated on the inner periphery and pivoted at the top center. Positioning lugs are welded on both sides, ninety degrees from the pivot point. At the bottom center two arms extend from the wrench proper, allowing the wrench to be opened and

placed on the serrated portion of the adapter. The arms are then brought together, forming in effect, a lever by means of which the adapter may be loosened.

Often a gunner on a mission found that his gun was jammed or firing erratically. The time it took for the gunner to remove his heated gloves and fumble with a wrench and screwdriver in the subzero cold to repair his gun often meant injury and sometimes his life. Tech. Sgt. Allen H. Buell, 8th Air Force ordnance draftsman from Salt Lake City, answered this situation with an all-purpose combination wrench, which does everything for the gunner during a mission. With it he can adjust the oil buffer, depress the oil buffer body tube lock spring and remove the oil buffer body, remove the gun mount adapters, remove a round jammed in the T slot of bolt or adjust head space, all within a few seconds and without having to expose his hands to the dangerous cold.

The tool was made by cutting off the handle of an 8-inch crescent wrench and brazing a $\frac{1}{4}$ by $\frac{3}{8}$ by $5\frac{5}{8}$ -inch steel shaft, tapered to a screwdriver on one end, onto the crescent wrench head. The stationary jaw of the crescent wrench is milled. A combination oil buffer filler screw tool and oil buffer body tube lock spring tool is press fitted into the steel shaft so that, if broken, it can be driven out and a new one inserted.

To supplement supplies of the Föhne-

"Spare Parts," considered just about the fastest P-39 in the Pacific, was built, as its name indicates, entirely from a salvaged fuselage and other spare parts by six members of the 7th Air Force. Shown with the plane are the men who built it, standing (left to right) Lieut. Benjamin C. Warren; Sgts. Harry Stahlke, Emil Zaph and George Wolfe; kneeling, Pvt. Eldridge Norton (left) and Sgt. Leo Sanchez.



When our aircraft return from a mission mechs take over, wasting no time in getting the airplanes ready for the next operation. Here, on a base in the Gilberts, mechanics and crewmen have immediately set to work repairing a damaged tail assembly of a B-25. This Mitchell's tail sustained flak holes that must be patched. The damage was done by Japanese ack-ack in operations over the Marshall Islands.



ON THE LINE *(Continued)*

stock clip which holds the arming wire in the bomb fuze vane and prevents the vane from rotating, Cpl. Angelo Lauri designed a hand-operated machine out of parts of a bicycle, jeep, 2½-ton cargo truck and other scrap metal which turns out about 500 acceptable substitutes an hour from discarded arming wire. Corporal Lauri is a member of an S and M Company in the 8th Air Force base ordnance. — Cpl. Rudy Springer, Ordnance Section, 8th Air Force.

NAVIGATOR DOES LIMITED MAINTENANCE ON SEXTANT . . .

Because sextants are "personal issue" items, care and maintenance become the responsibility of the navigator— to a certain extent. Maintenance includes what the navigator can accomplish readily in the field without the use of special tools and test equipment. The navigator must *not* attempt to make internal adjustments on the sextant; many received for overhaul indicate tampering by personnel who lacked tools and skill to accomplish a satisfactory job.

Mail call is one of the big events overseas. On the line with a heavy bombardment group of the Mediterranean Allied Air Forces in Italy, Cpl. George L. Teague, mail clerk, gives personal service on a burro. He didn't have to ring twice for Sgt. George Boosalis, who is reaching down for what is coming to him.



Sextants currently in use should give satisfactory service for the duration of the war plus, provided the navigator is familiar with the workings and does not abuse the instrument. The TO on the particular sextant will inform him why unrestricted maintenance is discouraged, and what can be accomplished with the skill and tools available.

The construction of the sextant is comparatively simple. It consists of nothing more than a worm, sector, optical system and scale or counter with which to read the deflection of a prism or mirror from zero. It is built to read to a precise angle. When this angle is measured, there are only four things which can affect the accuracy: "index or bubble error"; backlash; loose prism, mirror or reflector, and damage to worm or sector.

Damage to the worm or sector can be traced to either an excessive amount of dirt, or carelessness when assembling the instrument. Some sextants have very fine threads on worm and sector, and extreme care must be taken to prevent damage while working with them. If the sector or worm becomes barred, a binding and error will result.

Use care when cleaning the surfaces of the optical system. A well washed linen handkerchief is quite satisfactory; be sure there is no grit in the cloth and wipe the surface gently. Optical surfaces must be protected as much as possible and cleaned only when necessary.

To assist navigators with the check and maintenance of sextants, the collimator, optical instrument test, part No. 41G-9323, stock No. 7800-208200, has been supplied to all airdrome, antisubmarine, bombardment, fighter and troop carrier squadrons, as called for in their OEL. In addition, this collimator may be found in all instrument trailers, depots, many subdepots and other

similar activities. Stations which schedule frequent celestial navigation flights should have this collimator installed in a room readily accessible to all navigators.

TESTING OXYGEN INDICATORS . . .

Reports show that oxygen flow indicators are not being tested properly prior to installation in airplanes. For type A-3 indicators, check operation of the shutters as pre-installation test. Insert the blunt end of a pencil through the large threaded hole in back of the indicator and, pressing gently against the bellows, note the opening and closing of the shutters. If shutter fails to move, spring is broken or shutter assembly is defective.

The bellows and body assembly should also be checked by connecting the type A-3 indicator to an oxygen supply and raising the pressure to ten psi in the indicator. Shut off the oxygen supply and observe shutters; if shutters begin to close within five minutes there is a leak in the bellows or body.

Test the type A-1 indicator for leakage by connecting to an oxygen supply of 500 psi and submerge indicator in water. Bubbles will locate the source of leakage. The minimum indication of the type A-1 indicator must be 1/8-inch upward deflection of the ball with a flow of one liter per minute, from 500 psi to atmospheric pressure with indicator in a normal position.

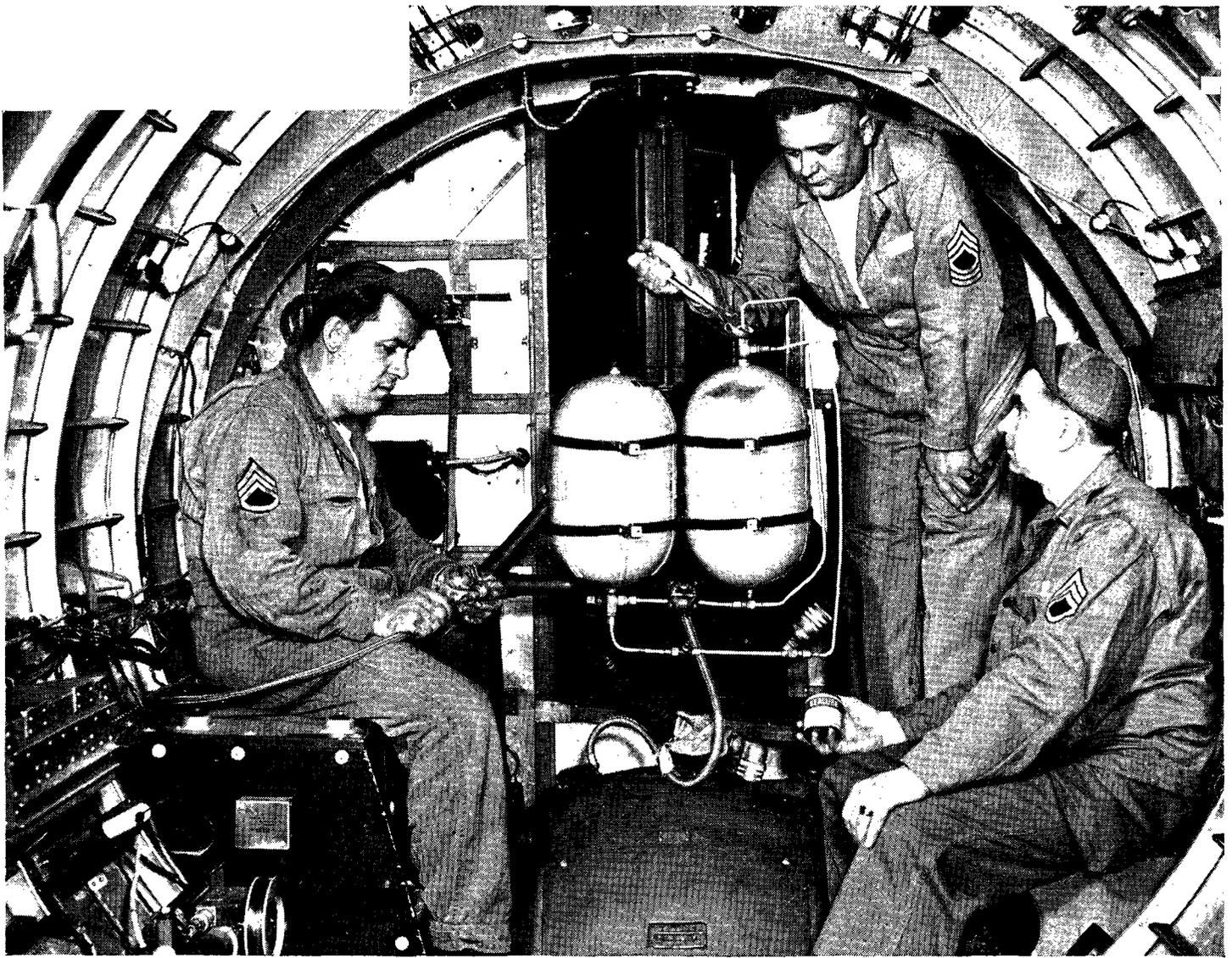
Complete information will be found in TO 03-50D-2 and TO 03-50D-4.

Incidentally, types A-1 and A-3 oxygen flow indicators are interchangeable provided the necessary low pressure and high pressure connections are reworked accordingly.

USE THE PUTT-PUTTS . . .

Never use the batteries installed in aircraft for starting the engines—or for any other purpose—while the airplane is on the ground. This should be a *must* rule. Reference: TO-01-1-52.

Batteries installed in an airplane are there only to work in conjunction with the generators, and to take care of any emergency "surge" which might place an overload on the generators, the main source of electrical power. Aircraft batteries do not have sufficient juice to stand the drag of airplane electrical equipment except for extremely short periods of time. In some airplanes the operation of the radio for five minutes alone will exhaust the battery. Auxiliary, portable gasoline power plants (putt-putts) not only pro-



ON THE LINE climbs inside the fuselage of a B-17 this month to bring you a picture of how not to connect the oxygen bottles above the belly turret. In taking this picture the mechanics were asked, "Do they *really* gum up the connections like this?" "Do they!" replied one man who knows, "some airplanes come into the hangar with oxygen bottles rigged in a fashion that would outdo Rube Goldberg's craziest contraption."

The gunner's breath of life will depend on perfect flow and functioning of this low pressure oxygen system (exclud-

ing other well known hazards). Some boners shown in the past would not preclude an airplane's flying, but these boners . . . well, figure it out for yourself.

Expert mechanics who know the right answers accommodated by posing these boners for July. They are (left to right) Staff Sgt. Early E. Real, Master Sgt. Clyde Gambill and Staff Sgt. Charles H. Minogue, all attached to Flight Section, 4000th AAF Base Unit (Command), Patterson Field.

Sergeant Gambill counts nine mistakes, listed on Page 64. Can you find any more?

vide starting power for the engines, but they may be used to charge the batteries while they are installed in the airplane, and they *must be used* whenever it is necessary to perform operational checks of electrical equipment.

Failure to maintain the proper charge on the plane's batteries may result in the subsequent failure or improper operation of electrical equipment and failure of generating systems due to overloads caused by the addition of abnormal battery charging requirements imposed upon the nor-

mal electrical loads.

Three standard types of putt-putts are allocated to squadrons to provide external electrical power. It is the responsibility of the organizations to obtain sufficient numbers of these units for their service. For supply officers' convenience the types of AAF putt-putts with ASC stock numbers are listed here:

Type C-7 (ASC stock No. 8200-721000) (TOs 19-45-3, 19-45-19) has a capacity of 1,500 watts at 11.25 volts.

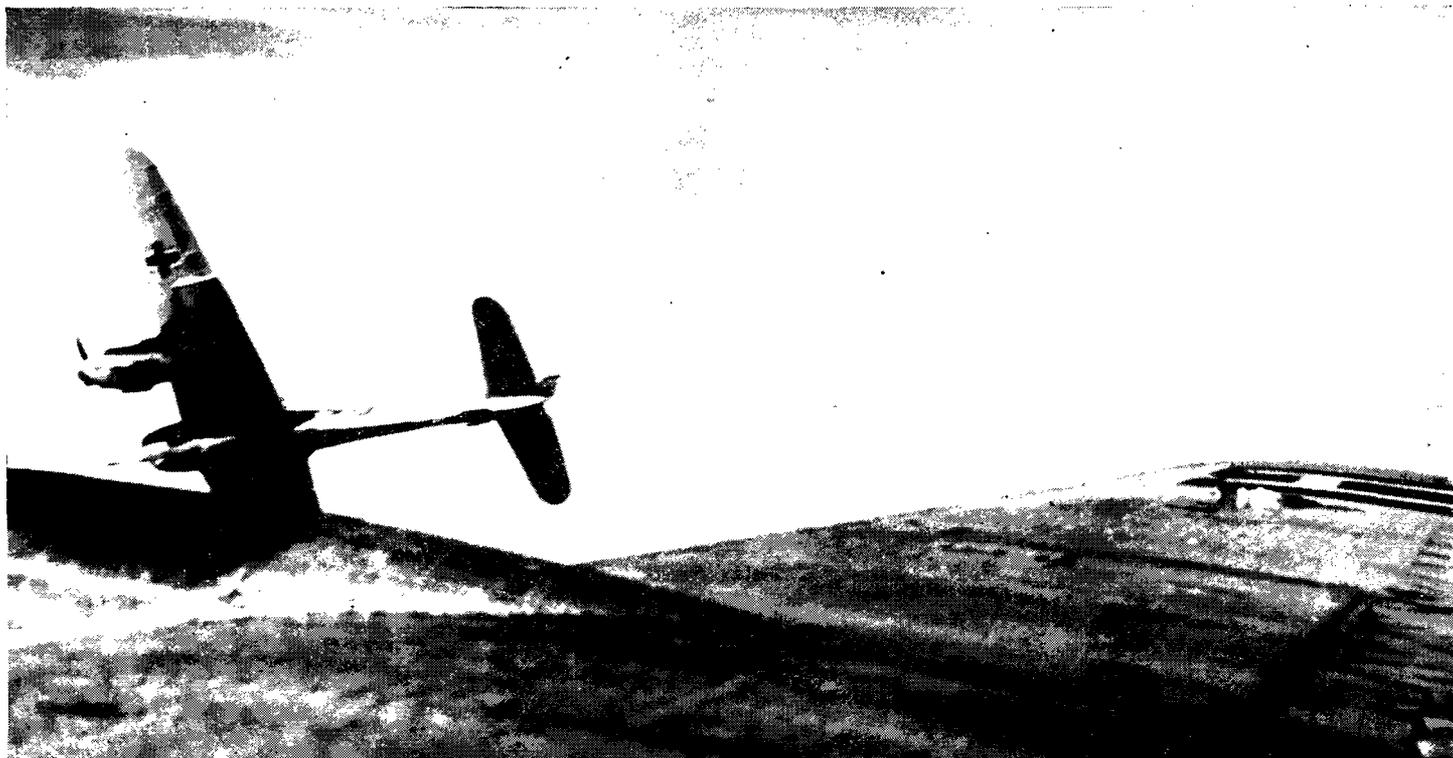
Type C-10 (ASC stock No. 8200-

729000) (TOs 19-45-5, 19-45-11) has a capacity of 2,000 watts at 28.5 volts.

Type C-13 (ASC stock No. 8200-729300) (TO 19-45-7) has a capacity of 5,000 watts at 28.5 volts.

CHOOSE CLAMPS CAREFULLY . . .

Make sure you use the correct type of hose clamps on self-sealing fuel and oil lines; otherwise, should you put on an improper type, the lines might pull off due to broken clamps. Check TO 03-1-29 and Par. 3 b TO 04-5-12. ☆



This Messerschmitt 410 breaks away, banking right, after pressing its attack against an 8th Air Force B-17. The ME came in with its 20 mm cannon blazing and scored at least one hit which can be seen just inside the wing marking of the American plane. The action during a

recent raid on Brux, Germany, demonstrates how desperately the Nazis have had to fight in an effort to turn our heavy bombers away from vital enemy areas. The Messerschmitt 410 is not as common in German fighter squadrons as the 110s and 210s of the same manufacture.

GERMAN JET PROPULSION. Before the start of the war most of the major powers in the world had a few plans underway on jet or rocket propulsion for aircraft. The Italians had already flown a rather clumsily designed jet propulsion craft, and Group Captain Frank Whittle of the RAF had completed his plans for his first experimental jet propelled plane. The Germans, always good engineers, have developed by now several jet propelled planes most of them still in experimental stages.

One of the most interesting is a rocket plane, a small bug-like contraption with a wingspread slightly longer than that of a 1/2 hp model plane, and a deep-bellied, tear drop fuselage just big enough to keep the plane from being a flying wing. It is liquid-rocket fueled, meaning that liquid oxygen and a type of liquid fuel is carried. It is an "alarm" fighter, with a flight duration of from eight to ten minutes. It has no wheels and it takes off from a track. It is supposed to climb rapidly and have very high speed. It lands on belly skids.

JAP INTERCEPTION METHODS. Japanese fighter pilots used many kinds of tactics, some good and some poor, in their attempts to break up Allied bomber attacks in the Gilbert-Marshalls campaigns.

They seemed to have effective aircraft warning and look-out systems, since their fighter planes were usually waiting over the targets when the AAF aircraft arrived. Most of the time, however, the planes did not attempt to strike at our B-24s and B-25s until after bombs were away. They seemed to rely on their anti-aircraft to prevent or spoil our bombing runs.

For a while, Jap fighter pilots would strike from all directions at a B-24 formation, but they gave up that procedure in time and made most of their attacks from ten to two o'clock. Beam attacks were tried occasionally, but runs from the back were rare. The early all-direction tactics were fairly interesting. The Japs seemed to be trying to figure out where they had best advantage. They would come in from any position, break away early and then improvise something else. They took full

advantage of the sun, and at first made passes singly, then coordinated single attacks and finally worked in pairs or fours. Frontal attacks from slightly above were quite common and even vertical dives were tried. In the latter, the fighter would dive through the bomber formation from above, allowing AAF gunners a short burst before the fighter was out of their sights.

In attempts to break up formations of B-24s, enemy fighters often would try tricks and feints. Sometimes a few fighters would perform acrobatics to attract attention while other planes attacked from another side. An enemy fighter on the flank of an AAF formation would feint a pass while another fighter would dive from overhead. Enemy fighters would stay off on one flank while another was waiting up sun ready to attack. Three enemy fighters would take a position on a flank while three others went up sun. One fighter would dive out of the sun and, after the pass, would take a position on the flank while a plane from the flank

went up into the sun to take the first fighter's place.

On B-25s, while making most of their attacks from ten to two o'clock, the Japs also tried many beam and rear passes. The mediums in the Central Pacific normally flew practically on the deck as they went into their targets, and the Japs were cagey about diving on them. Vertical dives, of course, could not be attempted.

Now and then, the Japs would fly a mile or so ahead of a formation of Mitchells, slow roll and make shallow dives on the B-25s from about 1,000 feet, turning sufficiently to fire on the whole formation. Jap fighters occasionally would start from about 2,000 yards out, come within 1,000 yards and break off into split S. Frontal attacks usually started from about half a mile ahead and 2,000 feet above. The enemy fighters would come down in a shallow dive, split S and half roll, with a breakaway at two o'clock.

In the latter part of the campaign, the Japs used "pacers" which stood off on one side of AAF formations and signalled to fighters as well as giving directions to AA installations as to altitude, course and speed of our aircraft. In this phase of the battle there was considerable air-to-air bombing by the Japs.

AAF crews were impressed throughout the campaign by the excellent teamwork between Jap fighters and their anti-aircraft,

LUFTWAFFE AND GRASSHOPPERS. Because the Germans normally go after that what bothers them most, enemy fighters in Italy spent some time chasing small observation planes which were gathering information for Allied infantry and artillery. The Germans soon found, however, that hunting down the little airplanes didn't pay off because the cubs usually were able to elude them or lead them back to anti-aircraft protected areas.

THIS ONE WORKED. The Japs, who have been trying a lot of air-to-air bombing, finally knocked out a P-38 with the tactic a few months ago. A top turret gunner on a B-25 the fighter was escorting reported:

"We were flying at 12,000 feet and from my position as top turret gunner I saw a P-38 about 2,000 feet above us and to the rear. Possibly 6,000 feet above the P-38 I noticed a plane and saw an object drop from his belly tank shackle. This object turned out to be a phosphorus bomb which exploded right in front of

the P-38. Many tentacles spread out with the body staying in a mass. The P-38 flew right through the main part and, possibly fifteen seconds later, I noticed white smoke coming from each engine. Not five seconds afterwards, both engines burst into flames which soon seemed to envelop the whole leading edge. The P-38 went into a spin and I watched it go into the water. . . ."

SELF-SEALING. A good self-sealing gasoline tank has finally been designed by the Japanese and is now being installed on their airplanes. The sealing cover consists of a number of layers of rubber with a total thickness of one and one-eighth inches. In some tests on a tank found in a crashed Jap flying boat, AAF engineers ripped a hole almost an inch in diameter in a layer of the sealing material and the hole closed up with no seepage whatever, indicating that the sealing qualities of the tanks are excellent.

MORE ON MINES. The Germans continue to attach anti-personnel mines to anything handy, and among their latest booby traps are fence posts. A wire leading to a detonating fuze is attached to the bottom of a post, with the wire extending to a large buried explosive charge.

Another trick was that of an enemy patrol which happened on one of our

artillery observation post telephone lines. They cut the line, then buried some mines near by and attached the ends of the telephone line to pull igniters. They figured on a lineman coming along in the dark and picking up what he thought was a loose end of wire. The trick wouldn't work so well in the daytime because what had been done was obvious.

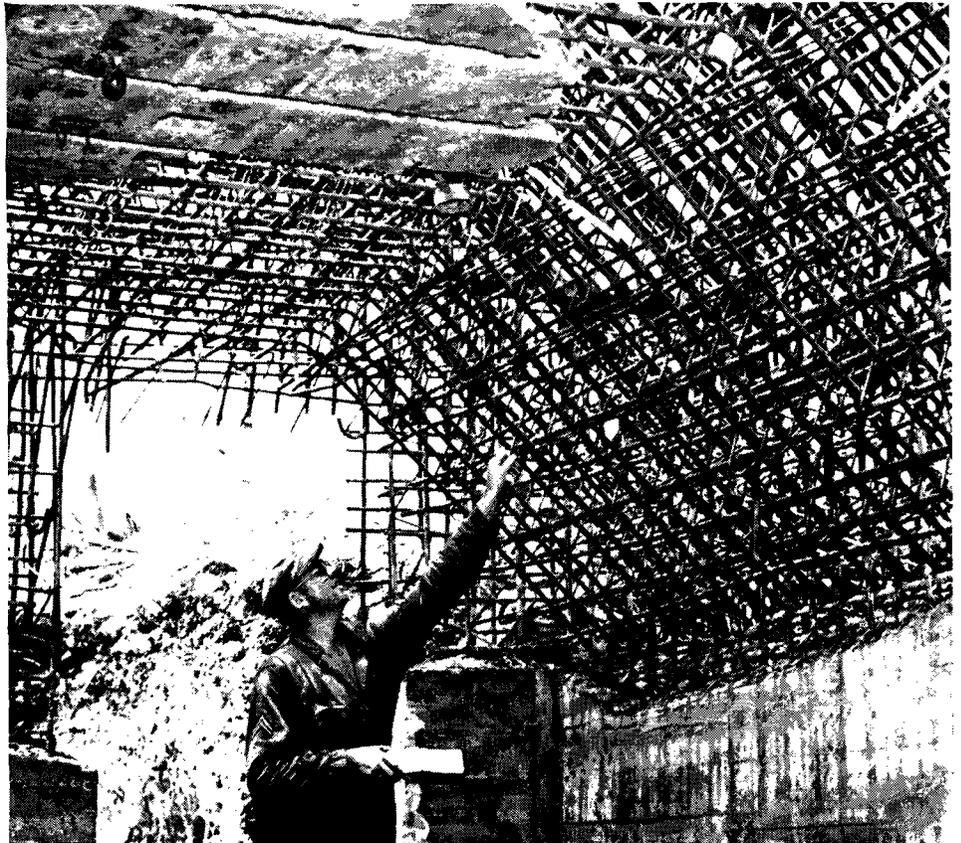
At a ford, usable only in certain seasons of the year, the Nazis equipped the banks with trip wires leading to mines which would have been detonated by anyone attempting to cross at the ford.

HARA-KIRI WITH BUMPS. They tell this story in the South Pacific about one Jap who did not want to go off to the wars.

He was a replacement in the 80th Infantry Regiment, assigned to go to the front. He sat in the second story window of his barracks, took a round from his ammunition pouch, put it into his rifle. He placed the muzzle against his left shoulder, and stepped on the trigger with his right foot.

Even at that distance he missed. The excitement got him, however. He fell backward out of the window, bruising his left buttock, left ankle and face. He also broke his acetabulum, which, in case you are nervous, is a socket in the hipbone into which a thighbone fits. ☆

It takes plenty of solid hits to knock out a Japanese pillbox such as this because of its thick, rugged construction. Cpl. Joe Quinn inspects the exceptional steel reinforcement and 22-inch concrete wall. This one was wrecked by accurate shelling and bombing in recent fighting in the Pacific.



PICTURE CREDITS

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Roll of Honor

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

(Continued from Page 48)

Turley, Joseph J., S/Sgt.
Underwood, Glenn W., Lt.
(& OLC)
Valek, Stanley, Lt.
Van Buren, Martin R., S/Sgt.
Vengrien, Ray F., Lt. (& OLC)
Vick, Lowell C., T/Sgt.
Vincent, Larry W., S Sgt.
Vogel, Robert I., S Sgt.
Walaczaka, Raymond C., S/Sgt.
Wallace, Charles N., Lt.
Wallman, James R., S/Sgt.
Ward, John V., Lt.
Ward, Lester T., S Sgt.
Ware, Warren H., Lt.
Wargo, Stephen, S Sgt.
Warner, Delbert R., S/Sgt.
Washburn, Curtiss, S/Sgt.
Watkins, Chaptin J., Lt.
Watkins, John C. A., Capt.
Watt, David S., Lt. (& OLC)
Way, Boyd S., S Sgt. (& OLC)
Weant, Willie B., Lt.
Wedon, Edward J. Jr., S/Sgt.
Weir, Edward E., Lt.
Welch, Earl C., T/Sgt.

Wells, George W., T/Sgt.
Wells, Roy L., Sgt.
Wellton, John V., S/Sgt.
Werts, Stanley R., Lt.
Wessel, Ralph G., S Sgt.
Whitaker, Coleman S., Lt.
White, Charles F., S Sgt.
Whitlock, Charles A., Lt.
Wickham, Clyde G., T/Sgt.
Wildermuth, William, Jr., S/Sgt.
Wilkinson, Charles W., S Sgt.
Willbight, Wilbur W., S/Sgt.
Wilson, George H., Lt.
Winger, George W., Lt.
Witter, Ray F., S Sgt.
Wolf, Raymond A., T/Sgt.
Wolfe, Robert W., S Sgt.
Womack, Hubert J., S Sgt.
Womble, Hubert H., Lt.
Wood, Jack K., Lt.
Wood, Thomas M., Sgt.
Wouffer, Robert D., T/Sgt.
Wright, Frank C., Lt.
Wright, Robert L., Lt.
Wright, William E., Lt.
Wyatt, James L., Lt.

Wyatt, Kirk K., Sgt.
Yates, Lawrence A., Jr., S/Sgt.
Yates, Will A., Lt.
Yerington, Edward R., Lt.
Yorum, Donald C., T/Sgt.
Yost, Harold N., S Sgt.
Youmans, Charles F., Lt.
Younn, Charles S., F/O
Younn, Frank, S/Sgt.
Younn, James D., Lt.
Younn, Joseph J., Lt.
Younn, Robert E., Lt.
Yuschak, Edward, S Sgt.
Zablocki, Walter A., T/Sgt.
(& OLC)
Zaruba, Leroy E., Lt.
Zeger, Wilbur M., S Sgt.
Zendejosi, Luis T., Capt.
Zenz, George R., Sgt.
Zettlemoyer, Earl N., S Sgt.
Zielaskowski, Alfred M., T/Sgt.
Zimmerman, Earl, T/Sgt.
Zimmerman, William R., Lt.
Zink, Grover A., Lt. (& OLC)
Zubko, Boris M., Capt.
Zwicker, Henry R., Lt.

MEET BURMA

(Continued from Page 42)

A rainfall of over eighty inches, on the right soil, will cause the growth of the tall jungle trees, with crowns forming a dense canopy overhead. Ground vegetation may be almost absent, or there may be a carpet of ferns or a tangle of cane, creeping bamboo and palms.

Probably the commonest vegetation in Burma is a combination of oak growth and grassland. It occurs in the hills from about 3,000 to 5,000 feet, where frosts occur. The oak forests retain their leaves the year round. Mixed in with the oak, and sometimes in extensive areas of light sandy soil, are pine forests.

On the east side of the Arakan Yoma moist teak forests form a zone between the oaks and the dry deciduous forest of the central Burma basin. Another valuable kind of timber is the pyinkado, which grows farther south than the teak.

There are a number of special precautions that may be useful for men operating in the Burma area. These are in addition, of course, to the usual warnings about avoiding mosquitoes, treating scratches quickly, purifying water and refraining from eating uncooked local foods:

Consult the headman in a village for permission to make camp nearby, attend festivals or make purchases.

Respect the Buddhist monks. Drop a coin in their "begging bowls."

Learn the Hindu caste marks. They are "insignia."

Don't pay the first price asked by a Mohammedan or an Indian. It is part of his fun to haggle. But a Burman won't bargain.

Be generous with cigarettes and tobacco. All Burmans smoke, including the children.

Try to learn the differences among the various peoples. They don't like to be confused.

Don't gamble with the Burmans. They take gambling seriously -- and lose hard.

Don't touch the food of Hindus or allow your shadow to fall across it. Only special castes may prepare food.

Don't offer milk to Nagas and other hill tribes. They regard it as impure.

Don't show the soles of the feet to Mohammedans or touch them with the left hand. Don't eat with the left hand before Mohammedans.

Don't touch anything in pagodas, temples or shrines.

Don't mutilate trees. Many of the local people are animists and consider trees the dwelling place of spirits.

Respect the various religious and social beliefs. Remember, as a foreigner you have no standing.

Stay out of political arguments of local peoples. ☆

Answers to Quiz on Page 38

- (a) 1,100 miles
- (c) Forward. To assist the pilot and co-pilot in leaving the plane
- (a) The mixture in the carburetor is too rich
- (c) The Canal Zone
- (c) Single-engine, single-place, low-wing monoplane with inverted gull wings
- (c) In the Mediterranean
- (b) Two seats, one behind the other
- (d) Florida
- (b) A navigational computer
- (a) Twin-engine medium bomber
- (c) Off the Chinese mainland
- (c) 100
- (b) The Netherlands
- (a) To call for help
- (a) True
- (b) False
- (a) 35 gallons
- (d) A meteorological term referring to a downward motion of air
- (a) Single-engine fighter
20. Left to right: P-39, P-40, P-51

MISTAKES IN 'ON THE LINE' PICTURE ON PAGE 61

1. The sergeant sitting on the left is holding the oxygen recharging hose in what appears to be a dirty, greasy hand. Grease will contaminate the fittings, may come in contact with oxygen and cause an explosion. One of the high points of this month's picture is the dire hazard of grease coming in contact with oxygen, potential cause for demolition of the entire airplane. See TOs 03-50-1, 03-50A-1 and 02-20EF-2.

2. Now, getting around to those oxygen cylinders, the one on the right is upside down. In order to attach tubing from the cylinder to the correct connections, much tubing and time have been wasted. By connecting the right way—with the check valve at the bottom of the bottle—the least amount of tubing is used which, with the fewest possible connections, reduces chances of leaks.

3. Because the check valve is hooked up backwards, the fittings are crossed. On both bottles the distributor is running into the filler valve. The sure way to hook up properly is to refer to the arrows on the valve to show which way the oxygen will flow. If the hook-up is backwards the oxygen will leak.

4. The flexible hose on the distributor line running from the pressure gauge into the turret is too loose. When the turret turns, the line will be chafed and possibly wear through and burst. Clamp the line securely to prevent rubbing.

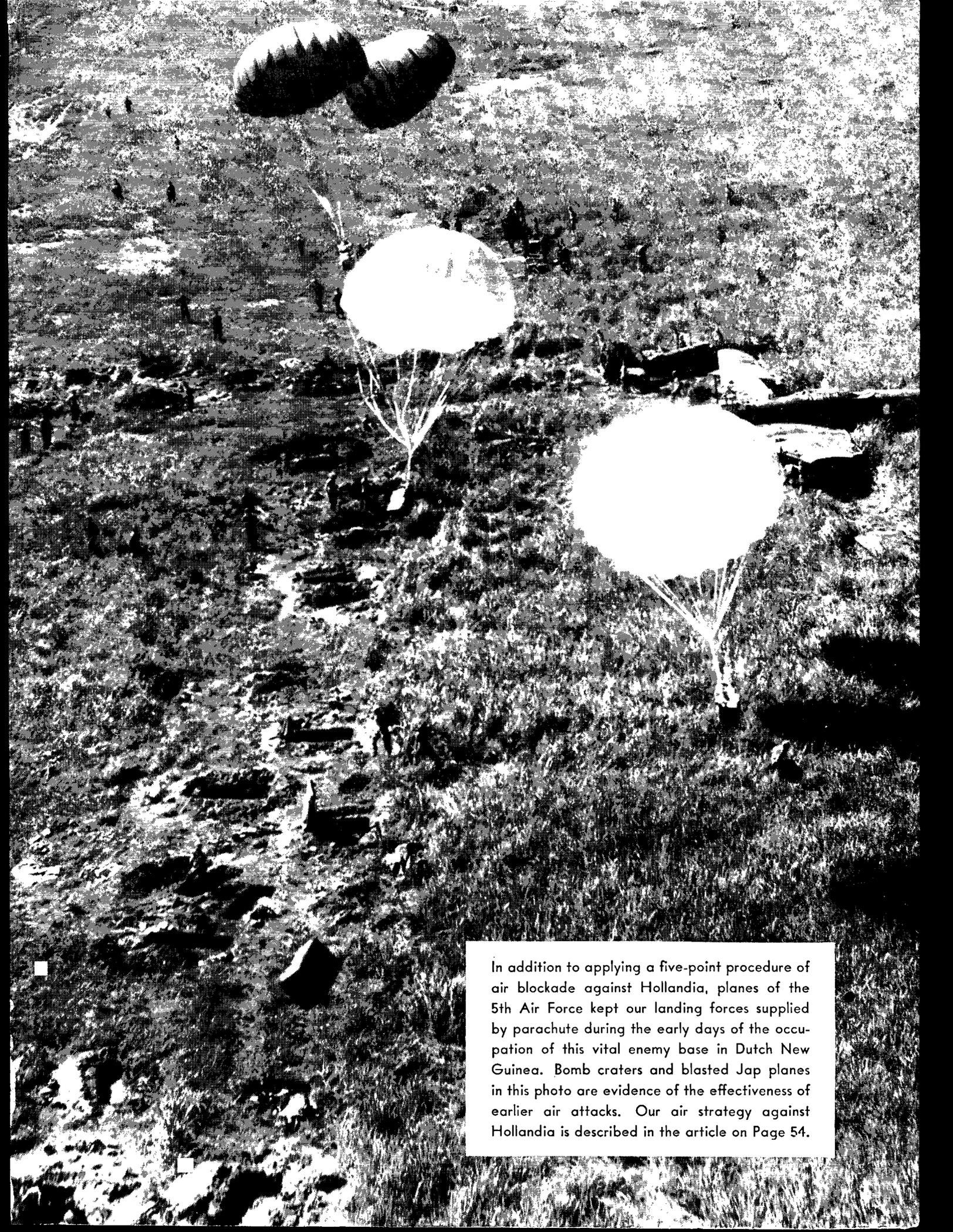
5. There is a kink in the line running from the filler fitting to the check valve on the right bottle, caused by not forming the line properly. The kink will restrict the oxygen flow and promote danger of the line's bursting from pressure.

6. A nick at no time does an oxygen cylinder any good! Ground personnel, prone to mishandle cylinders, drop them carelessly and subject them to various forms of nicks and dents. These dents weaken the metal and vibrations of the airplane crystallize the dented places. Further vibrations may result in open cracks. That's why handbook AN 03-50C-3 was prepared—to explain proper handling of oxygen cylinders. Have you read it?

7. Nix on that dirty, greasy rag parked on the turret. Repeat: TOs 03-50-1, 03-50A-1 and 01-20EF-2.

8. We've seen everything now, with the sergeant tightening a distributor connection with a ten-inch crescent wrench. Use the proper 5/8-inch open end wrench, please. Too many inch pounds easily strip threads or break off the flare on the tubing.

9. Is it? Yes, it is a can of ordinary thread lube the sergeant on the right is holding. See TO 03-50C-3. If he uses this on fittings, grease will get into the system, cause immediate explosion. Use standard thread compound, Spec. AN-C-86, recommended in TO 03-50-28.



In addition to applying a five-point procedure of air blockade against Hollandia, planes of the 5th Air Force kept our landing forces supplied by parachute during the early days of the occupation of this vital enemy base in Dutch New Guinea. Bomb craters and blasted Jap planes in this photo are evidence of the effectiveness of earlier air attacks. Our air strategy against Hollandia is described in the article on Page 54.

team track. *Railroad.* n. A track on which freight cars are placed for loading or unloading by shippers and consignees. *Colloq., U. S.*

team'work' (tēm'wûrk'), *n.*

1. Work done with a team, as distinguished from that done by personal labor.

2. Work done by a number of associates, usually each doing a clearly defined portion, but all subordinating personal prominence to the efficiency of the whole; as, the *teamwork* of a football eleven;

or the teamwork of the AAF!

(1) *n.* [AS. *tāen-*

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AIR FORCE

THE OFFICIAL SERVICE JOURNAL

OF THE U. S. ARMY AIR FORCES



To Normandy by Air

AUGUST 1944



This armada of 15th Air Force B-24s is blasting an oil refinery at Ploesti, long one of its vital targets. The attack, which occurred on May 31, left the cracking plant, storage tank area and oil pumping station in flames, and reduced the plant's oil production 90 percent. This attack was part of an offensive coordinated with the 8th Air Force and aimed at blasting Nazi oil plants throughout industrial Europe. For a report on this strategic offensive, read "After D-day" in this issue.



CROSS COUNTRY

SPEAKING as a magazine, we are more than a little interested in what you do with this copy of AIR FORCE after you have finished reading it. If you fail to pass it along, you may be preventing others from seeing a copy of this issue. The number of copies of your service journal distributed each month is great, but the AAF is a big outfit spread all over the globe. Our bulk distribution plan is dependent on your cooperation in sharing every copy with other readers.



AAF Regulation 20-13 redesignates the Assistant Chief of Air Staff, Materiel, Maintenance and Distribution as Assistant Chief of Air Staff, Materiel and Services, with responsibility for "complete control and supervision over the activities assigned to the Director, AAF Materiel and Services." The latter organization, just created, combines the Air Service Command and the Materiel Command. Maj. Gen. O. P. Echols is the Assistant Chief of Air Staff, Materiel and Services. Lt. Gen. W. S. Knudsen is the Director, AAF Materiel and Services with Maj. Gen. Bennett E. Meyers as his deputy. Maj. Gen. D. H. Dunton is commanding general of the Air Service Command, Brig. Gen. K. B. Wolfe of the Materiel Command.



To maintain proficiency among aerial gunners, the WD has announced that a limited number of AAF commissioned officers (within the continental limits of the USA) will attend the new course of flexible gunnery officers at the AAF Instructors School, Laredo, Tex. Graduates will be rated Aircraft Observer-Flexible Gunner and will be on flying status.

With need for such officers recognized, their work carries on from where basic gunnery school leaves off. In addition to continuing instruction in flexible gunnery and keeping gunners abreast of tactics, equipment and accessories in bomber aircraft, the combat gunnery officer acts in liaison, first, with the armament officer to assure proper maintenance of equipment; second, with the operations officer and other agencies to coordinate the planning of tactical operations.

The gunnery officer is a combination of efficiency expert and godfather to the aerial gunner. To understand the gunner's problems, he will serve as gunner on occasional missions. The TO of bombardment units has been changed to provide a flexible gunnery officer in place of the assistant operations officer-pilot. He will

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August, 1944

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BLUE STARS

and



RED STARS

By Maj. Albert Lepawsky

Commandant, Eastern Command Headquarters, USSTAF

Major Lepawsky, author of the accompanying article, was one of the original thirteen officers sent to the USSR to set up the Eastern bases for the AAF shuttle bombing system. He was adjutant of the pioneer cadre and served as executive officer at a fighter base in the Soviet Union before becoming commandant of Eastern Command Headquarters. Formerly historian for USSTAF, ASC, he now, in addition to his other duties, is historian for the Soviet project.

As the formation of B-17s roared over an airdrome somewhere in the USSR, the leader broke away, circled and came in on the mile-long runway.

The other planes swung around to land and the bomber on the strip taxied behind a shepherding jeep to a dispersal point. There, Lieut. Gen. Ira C. Eaker, commanding general of the Mediterranean Allied Air Force, stepped from the Fortress and walked toward the control tower amid the cheers of men of two allies.

Taking off from Italy a few hours earlier, the B-17s had attacked the Nazi marshalling yards at Debrecen, Hungary. Now, far across the Continent, they were methodically descending, one by one, on a new base for AAF operations in the USSR.

It was an historic moment. It signified the completion of a triangular shuttle bombing system by the AAF, which now

was in a position to pound the enemy from three approaches. Waiting to greet General Eaker at the control tower that auspicious June 2—four days before the land invasion of Western Europe—was a group of Americans who had played leading roles in the creation of the Eastern bases, necessary for the England-Italy-Soviet Union triangular shuttle.

Lone civilian in the welcoming party was W. Averell Harriman, American ambassador to the USSR, who, at President Roosevelt's direction, had laid the economic and diplomatic foundations for the project through Lend-Lease and the Moscow and Teheran conferences.

Other greeters were Maj. Gen. John R. Deane, chief of the United States Military Mission in Moscow; Maj. Gen. Robert L. Walsh, chief of AAF operations in the USSR, and Brig. Gen. (then Col.) Alfred A. Kessler, Jr., commanding officer of the Eastern Command, USSTAF. These three were the ranking representatives of many

Men of the AAF and their Soviet allies live and fight together as bases are established in the USSR for the triangular shuttle bombing of Nazi Europe.

other AAF officers and enlisted men who had been stationed in the Soviet Union to set up the new bases.

In establishing the shuttle's eastern terminal, the AAF was faced with a prodigious task. Shuttle bombing is one of the latest stages of strategic development in the air war. It is a new twist to the already perfected AAF bombing technique of high-altitude precision attacks upon key targets by daylight.

The shuttle operation can gain its full effect only when base facilities at all ends of the shuttle are of the same standard. In order to maintain the relentless schedule demanded, planes must be sent into the air as promptly from one terminal as from another.

Furthermore, unless the facilities of the new bases are as adequate as those of the previously existing bases, the general average of performance will drop. We learned that from experience with our first shuttle—that between England and North Africa.

To establish new bases in a far corner of the globe and then immediately to give them parity with older bases in more accessible locations was no easy matter. True, the AAF had plenty of skilled personnel and superior equipment and supplies, and it knew the proper procedures and techniques to be utilized in blasting the enemy. Transplanting these elements to distant points was the big problem.

The project required vast shipments of equipment; a constant flow of personnel



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The project required vast shipments of equipment; a constant flow of personnel

and supplies; an elaborate system of communications connecting the Soviet base area, the United Kingdom, Italy and Moscow; a new type of coordinated field order; Soviet clearances and escort, and creation of a corridor for AAF planes through a front that had been so well sealed off to daylight operations from the West that even returning Red planes were in danger from their own defenses.

But despite its magnitude, the job was completed on schedule. Through its efficient shuttle system, the AAF tied together the Eastern, Western and Mediterranean fronts over the roof of Europe. It turned the handicap of distance into an advantage. For by enlarging its choice of targets and routes, the AAF forced the enemy to spread his defenses. The result would be more confusion for a Nazi air force already strained by its increasing commitments on new Allied fronts.

BUT neither AAF brains nor ingenuity could have achieved successful conclusion of the tremendous undertaking without the genuine cooperation of the Red Air Force. The job was done by a mixed team from top to bottom.

In previous experience in inter-Allied military operations, mixing of personnel of separate nations occurred only at headquarters, with very few exceptions. In the field, units up to the size of squadrons and battalions were usually kept intact.

In the Soviet-American project, however, personnel were deliberately mixed down to the smallest element. The objective was to merge the specialized skills of the AAF in strategic bombing with the Soviet manpower necessary to help maintain base services.

This circumstance arose partly from the infeasibility of setting up a complete all-AAF organization for the project, partly from the practical Soviet policy of restricting Allied operations on Soviet soil to what were absolutely necessary, and partly from an experimental point of view, for each air force wanted to feel the other out and discover how they could best work together.

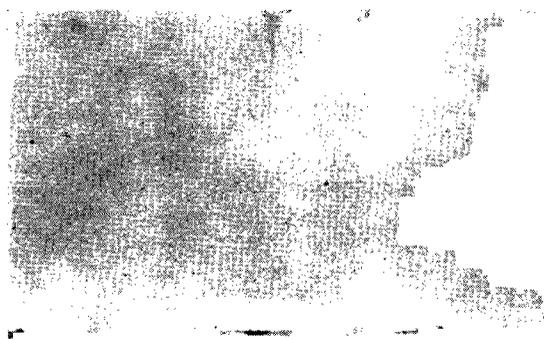
They found they could work together perfectly. Everywhere that was in evidence. It resulted in the finest of feeling between the men of the two allies.

On a typical day, American and Soviet officers could be seen huddled over a diagram inside an American tent, designated by a neat sign in both languages as Soviet command headquarters. In an orchard on the edge of an airdrome, AAF and Red pilots compared notes on tactics, not so much in words as in the universal sign language of airmen. On the line, ten Soviet mechanics worked on a B-17 under the direction of an AAF crew chief.

Close by, a team—half Soviet, half American—was loading bombs. Two signalmen, climbing adjacent poles, wore fatigues so similar that the American could

be distinguished from the Red soldier only by the latter's flight cap with its small red star with hammer and sickle insignia. At headquarters mess, American and Soviet officers ate at the same tables. A Red officer helped himself to American canned milk while an American officer sipped his tea, spoon-in-cup, Soviet style.

As an emergency supply convoy sped between two American bases, it could be seen that the drivers were Red soldiers and that the trucks were American—some Lend-Lease equipment bearing Soviet insignia, the others AAF equipment with American markings. From a jeep which darted along the column, an American officer shouted instructions in a lingo that was half Russian, half English. And the Red drivers yelled back the American expression: "OK."



Completing the AAF's inaugural shuttle bombing mission from Italy to the USSR after attacking Nazi marshalling yards in Hungary, leading B-17s have landed while others peel-off to come in.

Even in the air, which is the most delicate testing area of a man's ability to work with his fellows, the experiment met with great success. In certain non-combat flights, Soviet airmen were assigned as opposite numbers to AAF crew members. The results were good despite a language problem and differences in flying habits.

Soviet pilots like to fly on the deck more often than Americans do. They also put their tails down a little sooner and a little longer and they mix their stunting with routine flying. We found, too, that the Red flyers prefer to use magnetic rather than true bearings, that they reverse our plus and minus signs to designate magnetic variations and that they interchange our terms for "heading" and "course."

The AAF's elaborate control tower procedures and ground-to-air communications had to be coordinated with the Soviet visual signal system. We learned to watch our flares more carefully. There was the amusing incident of one of our Mustang pilots on day alert taking off without carefully checking the flare color. He

soon found himself at 10,000 feet, flying with a formation of Soviet fighters in what probably was the first mixed tactical operation of this type.

We began also to realize better the need for recognizing our Allied planes. Not that our pilots had made the mistake of firing at friendly aircraft. But in their anxiety to avoid such an occurrence, they had missed several kills in combat.

As far as personnel was concerned generally, the Soviet forces not only furnished the greater part of the manpower but they organized a new type of technical, engineering and service battalion, necessary to supplement the special cadres of officers and non-commissioned specialists assigned to the project by the AAF.

Symbolic of the Reds' cooperation was their organization chart. To depict the

Sometimes routine arrangements would meet a temporary impasse, but matters would be straightened out as soon as we saw each other's slant.

During the unloading of initial supplies at one of our stations, for instance, the Reds insisted upon moving the heavier and bulkier materiel first, leaving us the job of handling many classes of complicated aircraft parts and equipment at night. But after we explained that there were thousands of delicate parts that had to be unpacked and binned according to a definite system of classification for supply and maintenance purposes, they gave the unloading of this materiel priority.

After all, these lessons in American technology were what the Soviets wanted to learn. Our duty was merely to make the reason behind our procedures clear to them. Once they understood, they would go along with us.

The Reds' desire to carry out their assignments faithfully and diligently was demonstrated time and again. We saw Soviet officers, who had accompanied our supplies on the long trek from remote ports, spend hours tracing one box of equipment which was on their manifest but somehow had gone astray.

Another unforgettable scene was that of a Soviet sergeant crying like a baby because he had run over a stump and bent slightly the crankcase of the new American vehicle he had so carefully washed and serviced that morning.

Long hours meant nothing to the Reds when there was a job to be done. On one occasion, our chief engineer noticed that the same Soviet engineering crew was working a long shift every day on our installations. He suggested to the Red engineering chief that it might be better to adopt the American method of splitting the men into two crews and work one from 0400 to 1200 and the other from 1200 to 2000. The Soviet officer agreed it was a good idea. He divided the men into two crews but the next thing we knew he was working both of them from 0400 to 2000.

Regarding hours generally, however, we found the Soviets were modifying their program rather than requiring us to do in Rome as the Romans do. They even changed their mess schedule to conform with American custom. It soon was breakfast at 0700, dinner at 1200 and supper at 1800 rather than the Soviet habit of meals at 0900, 1400 and 2000.

We, too, learned to make concessions along these lines. At one of our stations, we substituted the Soviet custom of tea, bread and cakes at 2200 for the American habit of raiding the ice-box before bed-

time. And we became accustomed to being aroused from sleep anytime after midnight for either a routine or emergency conference with the Soviet officers, including the commander himself, Major General Perminov, who was decorated by the United States with the Legion of Merit medal for his energy and effort.

In their friendly desire to provide us with every facility, comfort and convenience, despite their own supply shortage, the Reds faced us with many problems. Not content to furnish us with well-sprung steel beds with straw ticks, they later insisted upon substituting soft cotton mattresses and adding fine pillows,

messhalls and living quarters came from forests miles distant, sometimes by primitive transportation. Delay in construction was caused also by the Soviets' insistence upon their fanciest workmanship.

Before we could set up our own feeding arrangements, our enlisted men and officers were royally fed by the Reds. Nothing but the best was the order and some of the fine foods had to be shipped from vast distances.

We finally persuaded them to substitute long tables for private foursomes and large boarding-house style dishes and some elements of the cafeteria plan for their many courses and their small dishes



S/Sgt. R. E. Robinson of Huntington, W. Va., examines Soviet Army woman lieutenant's shoulder stars at a base in the USSR. Above her pocket she wears AAF insignia given her by American GI.



First AAF shuttle plane to land in the USSR was this P-38, piloted by Col. P. T. Cullen on a photo reconnaissance mission from England a week before initial shuttle bombing run from Italy.

although we preferred our army cots and our very comfortable sleeping bags.

They proudly delivered to our billets the few unshattered mirrors remaining in the locality and the shiny cuspidors which they thought we needed and which we faithfully used so they wouldn't think us ungrateful. Soviet-built American latrines were the proudest display for miles around.

Poles, logs and lumber of the only type considered good enough by the Reds for the construction of our control towers,

for each person. They insisted, however, on retaining tablecloths, napkins and table flowers.

When later we shifted to American food, the Reds at some of our stations gave up their tasty native dishes and became part of our mess. We, in turn, re-adopted several Soviet dishes. As a result we continued to eat and live as well as work and fight together.

The difference in languages caused less difficulty than was anticipated. In his commendation to the entire command



Red Army women unload and assemble steel matting used to form runways at bases in the USSR for AAF shuttle bombers. The women won the admiration of the Americans for their drive and efficiency in performing hard tasks.

after the completion of the first shuttle run. General Kessler declared that despite the "difficulties of establishing new bases under unfamiliar conditions . . . you have demonstrated that the language barrier is fictitious among those who have a common objective and are willing to work unselfishly toward its attainment."

In part, we owed our thanks for the convenient situation to a corps of clever Soviet interpreters who were so anxious to talk English that we found it increasingly unnecessary to learn Russian. Among our own men, however, we had a few expert interpreters and a larger

number of Americans of Russian descent whose bi-lingual talents were indispensable to the project.

We found the best language lessons for the rank and file came simply from working and living together. In this, our enlisted men were generally more adept than our officers. After only a couple of weeks, with the help of the small U. S. Army language guide containing useful phrases, the most amazing type of conversation could be heard at our bases. It wasn't the purest form of grammar, but it served the purpose.

In one instance, we had the novel arrangement of a Yiddish-speaking Soviet

soldier and a Yiddish-speaking American GI working a ring-around-the-rosey by translating for their officers from Russian to Yiddish, from Yiddish to English, from English back to Yiddish and thence to Russian again.

Sometimes, but not often, we were blocked by the meaning of technical terms because of national differences. One of the cleverest Soviet interpreters could not quite understand one of our personnel tables because only one percent of the strength was recorded under "Labor."

"Isn't every soldier a worker or a laborer?" he asked incredulously.

(Continued on Page 44)

AFTER -DAY

As the excitement attendant to D-day subsided and the Allied armies began the slow grind across the rain-soaked fields of Normandy, observers who had feared that air power might lapse into a secondary role in the European theatre or at least fail to produce new and interesting developments, found they were very much mistaken. In the weeks following the invasion, despite heavy tactical demands from the battle front and the worst English summer in forty years, Allied airmen produced three developments of major importance and carried one long-range strategic plan to a brilliant climax.

That plan, the destruction of the German petroleum industry, had been one of the keystones of Allied grand strategy ever since 1942 when the Germans failed to conquer the oil-rich Caucasus. The spectacular attack by five groups of Liberators on the Rumanian refineries of Ploesti in August, 1943, was the first important American thrust. By the end of June, 1944, the RAF and AAF between them had carried out attacks on all the active refineries of Germany and her satellites. It was an effort that rivaled in importance the great winter blitz on the aircraft industry of the Reich. The results promised to be equally catastrophic for Hitler and his henchmen.

Significant though it was, this phase of strategic bombing received comparatively little publicity, partly because the press was preoccupied with invasion news and partly because the airmen, recognizing that they were not petroleum experts, preferred to wait for competent oil authorities to examine the PRU photographs and make final analyses and statements. But a simple summary of the air facts involved in one of these gigantic blows serves to show the striking power of the British-based heavies.

The most devastating attack came on June 20 when a record number—very nearly 2,000—of Fortresses and Liberators were dispatched against oil plants and military targets inside Germany and against the flying bomb installations of Pas de Calais. The heavies were escorted by more than 1,100 fighters. The Germans, who had weakened air defenses in the Reich in an effort to support their troops in Normandy, offered what resistance they could but were unable to prevent major damage to twelve separate oil



By Maj. Arthur Gordon

AIR FORCE Overseas Staff

plants on which they relied for 250,000 tons per month. Nine different targets were attacked in the Hamburg area by a force of several hundred B-17s which met no enemy fighters. Liberators, attacking the synthetic oil plant at Politz, ran into the stiffest opposition from about 100 rocket-firing twin-engine and single-engine fighters. This did not prevent them from scoring direct hits on boiler houses, hydrogenation units and other vital installations. Similar results were obtained at Misburg, Magdeburg, Ostermoor and Sterkrade.

To the Germans, hampered by shortages of skilled labor and materials for repair, harassed by transportation bottlenecks caused by bombs on marshalling yards and mines in the Danube, such a day must have ranked high on the list of national disasters. Their desperation could be judged by the ferocity with which they resisted a similar attack on the Leipzig area July 7. For the first time since D-day a major air battle ensued. Our fighters caught the Germans bunched for an attack on one of the bomber boxes and shot down the astonishing total of 75, losing only 6 themselves. The bombers, at a cost of 36 Fortresses and Liberators, accounted for 39 more. The loss of 114 aircraft in one battle was a blow that the groggy Luftwaffe could hardly afford but the Germans had no choice. Their armies in the field could fight stern defensive actions with little air support, as in Nor-

mandy, or with none at all, as in Italy. But the same armies could not function without oil.

There was considerable temptation to connect these attacks on the oil industry with the lack of fuel about which Panzer prisoners taken on the beachhead were beginning to complain more and more bitterly. But such shortages were probably caused more by the disruption of communications than the exhaustion of reserves. In any case, the planners of the oil blitz refused to count their chickens until hatched. They preferred to take the long-range view, which was that every oil refinery smashed brought the end of the war closer by an appreciable period.

As for developments in the air war in the month that followed D-day, the Allies produced three, and the Germans one. The Nazi contribution, for sheer novelty, was in a class by itself. The Allies introduced triangular shuttle bombing between Britain, the USSR and Italy, large-scale daylight bombing by the RAF, and high altitude precision fighter-bombing. Meanwhile, out of their battered top hat the Germans produced their Vergeltungswaffe, or vengeance weapon, the flying bomb.

The advent of the flying bomb did not surprise many American airmen. For months Marauders of the 9th, heavies of the 8th and fighters of both air forces had been hammering at launching ramps and installations on the French coast. Flying bomb sites were usually well concealed but fairly vulnerable to accurate bombing. Bombing was so effective that when the invasion finally goaded the Germans into using the weapon it was on a scale far smaller than they had hoped. Some experts estimated that the attack was six months behind schedule and that pre-invasion bombing had reduced it to about ten percent of the intensity planned.

Defensive measures such as anti-aircraft fire, fighter interception and barrage balloons accounted for a growing percentage of the missiles launched. Some got through, grumbling over southern England like asthmatic motorcycles. Allied airmen admitted that our raids on the bomb sites gave some respite to German targets.

The British press speculated openly about larger concrete sites on the French coast supposedly designed for launching giant rockets against British targets.

Our correspondent in the ETO reports on post-invasion highlights of the air war.

Twelve-thousand-pounders dropped by Lancasters made some dents in these structures. The areas around them were literally chewed to pieces by hundreds of bombs of all calibers.

More significant from a military point of view were the three major Allied developments. The shuttle flight of British-based heavies to the USSR on June 21, a day in which over 1,300 bombers hammered Berlin and the Pas de Calais area, was important insofar as it tightened the aerial noose around the Reich and gave Americans and Russians a chance to look at one another. The aircrews, escorted by American as well as Soviet fighters, met little opposition enroute. After five days, they proceeded to Italy, bombing oil refineries in Poland without loss. A few days later, they were back at their bases in England.

Strictly speaking, the introduction of daylight attacks by heavies of the RAF was not an innovation. The RAF had been out in daylight before. But June and July attacks on flying bomb sites and tactical targets in the battle area, culminating in the heavy blitz on Caen just before its occupation, indicated the degree of air supremacy the Allies had attained. Safe from interception by enemy fighters, the lightly armed night bombers could and did carry heavier loads than Fortresses and Liberators to short-range targets. It was not too farfetched to foresee the day when German air strength would be so depleted that Lancasters and Halifaxes, with adequate long-range fighter cover, might vary their night missions with an occasional daylight thrust deep into Europe.

THE third development was announced rather quietly and almost escaped the notice of the press, which was devoting itself wholeheartedly to the flying bomb furor. Most of the papers simply ran a three-line announcement to the effect that P-38 Lightnings were now carrying out precision bombing from 20,000 feet and higher.

Details as to how this was being accomplished were still classified but the implications were highly interesting. When planes as fast and self-reliant as the Lightnings begin nailing precision targets from such altitudes, each plane carrying a pair of 1,000-pounders, thereby risking only one man for every ton of explosive dropped, that's impressive from an economy standpoint if for no other reason.

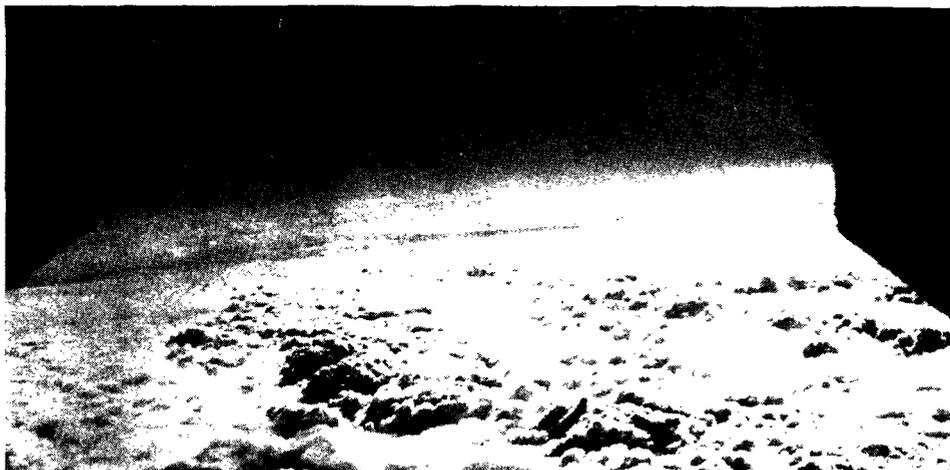
The new tactic is still in the diaper stage. At best it's a secondary function for planes whose primary job is still es-

cort work and the destruction of the Luftwaffe on the ground and in the air. But the other day a squadron of Lightnings picked a secondary target—a railroad bridge over a river—and knocked out three spans. From 12,000 feet with only sixteen planes bombing, each carrying two 1,000-pounders, that was pretty good shooting. It indicates that the big, twin-engined fighter is a steady bombing platform, that its great speed may actually make corrections during the bomb run easier and quicker, and that the bomb pattern can be easily controlled by varying formation flying. The results are not always so impressive—as usual in the ETO, problems of navigation and target recognition are the main handicaps.

The fighter is not yet likely to outshine the bomber at the bomber's own game. But this much is already evident. High altitude fighter-bombing can place explosives on targets outside the range of the mediums. It can get them there faster with more element of surprise and with smaller loss expectancy than the heavies.

It is less dangerous and likely to be more accurate than dive-bombing. It has limitations but it may turn out to be a very economical way of hurting the Hun.

The only friend that the Luftwaffe seemed to have in the weeks immediately following D-day was the weather. Rain and solid overcasts in Britain and Normandy gave Jerry a chance to patch up his communications and improve their serviceability to a point where in mid-July he began to fly a respectable number of sorties in support of his ground troops. But nobody seriously doubted that with the reappearance of good weather Allied air power would again reduce the forward German bases to virtual impotence. As the high noon of summer approached, it was evident that no matter on which front he fought, the German infantryman was going to have to meet our own foot soldiers under a canopy of Allied planes. How well he could fight under such conditions, or how long he would continue to try, was anybody's guess. Most of the guessers omitted any mention of 1915. ☆



Bad weather has been the German's staunchest ally. This photograph, taken through the open bomb bay of a B-17 over Berlin, gives an idea of what solid overcast looks like to a bombardier.

Heavies of the 8th and 15th Air Forces are striking crippling blows against the Nazi war machine in a far-reaching strategic bombing of German oil centers. Climax of the offensive was the June 20 attack at Hamburg on the Deutsche Petroleum and Harburg refineries, burning below







INVASION OF FRANCE

During the twenty critical days from D-minus-10 to D-plus-10, the 9th Air Force dispatched almost 40,000 planes and contributed a large share in the task of keeping enemy reserves from the assault area. It dropped and supplied two airborne divisions, built more than four airfields on the Continent, and destroyed a large number of Jerries and their equipment. In this and following articles, Air Force's correspondent just returned from France tells how American air power played its vital, complex role in the historic assault.

By Capt. Luther Davis
Air Force Overseas Staff

ON the afternoon of D-day three frightened infantrymen jumped into a foxhole on the beach and found in it a bunch of GIs wearing 9th Air Force patches.

"Jeest," said one dogface, "we didn't expect to see you air force guys for months yet."

This was the general reaction of groundlings to the large number of 9th Air Force men in France. At one time the advanced headquarters of the 9th was several hundred yards closer to the enemy than the most forward ground force command post. The AAF is in excellent repute in the assault area and our stock is riding high.

Much of this respect is due to the 9th Air Force, which was as much an integral part of the invasion as the First Army or the men who drove the Dukws. This was true from the very beginning of planning in which the 9th was given a variety of missions, varying according to the phase of operation. The plan established the first phase as preliminary from D-



minus-30 to D-minus-3, during which the 9th was "without prejudicing security of the plan, to cut such rail communications as will directly hinder the rail moves of the enemy reserves to the assault area."

To keep from "prejudicing the plan," it was decided that for every rail bridge in the critical area bombed, the 9th must bomb others outside the area. That the 9th succeeded both in its bombing and in not prejudicing the plan is proven by the fact that the entire operation is considered officially to have achieved tactical surprise and that as yet no single large enemy formation is known to have reached the battle area completely intact or on schedule.

This was done by many methods but the most impressive was the cutting of thirteen of fourteen road and rail bridges across the Seine and a like number—under the security plan—across the Meuse. All but one of these were bridges cut by the 9th's fighters and bombers which also succeeded in keeping the enemy from repairing the damage.

As an example of the work done in this preliminary stage, let's take one typical day, D-minus-10, and see what the 9th was up to.

On this day the fighters flew 260 sorties as escort to 9th or 8th Bomber Commands, made 15 reconnaissance flights and dispatched 154 aircraft to drop a total of 15½ tons of bombs in dive, glide and skip bombing of airdromes, bridges and marshalling yards. On the same day 261 B-26s dropped 516 tons and 73 A-20s dropped 72 tons of bombs on airdromes, bridges and marshalling yards. All of this occurred on a fairly typical day of the preliminary stage with typically abominable weather.

The blasting of airdromes was covered by a statement in the plan that the 9th "will render all enemy airdromes within a prescribed distance of the assault area unserviceable." The idea was that the Luftwaffe would then operate under the same disadvantages as our England-based aircraft. This the 9th did not quite do because the Germans repaired their fields with astonishing swiftness, but, in making it unsafe to keep planes or fuel on these airdromes, the 9th forced Jerry to operate from distant fields and thus succeeded in the tactical terms of the task assigned to it.

Also, as a part of the preliminary phase, the 9th was given 21 coast defense batteries to work on before D-day-minus-3. Because of the security plan only seven of these 21 were in the assault area—two outside the area to one inside. The 9th's fighters and bombers gave these 21 targets a message such as has rarely been seen.

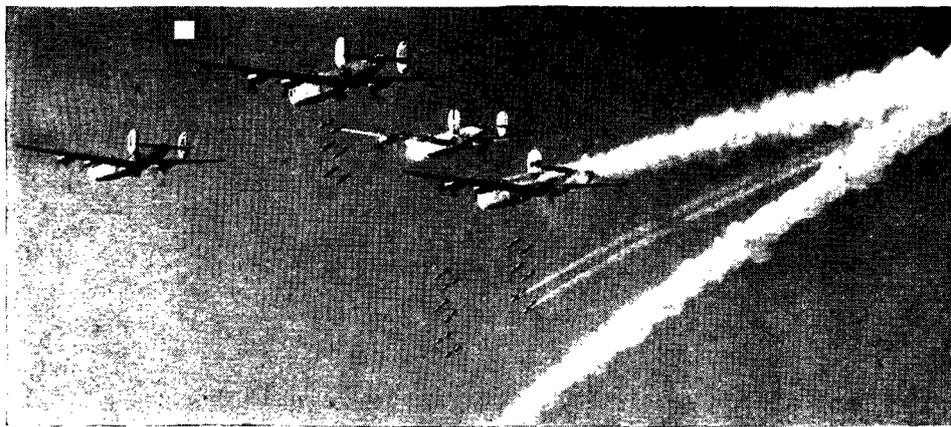


B-26s of the 9th Air Force smash rail junction behind German lines, preventing Nazi troop movement.

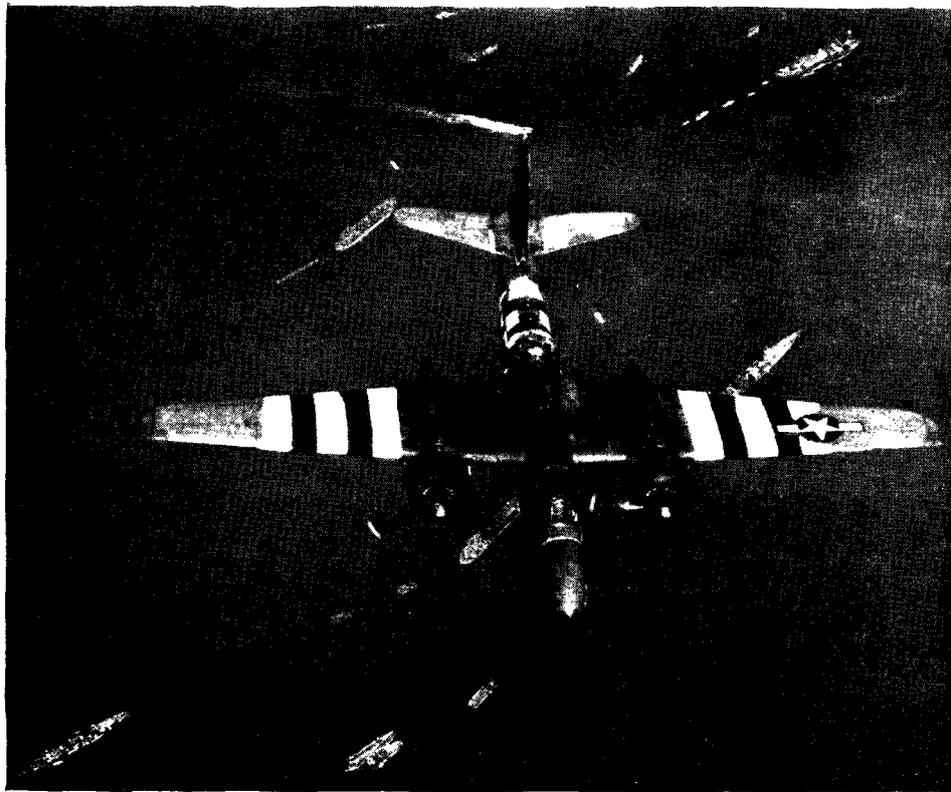
Some they destroyed but others were situated in concrete ten-feet thick. These General Brereton's boys pestered so thoroughly that Jerry prisoners now tell us that life in them became impossible. Communications and precision aiming instruments were so snarled and shaken that all were in a state of disrepair when our fleet arrived—and unloaded with astonishingly low casualties. Jerry knew what was happening and placed ack-ack around the guns in solid masses. In the main, the bombers just let them fire but when things were too tough, fighters dive-bombed the emplacements to keep the gunners' heads down while B-26s and A-20s worked. The answer is that the losses in the 9th have never gone above three percent.

During this stage the 9th's bombers

and fighters continued to attack enemy marshalling yards in France and in the Low Countries as a part of an overall plan of weakening his communications before D-day, keeping him from bringing materials for construction into the area, and as a means of making him use his marginal forces of labor in repairing rail routes when Jerry would much rather have set them all to work digging tank traps and emplacements along the coast. This attack on the western European rail system was the longest and most intense any railway has undergone. It started on February 9th, and between then and D-day, the 9th's bombers and fighters dropped 54,000 tons of bombs on targets in this category, completely destroying 13 marshalling yards, knocking out between



Big job for 8th Air Force heavies on D-day was hitting vital German installations. These Liberators unload their bombs on target with help of smoke marker probably dropped by lead plane.



On its way to hit a target in northern France, an A-20 passes Allied vessels bound for France.

50 and 60 locomotive depots (confirmed,) and wrecking more than 1,700 locomotives and 25,000 railroad cars.

All this had very salubrious results. For instance, we now know that this widespread damage caused stocks of coal vital to the war industries and to the trains themselves to be reduced to a day-to-day basis at most French stations; the repair shops, already over a year behind on routine maintenance and repair, were further discouraged and put behind while Jerry was forced to repair the trackage by tearing up rails elsewhere—hardly SOP in keeping up a railroad.

A FRENCH railroadman whom this correspondent interviewed in Bayeux said about his problems: "After a raid on one

marshalling yard, traffic frequently would be stopped for 100 miles around because signalling was made impossible and because all hands and equipment would be busy repairing the damaged area. The Boches had counted on robbing our railroads to keep up their own and the ones they needed in Russia, but instead they had to rob their own to keep up ours. It was magnificent."

The scale of effort slowly increased through this stage until we reached the preparatory stage (D-day-minus-3 to D-day.) Here the effort became all out on Seine bridges, finishing up in a blaze of glory with an even heavier pasting of the guns in the Cherbourg area. Throughout this stage the scale of fighter-reconnaissance flights was increasing from about

150 sorties per month to D-day, on which day the 9th alone flew nearly 250 reconnaissance flights.

In the preparatory stage, the 9th fighters and bombers went against more specifically tactical targets such as enemy headquarters, enemy fighter control stations, radar emplacements, road junctions and strong points on the beach—but still working under the security plan and not tipping their mitts.

All of which brings us to D-day itself. Bombers of the 9th were briefed on six special coast defense emplacements on the beach and on sixteen other strong points and told to hit them between H-hour-minus-30-minutes and H-hour. Coordinated with the bombers were the fighters who were given twelve batteries in the same area and told if they couldn't find them to get whatever was firing.

BECAUSE of their small size, these targets required good visibility, so you can imagine what was in the minds of the aircrews when they took off at four in the morning of June 6 with a ceiling of about 1,000 feet and visibility strictly non-operational. The only possible answer was for the mediums—which had been working at 12,000 feet since a year ago when their first low-level raid cost them 100 percent at IJmuiden, Holland—to go in on the deck. It was a tough decision but the boys carried it out and did it brilliantly. One naval observer says, "Solid packages of explosives seemed to fall right on the spots that had been worrying us most. As for those fighters, they came screaming in out of nowhere and unloaded so low I could actually see them being blown about by the blast."

Throughout what is called the Assault Phase (D-day through D-day-plus-1) the fighters were everywhere. The plan called for them to provide a curtain of P-47s for high cover over the beach, and P-38s as a part of the convoy cover. The Fighter Command also was charged with coordinating the participation of several groups of 8th Air Force P-38s in the convoy cover—the P-38 was chosen for this because it is so easily recognizable and we wanted no mistakes.

The Fighter Command also had to provide several groups of P-38s and P-47s for direct support of the ground forces, for bomber escort and for special request missions as they came up. The P-51s were briefed for special reconnaissance flights deep into enemy territory to see what was coming toward us. But that's not all—the fighters also had to provide escort for the 9th Troop Carrier's operations.

Having done their best to the coastal batteries and strongpoints, the medium and light bombers of the 9th Bomber Command were to attack enemy concentration areas, reserve areas, communications and motor transport, delay movement of enemy reserves and isolate fur-



ther the battle area. This area for us was roughly bounded on the north by the Seine, on the south by the Loire and in the east by a rail line running from the Seine to the Loire—known to the back-room boys as the Paris-Orleans gap. While the 9th's bombers massaged the actual battle area, they also went to work cutting the main line between Paris and Orleans. Later the 8th and RAF heavies went to work on the more distant Loire line. In this connection there is a story of a full German Panzer division which was seen by P-51 reconnaissance planes trying to get from northeast of Paris, around Paris and into the fight. Fighters and bombers went to work and that division is called destroyed—without ever getting within quaking distance of the main fight.

ON D-day alone, the 9th Air Force flew 4,351 sorties, as compared with 2,153 on May 18, previous biggest day. And they were flown in the face of weather that would normally keep any sensible air force quietly on the ground.

As for the weather we fought against, Col. Thomas S. Moorman, Jr., staff weather officer for the 9th, has this to say: "On only three of the ten days (D-day through D-day-plus-10) did we have the weather conditions which we consider optimum for medium altitude bombardment." Nevertheless, we went right on flying and on D-day-plus-1, the 9th beat its own D-day record by flying even more sorties—4,796. During the ten days that Colonel Moorman mentions, the so-called medium altitude bombers operated eight days and the fighters operated nine. Needless to say, there isn't much blind bombing you can do with friendly troops all over the place and consequently both fighters and bombers went in under the clouds—some B-26s bombed at 900 feet and the fighters practically moved around on their hands and knees.

During the ten days after D-day, fighters and bombers did what they had done on D-day except that by D-day-plus-7, the 9th Engineer Command had fields on the Continent from which fighters could operate during daylight hours. The fighters went in for something called "armed reconnaissance," which the Germans have learned plenty about by now. The technique is to put several groups on that assignment for a day, letting them relieve each other, and keeping someone up at all times. The reconnaissance comes in finding some Jerry motor transport or troop trains and the armed part is bombing and strafing it. The boys go in on everything, even single staff cars and motorcyclists. The usual practice is for a group to stick together—because when

Jerry jumps us he almost invariably does so in force—and for a certain percentage of the group to be unbombed, operating purely as escort.

There have been some German fighter reactions but on the whole his interceptions have been rare and fighter pilots are pretty browned off at not being able to run up scores. The main danger in these low-level operations is from ground fire since Jerry shoots everything from 88s to pistols at us. The losses, however, are not proportionately high although battle damage keeps maintenance crews busy.

Some of the typical problems besetting



During a visit to the Normandy front after D-day, General H. H. Arnold discusses the invasion with Lieut. Gen. O. N. Bradley.

fighter pilots can be seen from the following report of a post-D-day operation by some P-51s operating from England. They took off briefed to attack a railroad junction in the battle area and thereafter hit targets as the opportunity arose. When they arrived at the target they found the tracks torn up and locomotives smoking from a previous attack by other 9th Air Force planes which had foully got there first although definitely briefed for some other target. So the flight cruised over the area until one squadron leader saw some gasoline storage tanks hidden in a woods near the railroad. They all cried tallyho, but the first two planes down set them exploding and burning which left the rest of the group with nothing to shoot. After almost half an hour of cruising, one flight leader saw some gasoline trucks hidden in the shadows of some

trees along a roadside. They were promptly strafed and burned. Later another pilot saw what appeared to be six half-track armored vehicles on a road and took his flight down to strafe. Although they got several on the first pass, sudden unexpected fire from the trees on either side was quite disconcerting and made it seem possible that the whole set-up was merely a trap. The group commander did some talking and arranged it so one squadron would strafe the ack-ack in the woods while the others shot up the road. Within three minutes all the halftracks were orange with gasoline flame and only one of an estimated twenty AA guns was firing.

The 9th Bomber Command continued to go in as low as the weather dictated, one group having stogged around at 1,000 feet and still missed the target. A typical day for air support was seen on June 15 when the 9th was following the air support plan worked out by higher headquarters. The plan was: (1) to support the American Fourth Infantry Division and Seventy-ninth Division in a drive north of Montebourg; (2) to protect the southern flank of the American Ninth in their drive toward La Haye Du Puits; (3) prevent attack of a German parachute regiment at Carentan; (4) cover withdrawal of a British division from the Caen area; (5) attack and prevent enemy movement at Caen; (6) prevent enemy attack toward the eastern flank. As their part of this plan, B-26s and A-20s were assigned eighteen targets. They attacked twelve of these in the morning from zero feet and the six others in the afternoon from what one pilot called "submarine altitude."

The measure of success for all of us, from an aircraft worker in the United States to a line chief in Normandy, is that the invasion succeeded.

THERE is little doubt among staff officers here that if Jerry had been able to devote his labor in France to improving his defenses instead of repairing damage, had employed his air force in the manner and strength he had planned years ago, had moved his troops speedily and at will, our entire plan would have failed or have been postponed for at least a year. And the measure of the success of the 9th in particular is that if they had failed, all the good work of the rest of the team—yours and mine and the Forts and everybody's—would have failed, too.

They succeeded, as even Herr Goebbels admitted when he said, "Our troops are helpless against the overwhelming superiority of the American Air Force which is continually over the battle area in great strength." ☆

PLEASE pass this copy of AIR FORCE along! Share the service journal with every man in your unit.



The thorough treatment given airfields of the Luftwaffe in France is demonstrated in this photo taken shortly after heavies of the 8th Air Force had paid the area a visit. These attacks on Nazi airfields located

within striking distance of the invasion sector helped keep the skies clear of enemy aircraft. A string of Nazi trucks is shown on the highway at left in this photograph taken by an 8th Air Force reconnaissance plane.

Near Quineville, France, this heavy concrete fort with its large caliber coastal gun was shattered by air force and naval bombardment.

The photo below is striking evidence of the effectiveness of an RAF night attack on a marshalling yard located in a small French village.





OUR FIRST FOUR AIRFIELDS IN NORMANDY



French soil gets a coating of landing mats as AAF engineers ready a Normandy landing strip for business. Note invasion-marked planes at left.

A 9TH AIR FORCE pilot, flying an un-armed Cessna C-78, tried to land on the main Cherbourg airport more than a week before Cherbourg fell. Asked how he'd ever mistaken that large permanent airdrome for one of our advanced landing grounds, he said, "I hadn't been in France for two days. We build 'em awful fast, you know."

Not quite that fast, but he's right - awful fast.

Personnel of the 9th Air Force's Engineer Command clambered out of their assault boats on D-plus-1 with German 88s only fifty yards away. They found that the real estate chosen beforehand for their first emergency landing strip was still in enemy hands, so their commander, Lieut. Col. John J. Livingston, borrowed a half-track armored car and went shopping. Pretty soon he found a likely spot near the beach. There followed a day of talking the ground forces into letting us use it for it had been earmarked as a bivouac area. These discussions went on until the early morning of D-plus-2, when the ad-

Thanks to the 9th Air Force's own 9th Engineer Command we had airfields in Normandy before Jerry was sure we had come to stay. There was an emergency strip on D-plus-2 and real fields on D-plus-7.

vance detachment of Colonel Livingston's engineer aviation battalion went to work. There were 28 men, two bulldozers, two motorized graders and one two-and-a-half-ton dump truck.

Also, there were Jerry snipers who winged one of the 28 and frequently forced the entire detachment to stop work and make with the MIs. In these fights the engineers took three prisoners, killed one Jerry (confirmed), plus many other probables. The field in which they were working had large signs all over saying "ACHTUNG! MINEN" so they had to

search carefully for mines. They found fewer than they expected. They also had to worry about occasional Jerry artillery fire and the continual hazard of the First Army's L-1s and L-5s which kept landing and taking off throughout the construction.

Despite all of this, a hasty emergency strip was ready by noon the same day and some of the heavy equipment could be sent on its way to a new site. In the meantime more men and machinery had arrived and events at the second site - which was slated to become an advanced landing ground - moved swiftly. Here, there was the same hazard as at the emergency strip plus quite a bit of German aerial activity at night - strafing, bombing and photographing in the light of flares. Our casualties from all these sources were nil but on this new job a bulldozer hit two Teller mines which hadn't been disposed of for some reason. The explosion didn't hurt the driver at all and damaged the equipment only superficially. However, the noise brought a dozen or so running to the scene of the

accident and one of these bystanders set off a Jerry "S" mine known familiarly as a "Bouncing Betty" because it pops into the air and explodes above head level. Betty injured nine men, killed nobody.

While this work was in progress on the ALG, men left behind at the emergency strip were busy extending it to 3,600 feet, fitting it with marshalling areas and taxiways. Thus, although it's called an ELS, the first strip is a great deal more and is actually used as a transport field. On D-plus-3, at ten in the morning, C-47's of the 9th Troop Carrier Command landed there and picked up wounded for air evacuation. For the historically minded, this was the first scheduled use of an Allied airfield in France in this invasion. Since then thousands of wounded have left from this field and it serves as an airport for visiting brass.

Now the plot thickens. While Colonel Livingston's men were finishing their transport field and beginning their advanced landing ground, other parties arrived and started work on more fields. A detachment of an engineer aviation battalion under the command of Maj. Donald A. Parkhurst landed on D-plus-3 and went right to the site which had been chosen for them on the basis of pre-invasion aerial photographs. There were 612 men and plenty of equipment: their troubles with the enemy were few although six Germans surrendered to Major Parkhurst who was surprised but willing and men of the outfit took other prisoners.

On the other American beach, the one on the Cherbourg Peninsula, men of a battalion under the command of Lieut. Col. Max G. McCrory landed on the morning of D-day. They stepped off the boats in the face of enemy mortar fire, but the advance detachment headed straight toward the assigned site. This scouting party of nine men found the site all right, but also found a German four-inch field piece barking away less than a hundred yards from the end of the proposed strip. Master Sgt. Charles A. Lane, leading the detachment, decided the enemy was probably interested in bigger game, so he and his intrepid eight solemnly went about the business of walking the center line - marching down the middle of the property looking for fills, holes, obstructions in full view of the Germans. They got away with it.

They completed an ELS on D-day, and by D-plus-2 work on a larger field was going hell-for-leather, almost completely uninterrupted by enemy action. The three outfits mentioned above were not exactly in competition, but each knew what the other was up to and the result was, say, stimulating to all. By 0600 on D-plus-7 Major Parkhurst's men had their field complete enough to be called a refueling and re-arming strip and at that time a

squadron of P-47's came in for gasoline and ammunition. By evening of the same day Colonel Livingston's men got a bunch of P-47's which landed for the same purpose. This field, Colonel Livingston's men staunchly maintain, was ready much earlier but they couldn't lure any planes in "except those damned little cubs which don't count."

In the early afternoon of D-plus-9 Colonel McCrory's field entertained two squadrons of P-47's and the 9th Engineer Command could report proudly that four fields, each capable of servicing, refueling, rearming a group at a time, were actually operating in the American zone in Normandy. Consequently, we're afraid there's going to be a discussion for years about whether Colonel McCrory's, Colonel Livingston's or Major Parkhurst's men got there first. Of course other battalions and detachments of battalions had been landing in the meantime and starting work on fields of their own. Each of the battalions mentioned above had sent advance parties ahead to begin work on other sites - so the report "four fields ready" doesn't tell the whole story. Moreover, each of the four strips was being improved by addition of hardstandings, surfacing and so on. In this connection, here is the phasing through which a typical strip goes, and the specifications for each phase:

(1) First comes an Emergency Landing Strip (ELS), which is supposed to be "of sufficient length and level surface to enable aircraft in distress to land."

(2) Then a refueling and re-arming strip (R and R) "of sufficient length of level compacted surface for landing and taking off, with adequate marshalling areas for rapid turn-around of aircraft, adequate tracking to insure operations under all summer and autumn conditions." In practice this means the aviation engineers must clean, grub, grade and roll a runway 3,600 feet by 240 feet with a 150-foot by 240-foot overrun at each end.

(3) Next step in the life of an airfield is when it becomes an Advanced Landing Ground (ALG) which requires the following improvements:

(a) Clean, grub, grade and roll two 300-foot by 150-foot marshalling areas at each end.

(b) Clear obstructions in approach funnels to permit a minimum glide of one in thirty.

(c) Surface the marshalling areas in our Normandy operation surfacing so far has been with square mesh, a chicken wire metal mat of British manufacture.

(d) Surface the runway 120 feet wide.

(e) Add taxi tracks.

An ALG is defined as about the same as an R and R but with additional dispersal facilities so that it can be used to capacity by "flying in squadrons to replace others as they complete the scale of effort appropriate to the period."



Men of 9th Engineer Command using graders.



First P-38 lands on newly finished strip.



Fighters are rearmed at Normandy field.

Landing strip completed. C-47 lands jeep.





Dawn of D-day found the fields of Normandy littered with parachutes and gliders which in the cold darkness before

H-hour had landed one British and two American Infantry divisions—the 82nd and the 101st—behind the Germans'



forward defenses. The lead planes of the Troop Carrier Command crossed the invasion coast at 0006 and dropped

the first paratroopers at 0016. They landed where the enemy wanted them least, with a minimum of casualties.



4,000 with moonlight breaking through. Wind was fresh but not strong; visibility good.

Earlier that evening the entire area had been prepared by as heavy an aerial bombardment as could be dared without giving the whole show away. Tactical surprise was counted on—and achieved. All planes re-

ported flak and two or three were seen to go down in flames, but the concentration of fire which the enemy could have mustered had he known what was coming was definitely not there.

Fighter cover—not escort, but high cover—was maintained over the entire area and a small force of Mosquitoes hung around, bombing, dive-bombing and shooting at flak emplacements and searchlights. They rambled all over the coast and caused a few C-47 pilots to report enemy night fighters. They kept a lot of German heads down.

As for enemy ground interference, there was some worry about things called air landing obstructions which Jerry had placed all over the Cherbourg Peninsula. These are posts about ten or twelve feet high planted in likely landing zones. Some are pointed at the top and they frequently have barbed wire stretched between them. However, we know of no case in which our airborne loads were dumped on these obstructions.

The gliders worried the command most because they came last of all—when presumably the enemy would be alerted—and because they had to fly so slow. However, only one tow plane was lost and only four gliders were prematurely or improperly released. Their job was finished at 0408 hours, and Troop Carrier was through for awhile.

Began then what will always be re-



At an airfield in Britain, C-47s are lined up beside Horsa gliders which they towed over the Channel.



C-47 hospital plane picks up wounded at advanced field in Normandy. Plane can carry 24 stretcher cases.

membered by a lot of us as the great sweating-out. There was for a long time no way to know what was happening to the men we'd dropped. The only signal received from the airborne troops was a panel marker placed at the appointed place and the appointed time indicating where they wanted resupply and reinforcement.

This operation, which had been decided on as part of the original plan, began before dusk on D-Day. Two hundred and eight C-47s towing 172 Horsa gliders of British manufacture (carrying 6,900 pounds) and 36 American CG-4As crossed the Channel between 2110 hours and 2310 hours. The gliders carried additional elements of the airborne divisions already landed as well as items of resupply—ammunition, food—and some heavy equipment to our waiting troops. The following morning, D-plus-1, 48 Horsas and 150 CG-4As were released over the same spot; 249 other C-47s dropped supplies. Thus the air phase of the airborne operations to "assist in the initial assault and prevent enemy troop movements from east to west" ended at 0900 hours on D-plus-1. The entire operation had involved 1,371 sorties by 9th Troop Carrier planes, plus 301 by gliders.

OPERATION BACKGROUND

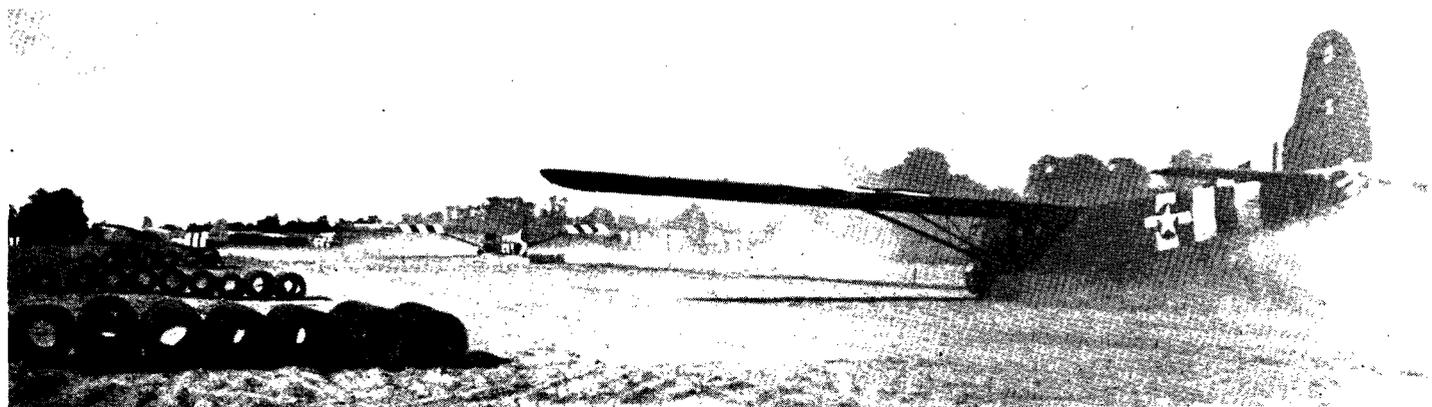
Basically, the operation succeeded so brilliantly because 9th Troop Command

received what every Troop Carrier outfit has been seeking since the beginning. For once, a troop carrying organization was permitted to devote itself to training for its combat assignment instead of indulging in freight-hauling right up to the moment of action. The 9th had its own equipment and was not forced—as in the early Mediterranean operations—to use mixed, tired and foreign aircraft. Moreover, the high command planning for the operation took into account the various special requirements—adequate time in which to prepare for the particular operation as well as for operations as a team under varying conditions, a well-marked route to objective, fighter protection and bombardment diversion.

Coordination of the pre-invasion training and of the actual D-Day operations was achieved through the Allied Expeditionary Air Force Headquarters which controlled both 9th Troop Carrier Command and its RAF equivalent. The 9th remained under the 9th Air Force for administration and discipline, but this channel was by-passed for operations—orders went straight from AEAFF to 9th TC.

Troop Carrier, after years of being mistaken for the Air Transport Command (which properly has no part of carrying through and into combat—Troop Carrier's job) and after suffering a great many lean days, made the grade—with plenty of room to spare. ☆

Raising great clouds of dust as they skid in on their bellies, gliders with men and equipment land on partially completed field in France.



BLAZING THE TRAIL ON D-DAY

Here is how the Pathfinders led the successful Troop Carrier-Airborne Infantry operations on the Cherbourg Peninsula



Crew members of the lead pathfinder plane were (left to right): Cpl. H. E. Conrad, radio operator, Capt. E. E. Cannon, flight surgeon, Capt. W. Culp, navigator, Capt. V. S. Pedone, co-pilot, Lieut. Col. J. L. Crouch, pilot, who directed pathfinder training for the 9th.

ONE of the most important jobs in the invasion was that of Pathfinder units which pointed the way for troop carriers and gliders. Much of the work of the Pathfinders is secret, but here, in an interview obtained just before D-Day, Maj. James T. Blair, Jr., executive officer of a Pathfinder unit, tells considerably about the duties of his crews:

Our job, briefly, is to do for Troop Carrier planes taking troops into enemy territory what RAF pathfinders do for their night bombers—mark the target so the main forces can find it without delay and without error. In other words we go first—and we've got to be right.

To do the job we have planes and crews carefully chosen from among the best in all the groups that make up 9th Troop Carrier Command. They're grand boys who knew their stuff before they came to us and who since have been trained and re-trained in their tasks. In addition, we have some special equipment to help us navigate—the very best equipment that Allied engineering ingenuity can produce. (Right now—a few days before D-day—it's all secret and we're practically writing this in a whisper for publication after we've done the job. Until D-day even the fact that our Pathfinder outfit exists is secret.)

Our commanding officer is Lieut. Col. Joel L. Crouch who was a United Airlines pilot before the war and who knows flying as well as it can be known.

He was with a Troop Carrier wing in Sicily and he understands how important our job is, understands from experience. It's no secret any longer that—due to a variety of causes which I won't discuss here—some of the airborne personnel Troop Carrier delivered in the Sicilian campaign weren't put down where they were supposed to have been. This time

it's got to be different and here's how we mean to do it.

Ahead of the main column will come a flight of C-47s provided by and manned by our unit. There'll be this kind of a spearhead for every drop zone on which troops are to be delivered.

Presumably the mission will be at night, undoubtedly over strange territory, and probably in the face of enemy opposition. It's the job of this lead flight to hedgehog in at 500 feet or so, keeping under the enemy's radar field, fly directly to the 500-yard-by-500-yard area assigned them and drop special Pathfinder teams of Airborne Infantry at precisely the right moment—neither a second too late nor too soon.

IN each Pathfinder plane there will be the usual crew—pilot, co-pilot, navigator, radio operator and crew chief—but all trained for the special job; the crew of each ship will work out the problem and be briefed to carry on in case the other two don't get there. To guard even further against accidents, the main body—flying behind us—will be led by another flight of our boys.

Each aircrew member will have had between thirty and sixty hours of special Pathfinder instruction—minimum—and some a great deal more. At least a third of our men are veterans of the African, Sicilian or Italian campaigns.

The course consists of ground instruction on the purpose and tactical employment of Pathfinder and on the theory behind the special equipment we've been given. After that come instrument flying refresher courses, reviews of dead reckoning theory and practice, and then hours of flying as part of joint exercises with the Airborne Infantry who'll ride with us and jump out when we tell them to. Once on

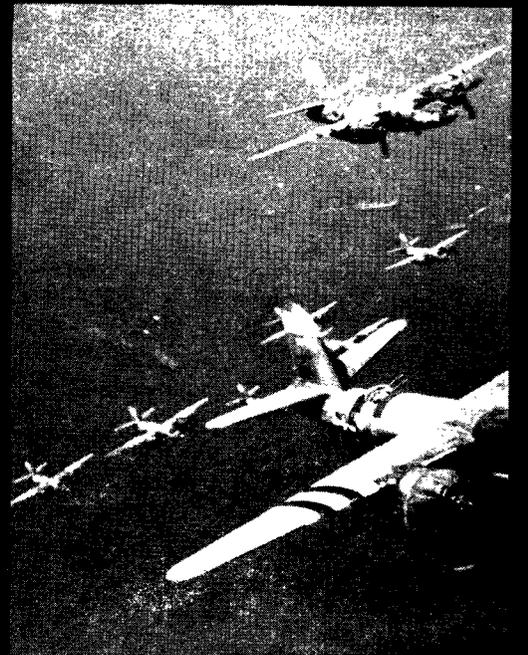
the ground the infantrymen have to set up radio and visual aids. No less than we, they have to know what they're doing.

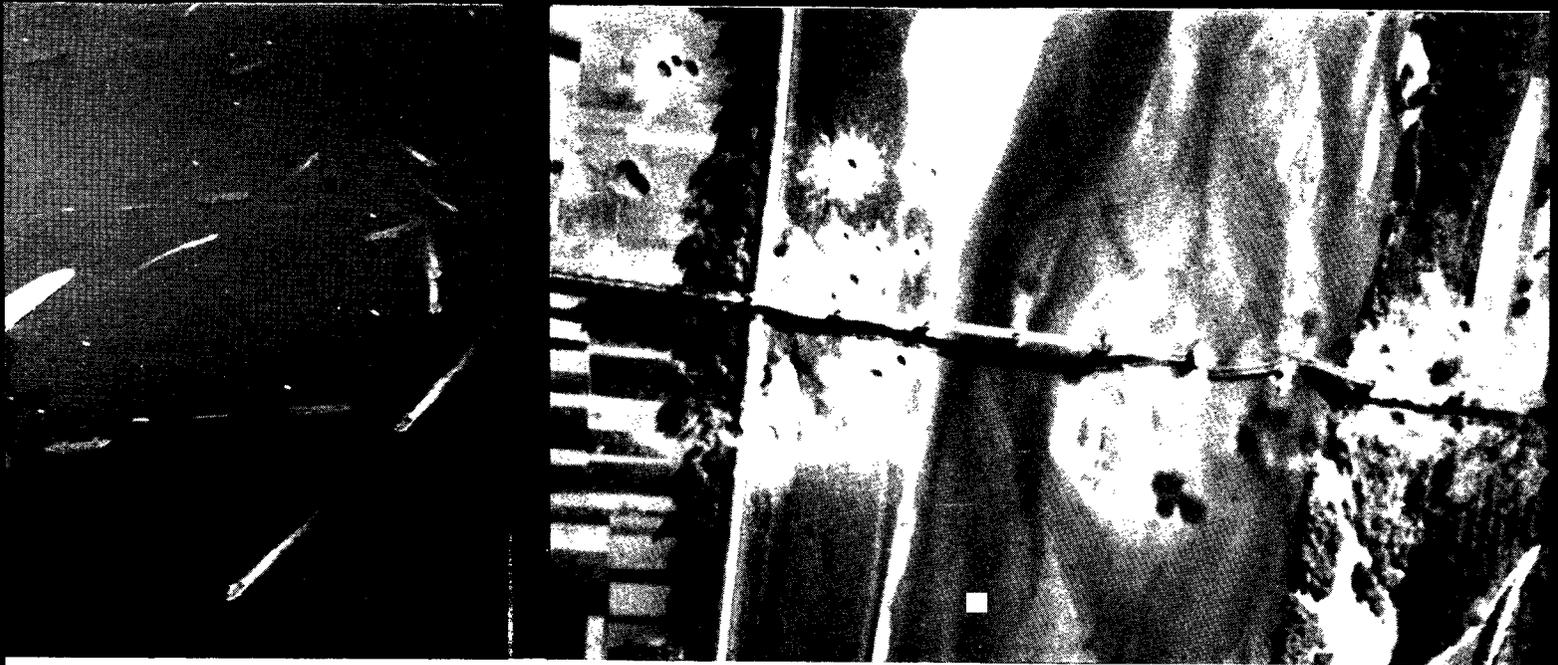
Let's say the Pathfinder crews for a certain drop zone have reached their target. The pilot gives the jump-master the green light and a dozen or so parachutists who have trained with us for months pile out of the open door of each plane. They have lights they can set up. These might be just flashlights making a prearranged signal, flares or something called *Hollophane Zone Indicators*. These are electric lanterns with great range so made that they can be seen only from one direction—not from the rear or directly above. There are two separate cones of light to tell pilots, approaching along the correct course and at the designated altitude, when they're getting close to the zone.

We're the first Pathfinder unit for Troop Carrier activities in the world. (That is on the Allied side. Possibly the Germans have something like it, but we've never seen any signs of it.) However, we owe a lot to the British who first established Pathfinder organizations to drop flares on targets for night bombers. Much of our navigation equipment was devised by the British for such use, and some of our tactical ideas are the results of British experience in this kind of work.

Setting up the Pathfinder units was actually accomplished by the 9th Troop Carrier Command under Brig. Gen. Paul L. Williams. He instructed each of his groups to turn over to us three of their best C-47s with complete crews. That commanders were willing to give us first rate material—instead of indulging in the old Army game—is the best testimony I can think of to the importance of our mission. They *know* now that if we do our part well, the whole show will succeed. ☆

INVASION





MAINTENANCE FOR KEEPS



By Master Sgt. Arthur Jolly
13TH AIR FORCE



**A story of lessons learned
the hard way by mechanics
at advance tactical bases
in the South Pacific Theatre.**

BACK home, if you're stuck on a job or in a rush, you can call upon the shops in the hangars. At an advanced tactical base in the South Pacific you either call upon God or your men—and often upon both.

You get a great deal of relief and satisfaction, however, when the engineering section chief knows his job thoroughly and works in perfect harmony with the engineering officer, the line chief and the crew chiefs. It does no good if every part of a plane except one functions. That plane will fail and the man who fell down on his job is responsible for the fate of a plane and, more important, for its crew. That responsibility hangs heavily over every man who works on the line at all times.

Ours is the oldest medium bombardment squadron in this theatre; it has been operating here almost since the start of the war. We have gone through plenty and we have made as many, if not more mistakes than most outfits. We have tried to benefit by them and to improve

constantly our technical skill. Our greatest assistance has come from the TOs and other information provided by the Air Service Command. But not even a man with a VHF crystal ball, suspended by the latest gyroscope and fixed on a true magnetic north, could have foreseen some of the heart-breaking events we have encountered.

The essence of a ground crew is teamwork. In the more than three years that this outfit has been operating our ground men have never stood a formation or had to answer a roll call. They've always been on the line long before they were scheduled. They've worked days and nights and never has their morale been better than when they were under actual combat conditions where they could see the results

their planes were accomplishing.

Each of the section heads is a specialist carefully chosen before we came overseas. The rest of the men we picked up were not specialists. But they soon became so under the guidance of their sergeants. It has been easy to teach these men. In the first place they came to us highly skilled from the various schools of the Training Command. Almost all of them were well educated, having gone at least through high school. And most important of all they were Americans with a great gift for all things mechanical. Ours is a far different group of line men than we were in the old days when everything we did in the Air Corps was experimental. We used to argue about all technical procedures. Now, through the TOs we know. There is no guesswork about it.

In our squadron each plane has a crew chief and at least one assistant. They perform all the inspections as prescribed in 0020 and do first and second echelon repair on the whole aircraft and engines. The crew chief calls upon the line chief

when he needs shop men for some specialized job, such as a plane damaged by flak. Or the crew chief will come to the line chief when he has some trouble with the plane that he cannot solve, such as some form of engine trouble. The line chief acts as a consultant, just as one doctor will call in another doctor to talk over a case. When a decision is reached the men are aided by the crew chief in the heavy tasks.

One of the more difficult things to impress upon crew chiefs is that it isn't necessary to wait the full 50 to 100 hours to pull an inspection. They must have proven to them that they are not cheating themselves when they do a running inspection during the last ten hours or so before it is actually due. In this manner, work is staggered and the plane is never out of commission. For example, if a ship is not going to be flown on a particular afternoon and forty hours are up, it is a good time to pull the tires instead of waiting for the final ten hours. In that way a plane, barring accidents, will never be out of commission longer than three hours.

WE have found that it is important to have more than one inspector to a squadron. In fact, three is the ideal number—a chief inspector and two assistants. They can cover more planes, break the inspections up and specialize in different parts of the plane. In general, over-all inspections the chief inspector can take the fuselage and tail section; the second man, the left engine and nacelle including the left wing and the third, the right engine, nacelle and wing.

The inspectors are not there to criticize or spy upon the crew chief and his assistant. They are there to aid in every possible way, and that is clearly understood in their attitude and work. All men are pulling together to make the planes as perfect and as safe as possible.

The most important duty of these three men is what we call the spot check inspection. Each day, in addition to their other duties, they go through every plane of the squadron for a different purpose. This is an aid to the crew chief, for they invariably discover things wrong long before the regular inspection. Here is how the engineering department breaks down this spot check inspection: Monday, landing gears, struts and fittings; Tuesday, tail group; Wednesday, electrical system; Thursday, engine nacelles; Friday, control cables and surfaces; Saturday, plane interiors and Sunday, emergency equip-

ment. These inspections are run in addition to the complete monthly check made on all of the squadron's planes.

It is impressed upon every man from the highest to the lowest that his equipment is the main thing. We do not tolerate men abusing squadron equipment. Only new men ever fail to exercise proper care, since you quickly learn how valuable and scarce all items become, particularly when you want a tool and find it broken. As soon as any piece of equipment is damaged, we fix it immediately for it might be needed the next day. Little things like small battery work lamps are important. Ours are constantly recharged in the event that we have to work at night.

Perhaps the most satisfactory thing about working far away from the comfort and luxury of hangars and shops is the opportunity to improvise equipment and to invent combinations of gadgets out of salvaged material. We have several such inventions, which serve a definite need and we feel that someone else might be stuck and want to know how to fabricate something like them.

Our mobile sheet metal trailer is our pride and joy and, like everything else we've run up, it is made from salvaged equipment. It contains a concrete Briggs and Stratton three hp engine which is hooked into a 110-volt generator taken from a cletrac. This provides electric power for running lights at night, drills, soldering irons and the like. It has an air compressor salvaged from a cletrac which is incorporated with two high pressure oxygen tanks for air supply tanks. The unit is driven by a five hp Continental putt-putt. It has an air regulator for riveting which runs an air hammer and air screwdriver. It can pump a maximum of 1,600 pounds of air pressure. To lower the pressure and maintain a steady flow under 75 pounds, a surge chamber was developed out of an old fire extinguisher.

ALL of the equipment is mounted on a 500-pound jeep trailer with extra spring leads. We have found that jeep trailers are the best, for they are the lightest and smallest. We have no use for large trailers. An important feature about all our equipment is that it must stand low to pass under the wings of the plane. With this trailer we can employ a large number of men on one plane and, at the same time, do sheet metal work, pump up the tires, clean the engines and pump up an accumulator. This was developed with the aid of Sergeants Troy, Berger and Boachek. As a result of a tragic lesson, we fabricated six droppable bomb bay baggage racks from salvage material. One of our planes was in transit with flying crews and ground personnel and their baggage. One of the motors cut out. The weight was too great. They couldn't throw out the baggage fast enough. As a result the plane went down.

Since that time, we have been using this baggage rack for transporting air crews with their baggage from one station to another in the South Pacific area. Now, in the event of an emergency when an engine fails and the pilot has trouble maintaining flight, he can drop the baggage rack just as he salvos his bombs to lighten the plane and maintain flight on one engine. The rack holds 2,200 pounds although 3,200 pounds has been carried.

Our dream project—to date we haven't been able to get either the parts or the time—is a mobile flat trailer large enough to carry three jacks. The flat part of the trailer would be eighteen inches off the ground so it would be easy to tip the jacks off. It would be about twenty feet long by five feet wide similar to our 2,000-pound bomb trailer.

Each airplane, we have found, has its own peculiarities and develops other ones in the various theatres of operations. Here are the quirks we especially watch for in the B-25:

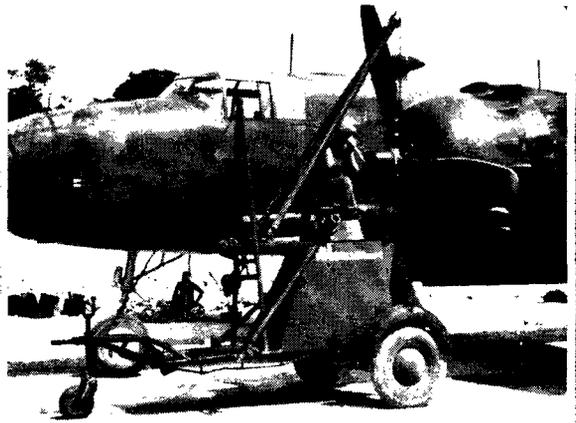
(1) Be certain that the individual exhaust stacks are secure on the exhaust cylinder flange. Keep close watch around the cowling for excess oil thrown from exhaust stacks.

(2) Check the rocker arm to see if the bearing is freezing. If it is tight and caught soon enough, it will prevent the necessity of pulling a cylinder because of a blown valve.

(3) Care should be taken by the crew chiefs when they put in hydraulic fluid to be certain it contains no foreign matter. As the plane gets old such matter will damage precision parts, like the brake valves. Use the gauge which is provided for measuring pressure on each wheel. Be certain the pressure is correct for the TO of the planes.

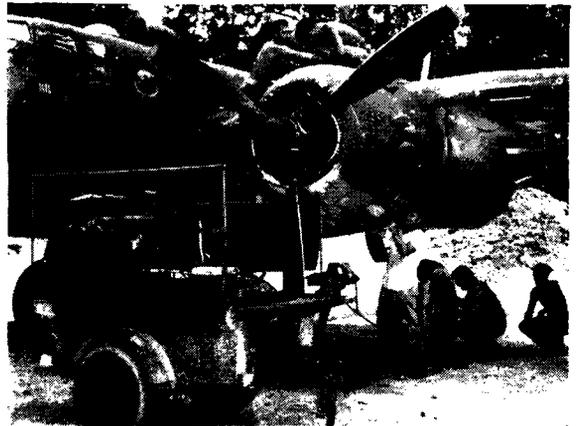
(4) Trim tabs and bearing attaching bolts. They'll come loose if they're not constantly inspected.

(5) Keep the self-aligning bearing connecting rod bolts as tight as possible.



Tech. Sgt. Clarence Lavender put a boom and hoist on a standard dolly; now mechanics are able to drive out to a plane, install or remove the prop in one operation.

At an advance base, with planes dispersed quick, mobile maintenance is necessary. This compressor, mounted on an old bomb trailer, keeps tires properly inflated.



(6) Proper tension of control tab cables is important at all times. Otherwise, the pilot constantly has to change the settings while in flight.

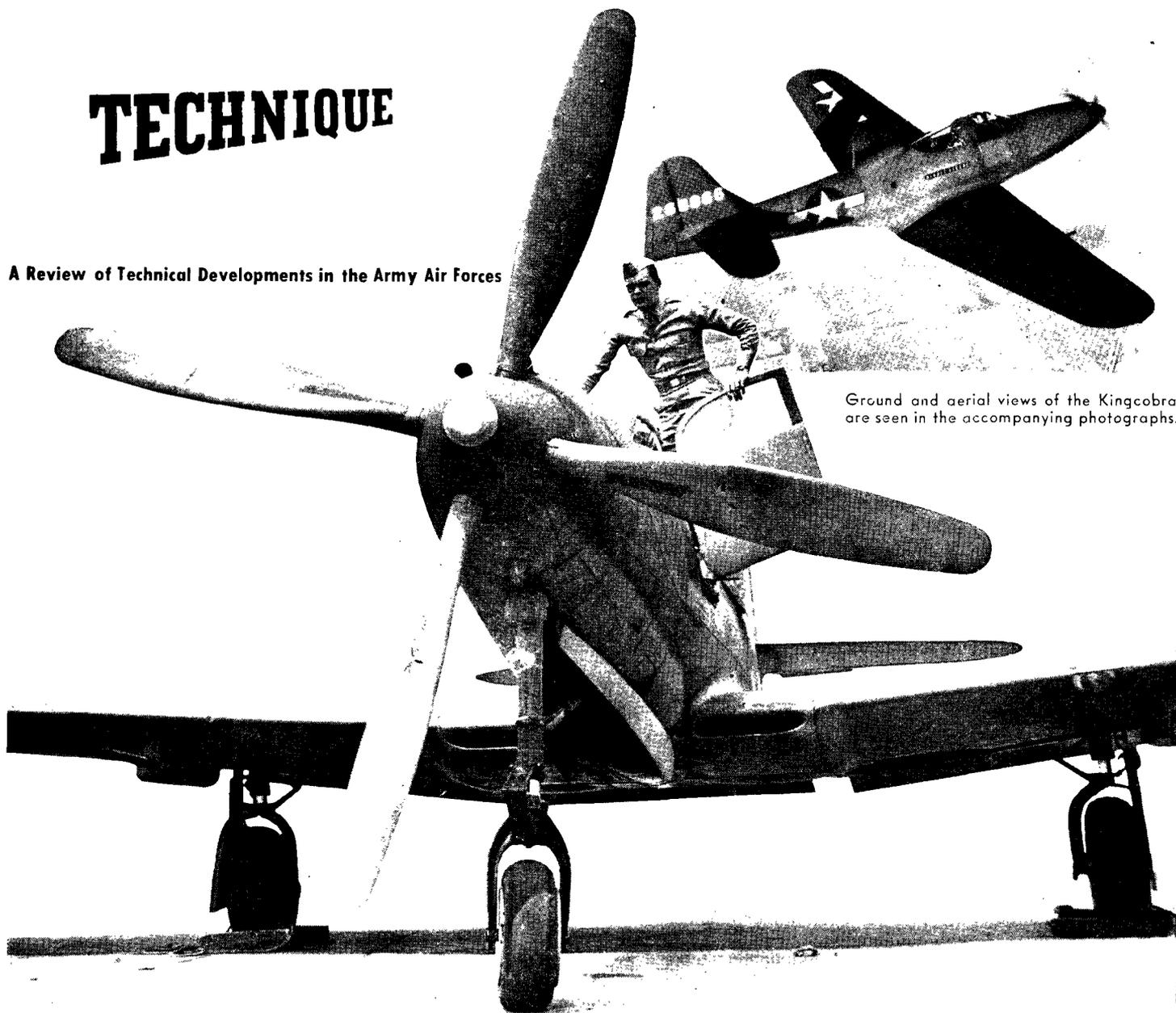
(7) After strafing missions, watch for metal fatigue in the sides of the nose next to the guns. The rivets may pop out.

(8) More care should be taken in setting the voltage regulators. One and a half volts over the specified 28.5 will burn up the batteries. That is too high a charge in this climate. The flight engineers or navigators should realize when they check voltage that it's more than just a question of charging the batteries. The voltage must be correct. We have a rule that no one touches the voltage boxes but the men from the electrical section.

Perhaps this is all old stuff. As I said before, we learned the hard way and we will undoubtedly learn a good deal more. Meanwhile, we expect to maintain our planes to the best of our ability and to shorten our time for an engine change in the field from less than our record of seventeen hours. ☆

TECHNIQUE

A Review of Technical Developments in the Army Air Forces



Ground and aerial views of the Kingcobra are seen in the accompanying photographs.

THE P-39 GROWS UP

The P-63 is the answer to the AAF's quest for a speedier and higher-flying edition of the Airacobra.

THE AAF has a new fighter that looks like an overgrown P-39. It is bigger, has a more powerful engine, can fight longer at higher altitudes and is faster than its Bell predecessor. Officially, the plane is designated the P-63. It is popularly called the "Kingcobra."

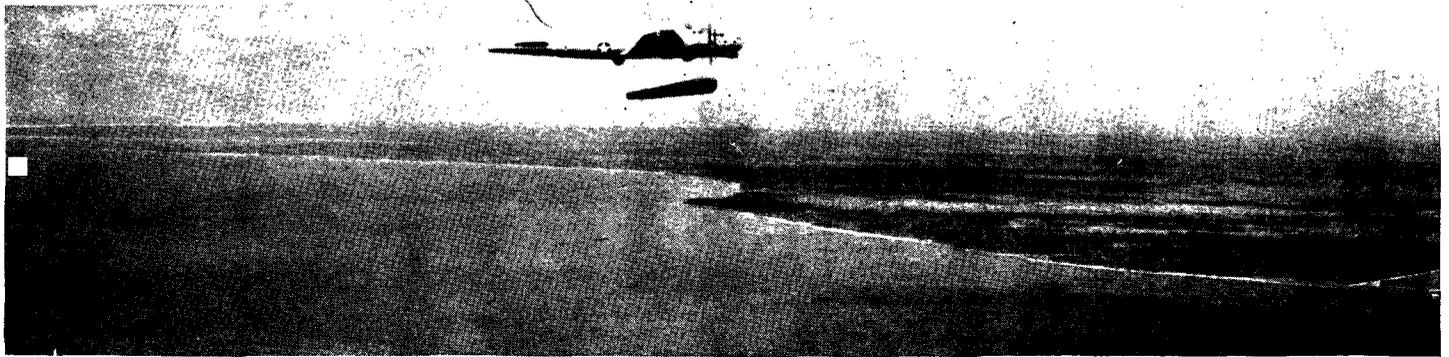
The P-63 is an all-metal, low-wing, land monoplane with a tricycle landing-gear and a single tail. Front, top, bottom and profile views are almost identical to those of the P-39.

The Kingcobra came into being in 1942 when the AAF decided it wanted a fighter plane that would outperform the Airacobra but would retain some of its features. Incorporated in the new plane's design are the P-39's cabin with automobile-type door, big air-intake scoop behind the pilot's seat and exhaust outlets on the side of the fuselage.

The Kingcobra also has a unique arrangement for horizontal stabilizer and elevators which are situated ahead of the triangular-shaped rudder.

With its great wing area and added power, the P-63 has a radius of turn shorter than that of any existing U. S. fighter. Its engineers claim it can turn with the Jap Zeros.

The fighter is powered by a single Allison 1500-horsepower, in-line engine with an improved supercharger. Its armament consists of one 37 mm cannon and four .50 caliber guns.



A B-17 is seen releasing the Flying Dutchman at an altitude of 800 feet. Seconds later, three huge parachutes billowed open to support the newly-developed, motorized lifeboat in its descent to the water.

THE FLYING DUTCHMAN

At first it seemed as if the bottom had dropped out of the Flying Fortress as it roared by low overhead. But a second later as three huge parachutes billowed open, the "bottom," which they supported, could easily be identified as a life boat. Down it floated until, prow first, it struck the waters of the Gulf of Mexico. A small group of men in a rubber life raft drifted downwind to the boat, climbed aboard, started the motor and headed for the dock. The AAF was testing its "Flying Dutchman."

That was in April when trials were being run with the newly-developed, portable-by-air, all-plywood, power-driven lifeboat which is dropped from planes to personnel stranded at sea. Today it is in mass production and doubtlessly will play an important role in air-sea rescue work. The boat provides shelter and carries food and clothing and enough gasoline and sail to permit a voyage of 1500 miles in the roughest weather on any ocean in the world.

Designed late last fall by the sea rescue unit of the Materiel Command's equipment laboratory, the new airborne lifeboat, now an AAA priority project, will be used to provide a navigable craft for:

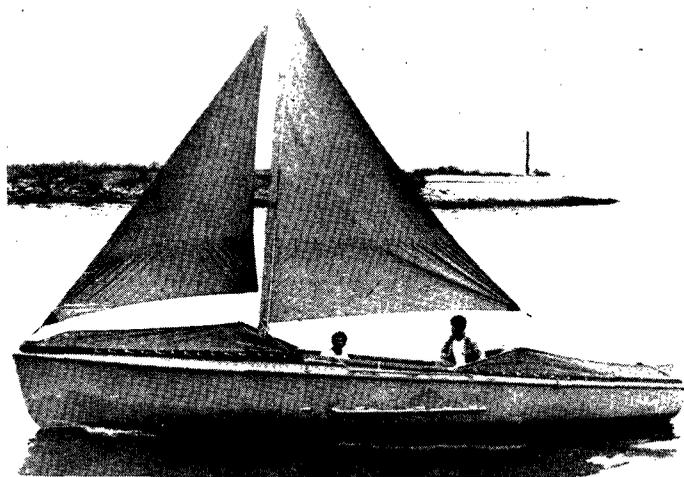
- Floating survivors of ship sinkings or ditched planes when mountainous waves prohibit seaplanes from landing and effecting on-the-spot rescue or when there are too many survivors to be picked up by heavily-laden, patrolling aircraft.
- Survivors stranded on isolated islands, which are inaccessible to planes because of dangerous coral-reef approaches and jungles.

At present the Flying Dutchman can be borne only by B-17s, but installations are being devised for other types of heavy planes such as the B-29, C-46 and C-54, all of which are so constructed as to provide ample ground clearance when the boat is in carrying position.

Light but strong cables, which are attached to conventional bomb shackles, hold the boat snugly against the fuselage of the Fortress. Only about thirty minutes are required for hooking the boat to an operational B-17. The plane's bomb bay doors are removed and the standard bomb-hoist lifts the boat into place. The fit is so perfect and the lines of the boat, with prow forward, are so smooth that the extra burden reduces the bomber's speed by only eight mph. The installation causes no interference with the operation of the plane's armament.

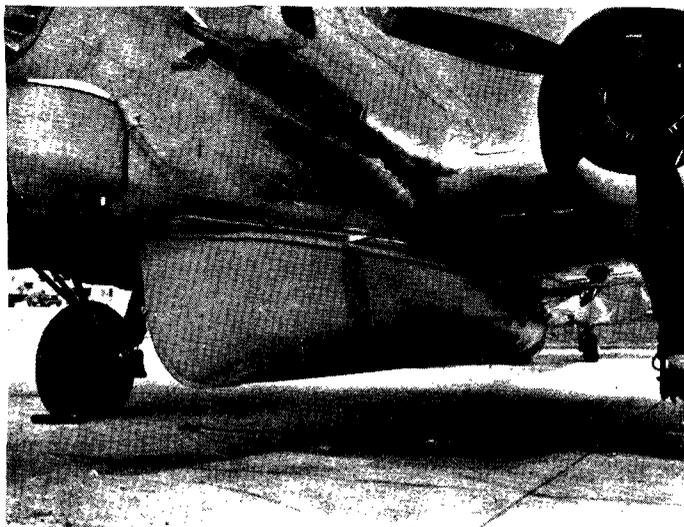
The boat is released by the mechanical bomb-salvo, operated either from the bombardier's or pilot's compartment. A cluster of static-lined-operated parachutes is used to lower the craft to the water.

Constructed of plywood, the 27-foot boat weighs a ton



To save gasoline, the boat can be converted into a sailing sloop by use of its portable, 20-foot mast and 145 square feet of mainsail and jib. Stowed food and equipment are ample for a 1500-mile voyage.

In carrying position, the Flying Dutchman hugs the fuselage of the plane. The fit is so snug and the boat's lines, with prow forward, are so smooth that the burden reduces a B-17's speed only eight mph.



empty and can carry three times that weight in men and equipment. It is powered by twin, five-horsepower, air-cooled engines, each geared to a bronze, two-bladed propeller of seven-inch diameter.

Top speed of the boat is eight mph and it has a fuel capacity sufficient for a 400-mile voyage. Included in the equipment is a 20-foot, solid-wood mast which, when fitted with 145 square feet of mainsail and jib, converts the craft into a sailing sloop for the purpose of conserving gasoline.

In addition to furnishing power, the engines are used to operate two salt water stills and their hot cylinder-heads serve as stoves for heating canned food and coffee and for frying fish and birds which survivors may catch.

The stills, which are situated adjacent to the engines so they can utilize the exhaust heat, produce two gallons of distilled fresh water for every gallon of fuel burned. Exhaust heat also helps keep the stern cabin at a warm temperature when cold weather is encountered.

DESIGNED with a center board and rudder, the boat is divided into three sections—fore and aft chambers, which also serve as cabins, and an open-cockpit in the center. The chambers contain cylinders filled with carbon dioxide, which provides the craft with buoyancy and prevents it from capsizing. Each of the chambers can shelter four men from inclement weather and the blistering rays of the sun.

Every essential for treatment of the wounded and ill and for the sustenance, safety and comfort of all survivors during a long voyage is found stored in the Flying Dutchman. Standard equipment includes blood plasma, medical kits, canned foods, fishing tackle, blankets, air mattresses, rain-repellent pants and parka jackets, underwear, fatigue hats, sox, a Gibson Girl radio, signalling devices, cigarettes and chewing gum.

On one test, seven men lived in one of the boats for six days, sailing 600 miles across the Gulf of Mexico. They heated the stored food and coffee, fished (with no luck) and weathered a 30-foot sea.

Development of the Flying Dutchman required plenty of patience. Trials were begun with the dropping of a dummy boat in which engines and equipment had not been installed. This operation proved dangerous, for the boat, upon release, dropped but a few inches before it was caught in the terrific force of the windstream and hurled back against the plane's fuselage, which was damaged by the impact. Now, a catapult device pitches the boat away from the plane.

Then the first boat to be dropped with engines and full equipment aboard tore away from its parachutes and smashed to bits. A new harness installation and other changes prevented a recurrence of that mishap.

As a result of the tests, a standard procedure for releasing the boat has been adopted. Over the stranded personnel, the plane is flown into the wind at an altitude of 800 feet—the lowest height from which the chutes will have ample time to open—and at a speed of 120 mph, achieved with one-third flaps. Under these conditions, the boat will alight downwind of the survivors so they can drift toward it.

After leaving the plane, the rescue boat is supported during its drop to the water by three 48-foot rayon parachutes. A sling with two cables, one attached to the bow and the other to the stern, serves as a harness for parachute attachment.

The craft strikes the water, bow-first, at an impact speed of 25 feet per second and at an angle of 45 degrees. Immediately, a smoke pot, set off by a static line, burns so that stranded persons can spot the boat even though waves may hide it.

At the same time, two rockets with 150-yard buoyant lines are fired outward from each side of the boat. The rockets are released electrically by means of a salt-water immersion switch. By use of the lines, the survivors are able to pull themselves to the boat if the sea is too rough for paddling.

Once aboard, the rescued men can travel for 1500 miles with all the comforts of a planned cruise.

WHAT'S NEW . . .

CARGO TIE-DOWN KITS — Three new types of cargo tie-down kits (R-1, R-2 and R-3) have been standardized for use in cargo planes to provide a quick systematic method of on and off loading of heavy equipment. They have been used extensively by the Air Transport Command in recent months. Light trucks, machines, power plants and the like, may be firmly secured in all types of cargo planes. Rope hooks designed to eliminate laborious knot tying and wasteful cutting are included in the equipment. Rope tighteners take up any slack which would allow cargo to shift and, wherever possible, rods, beams, locks and jacks are used in place of rope to eliminate slack. Type R-1 Cargo Tie-Down Kit (Spec. 40649) is designed for use in C-60 and C-64 aircraft. Type R-2 Kit (Spec. 40650) is designed for C-47, C-53, C-53A, C-62 and C-76 aircraft. Type R-3 Kit (Spec. 40651) is used in C-46 and C-87 planes.

SAIL ON IMPROVED RAFT — The AAF's latest Type C-2, one-man life raft weighs only eighteen pounds, complete with sail and spray shield, and attaches to the life vest. The spray shield attached to the top of the raft, protects the occupant from sun exposure and drenching by waves and rains. Made of a light, waterproof material it is snapped or strapped around the occupant when he is in a sitting position. Bright yellow on one side to attract attention, the shield is blue on the other for camouflage protection. Made of a tough, light, red fabric triangular in shape, the sail is fitted to a five-foot high aluminum mast which telescopes to fit in the pack. The life raft pack is constructed in two sections. The outer section of the pack is fastened to the parachute harness, while the inner section with raft and accessories is attached to the life vest. When the prepare-to-ditch signal is given, the pack is snapped to the parachute harness. The inner section remains attached to the life vest when the harness is released, thus eliminating the danger of the raft drifting out of reach in the water. Basis of issue for Type C-2 one-man life raft will be one for each crew member on bombardment type planes.

RAIN REPELLER — A newly developed rain repeller kit makes glass surfaces shed water like a duck. The water repellent mixture has been developed for use on any flat or cylindrical glass or plastic surface not protected by windshield wipers. Twenty bottles of liquid contain enough rain repeller for ten applications on an average windshield. The film formed by the rain repeller mixture causes an increase in the surface tension of rain drops. Instead of sticking to the glass and distorting vision, drops hit the surface and are immediately blown off by the air stream. The film will not affect visibility in dry or wet weather, and ingredients contained in repeller liquid will not harm plastic windshields.

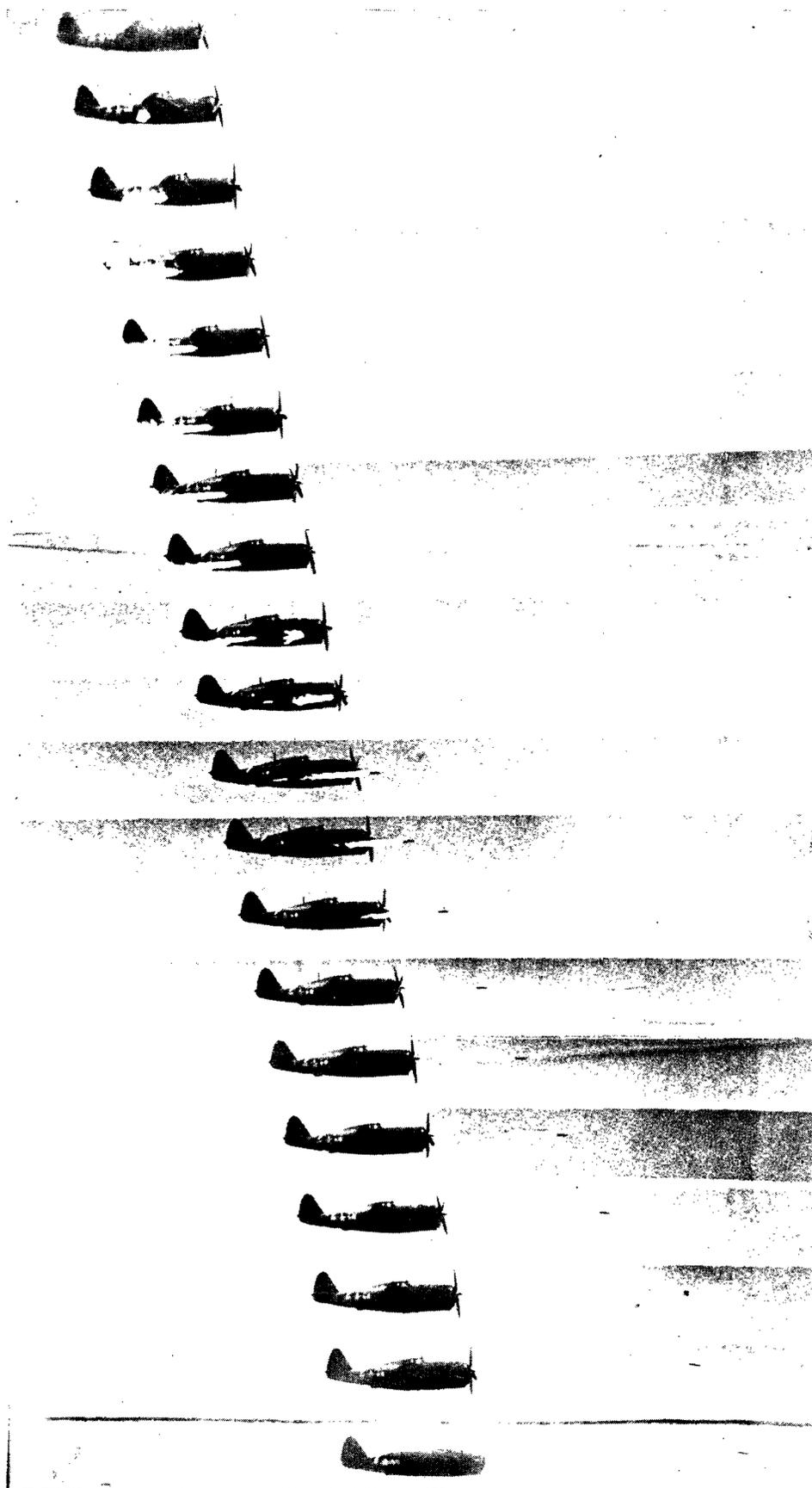
ELECTRICALLY HEATED FLYING SUIT is replacing the F-1 (original blue one-piece electric suit which was wired in series) and the F-2 (the elastique jacket and trousers with the buttoned-in electric liner). As distinguished from previous types, the F-3 is merely an auxiliary garment to carry the heating wires. Without any current in the wires, the suit has little insulative value. Wired in parallel, each shoe, each glove, the jacket and trousers can be heated independently and should any one unit fail, the others will operate. The F-3 is part of a complete outfit—long woolen underwear, GI shirt and trousers, electric suit and intermediate (alpaca) suit. Cold room tests indicate the outfit will keep a man comfortable at minus 40° Fahrenheit.

ENGINE HOIST — THE TYPE A-7 PORTABLE ENGINE HOIST has been standardized and will replace type A-2 hoists now in use for general engine changes. Now designed to handle all types and sizes of aircraft engines, the A-7 hoist is portable by air, weighing about 1,000 pounds. It is easily knocked down for transport. Mounted on three wheels, the hoist may be towed behind a jeep at slow speeds. The hand winch supplied with this unit has a capacity of 4,500 pounds and can be operated without difficulty by one man. The hoist is designed with a 17-foot 6-inch ground clearance and a 6-foot 6-inch reach.

Prepared in collaboration with the
Engineering Division, Materiel Command

OUR ROCKET-SLINGING FIGHTERS

By Lieut. Col. H. L. Donicht, ARMAMENT LABORATORY, MATERIEL COMMAND



AN Oriental weapon, centuries old, is back in the Orient again helping to defend the Chinese who first invented it. The rocket—which China's warriors used against the Tartars in 1232—fitted to American fighter planes has given air power a new and deadlier striking force. Literally, it puts wings on our biggest divisional artillery guns and gives them the mobility of our fastest fighter planes.

Rocket-slinging Mustangs, Warhawks and Thunderbolts in the CBI and South Pacific theatres already have struck decisive blows at Jap landing barges, locomotives, ammunition trains, island fortresses, warehouses and other ground targets.

In developing the rocket weapon, skepticism and difficult engineering problems had to be overcome. One of the chief problems was to get the rocket gun out of the Buck Rogers' world and into practical installation for aircraft. In two years of stepped-up research, AAF armament experts have tried to surpass the Germans, who have been wrestling with the rocket gun for more than ten years.

On July 6, 1942, flying in a Curtiss P-40 in the skies over the big Aberdeen Proving Ground, the author fired the first airborne American-designed rocket gun. That was the beginning and at that time the plan was to develop high-explosive self-propelled projectiles for air-to-air fighting. War changed all of that and today our rocket-equipped fighters use their "torch guns" exclusively against ground targets. Here's why:

THE British urgently needed a weapon to break up the hordes of Junkers, Dorniers and Focke-Wulf bombers when they came over in order that RAF Spits and Hurricanes could effectively challenge them. That was in the early stages of the war. Now that our Forts, Liberators and British heavies have "dumped the sky on Berlin," the Germans have been forced to find a new weapon. The Nazis turned to their ground rockets which they had been using in their field guns and applied them to aircraft. The result was a cumbersome, heavy rocket gun installation beneath the wings of their small fighters, yet highly effective as a surprise weapon.

The price of defeating Nazi rocket tactics required the development and diversion of long range fighter aircraft. It also led to more intense interest in rocket usage in our own combat aircraft.

A high-speed camera catches a P-47's rocket gun in action during flight. The prop was feathered to permit making the photo-series.

A Development Story of the AAF's 'Heavy Artillery'

And since the enemy at this stage of the war isn't providing us with big air targets, due to his lack of bombers, our rocket guns have been principally designed for air-to-ground work.

Initial installations were made on a production P-40. A single tube of steel was hung under each wing. This tube had fairly thick sidewalls since we didn't trust the rocket forces about which we knew so little. One thing we had learned, however, was to make the tube long enough so that it took the rocket blast away from the surfaces of the wing. A long tube, throwing the fast moving gases out into the airstream, provided a universal answer for installation on aircraft of fast burning rockets.

The heart of the rocket gun is its projectile. Unlike a big gun whose chamber holds the powder charge which hurls the shell through space, the rocket carries its own power along with it.

The projectile we are using today was developed by the Ordnance Department with the cooperation of the NDRC and AAF personnel. Made by Army Ordnance, it is called the "four and a half." The projectile is four and a half inches in diameter, approximately a yard long and is comparable in size to a 105 mm shell. The shell has three main sections—the fuze, head and the motor.

The shell's head carries its destructive force. Approximately one-third of the entire projectile in length contains a large charge of HE. The HE charge is set off by the fuze upon impact of the shell. It may also be timed to explode at a preset range from the aircraft, a method the Germans are using extensively. They fire their rockets with time fuzes and the pro-

jectiles explode in the air, raining fragments on our bomber formations.

Directly behind the powder head of the rocket projectile is the motor shell or chamber. The "motor" is rocket propulsion—its driving force set up by jet gas pressures propels the projectile through the air to the target. The motor is filled with powder propellant which, when ignited, shoots gases at a high velocity out of the tapered end of the motor case, which is about one and a half inches in diameter, causing jet propellant forces which thrust the projectile forward. The small end of the projectile casing takes the form of a Laval Nozzle, a type which has been used in supersonic wind tunnels to create highspeed airflows. It has the same effect in compressing the jet gases.

ENCIRCLING the "nozzle" at the tail end of the projectile are six fins, each about four inches long and an inch wide, hinged in such a manner that they fold into the rocket tube. Once the projectile is fired the fins fan out to help guide and stabilize it in flight. The rocket is ignited electrically by the pilot who presses a button or trigger on the stick.

The combined weight of the two three-tube clusters carried by our fighter planes and their projectiles is about 450 pounds, as compared with a ground-type 105 mm howitzer and six rounds which weigh approximately two tons—or ten times as much.

A small fire control box in the cockpit enables the pilot to fire the rockets individually or "in-train," the six projectiles leaving the tubes at one-tenth of a second intervals. Potentially, a single fighter pilot flying a Thunderbolt with its

eight .50 caliber wing guns and six rocket tubes in a single strike has the firepower of six armored forces tank-busters.

In addition to its detonating effect, the rocket spreads gaseous flame and hot metallic ashes which set fire to anything inflammable, making it particularly effective against gasoline storage tanks, ammunition dumps and warehouses.

The present rocket guns are mounted so that their sightline is the same as that for the fifties in the wings, thus permitting use of a single gunsight for firing both rockets and machine guns. Tubes now in use are made of paper plastic with side-wall thickness of about one-fourth of an inch and they are one-third as heavy as the steel tubes previously used. The tube clusters can be jettisoned from the wing either before or after firing, giving the pilot maximum performance. The jettisoning of the tubes and the resulting waste of about 400 pounds of steel on each single-plane mission led to the development of paper plastic tubes, as did the consideration for minimum reduction of climb. When in flight, with tubes and rockets ready for firing, the airplane loses little of its performance.

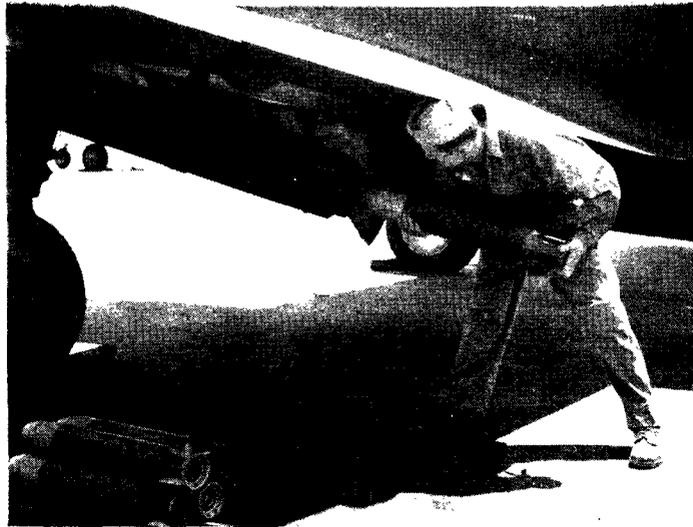
Rocket installations are so positioned on the wing of the fighters that droppable fuel tanks or bombs also may be carried.

We are improving present installations, and it may be that in future we will have rocket guns that hurl projectiles such as those fired from battleships.

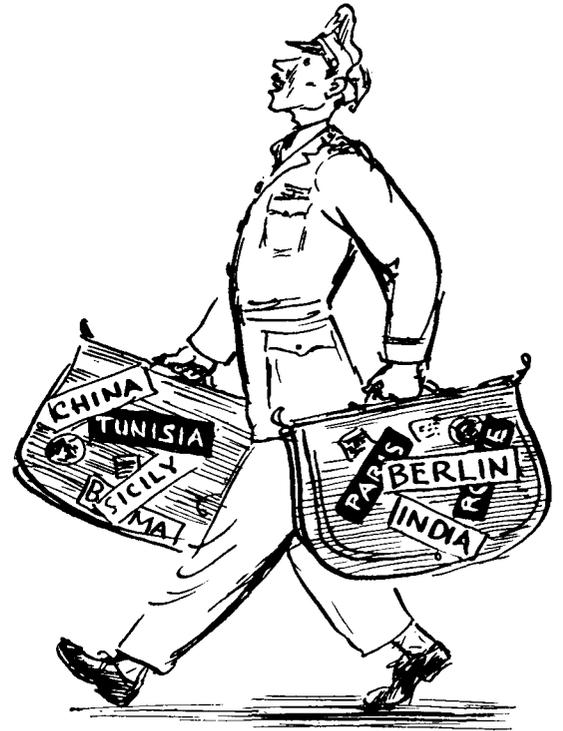
Although it is granted that the fine firing mechanisms and heavy tubes of our conventional cannon make them more accurate, the rocket gun, because it is light and can be applied to fighter aircraft, is the AAF's "heavy" artillery. ☆

General appearance of the jettisonable rocket-tube installation on the P-47 and of the projectile itself is seen in these photos made during tests at Wright Field. The unit consists of three guns, each of which

carries one rocket. The flexible fins of the projectile fold into the tubes which are loaded from the rear. The rockets shown are dummies used for experimental purposes only and they are not fuzed.



A colonel, who has been a passenger on 84 missions, checks the human equation and keeps his number down.



THERE'S a colonel now attached to one of the 9th Air Force's B-26 outfits who probably has ridden as supercargo on more combat missions than anyone else alive. He is officially credited with 84 trips over enemy territory—which is pretty good for a ground officer, non-rated and not on flying pay—and he wears the Silver Star, the Distinguished Flying Cross with one oak leaf cluster and the Air Medal with four clusters.

He won't let us use his name and his job is secret, but the boys call him "Mike" and the job doesn't matter to our story, which is about how he's managed to fly combat in every theatre of war except the Aleutians without ever getting hurt and about the method of survival he relies on rather than his luck, which he figures must have run out long ago.

"This business about your being able to do nothing about it when your number's up may be all right for most people," Colonel Mike says, "but I've got to figure another way. Riding as a passenger, I have to worry about whether the pilot's number is up. So I've developed several theories on how to tell when a particular crew is probably in for it. So far, I've been right."

When he arrives on a strange field, the colonel tries to arrange not to fly for at least a day or two. In the meantime, he gets to know the pilots and makes a mental list of people with whom he doesn't think it wise to ride. Highest on the list he puts crews, any member of which can't answer quickly and without deliberation these questions:

"Who's your co-pilot?"

"Who's your engineer?"

"Who's your bombardier?"

"Who's your tail gunner?"

"Who's your turret gunner?"

The colonel figures that any member of a crew, which has been kept intact, can't be very good if he can't rattle-off the names of his teammates. Mike also feels that any crew, which has been changed or broken-up so frequently that its members don't know each other, isn't long for this world.

Sometimes, the colonel's queries draw blanks from every crew of an entire group. In that case, he leaves the station and waits for the CO to be relieved. This change invariably takes place, he says, as soon as Command gets a look at the group's loss-rate. When a new CO—one who insists upon crew integrity—arrives Mike goes back and rides happily.

WHEN Mike, after arriving at a field, finds three or four crews which seem composed of bright boys, he sets out to find the safest pilot among the eligibles. He reaches a preliminary decision by obtaining, mostly through observation, the answers to a set of questions which he uses as a check list:

- Is the pilot alert and attentive during briefing or is he busy playing hero, demonstrating nonchalance and yawning loudly to show what a sleepless Casanova he is?

- Does he take a good healthy interest in the various safety gadgets and in emergency technique?

- If Mike asks him to run through ditching procedure, does the pilot do so with intelligence and understanding or is he one of the "things-like-that-can't-happen-to-me" boys?

- Does he check to see that there are extra chutes, Mae Wests, rafts, jungle kits and flak vests aboard for his passenger? (It's not that Mike minds getting those things together for himself but he likes a pilot who displays a feeling of responsibility for everybody aboard his ship.)

- On the line before take-off does the pilot lie flat on his tail and dream about life in Winnetka, Ill., or does he stay on his feet and do something about insuring that he'll get back alive to the "garden spot of Chicago?"

- Does he look into the bomb bay to see if everything's ship-shape?

- Does he insist that the plane is thoroughly pre-flighted?

- Does he run through an intercom test before take-off, when there's still time to correct faulty equipment?

- Does he talk things over with his gunners and interest himself in their equipment or is he one of the walking dead who figure enlisted men's business is enlisted men's business?

That's about as far as the colonel is able to go in his quest for a safe pilot without actually flying with a guy.

Once in the air, Mike keeps a sharp eye on the pilot in order to verify or correct his earlier appraisal of the man.

Observing the pilot's flying skill, the colonel pays particular attention to the man's ability to relax at the controls, his familiarity with the type of aircraft and the particular ship he's operating, his ease and sureness in handling the plane, his knowledge of and attention to the instrument panel, his deftness in setting the trim tabs and his concern with fuel conservation.

Snow, Sand and Sarongs

Next he determines whether the pilot is leader of his crew or just an aerial chauffeur. He likes a pilot who, by checking all posts frequently, knows at all times where each crew member is working and what operation each is performing.

If the pilot proves to be in complete command of his plane and crew and of every situation which presents itself, the colonel then feels he has a man with whom he can fly with confidence that the percentage for survival is in his favor.

BUT if he discovers that his original estimate was erroneous and that the pilot does not come up to his standards, about all Mike usually can do is ride out the mission, meanwhile making a mental note not to choose that pilot again if he is required to accompany the same group on another mission.

On one occasion, however, the colonel didn't hesitate to cause an abortive flight when he detected what in his opinion was a serious shortcoming in the pilot. A few minutes after taking off from China in a B-25, Mike happened to inquire what the colors of the day were.

"Colors?" asked the pilot in surprise. "Why, everybody around here knows what a B-25 looks like."

Astounded, Mike shouted and roared the kid into turning back. Not being a command pilot, the colonel isn't sure he was within his rights. He has an idea he did a wise thing, though, because the color-of-the-day-blind kid was reported missing in action three days later.

"It's not that I'm queer for identification signals," Mike explains. "It's just that I like to ride with people who take their flying seriously and aren't too lazy to try to stay alive."

The colonel realizes, of course, that even the best pilot and crew may run into trouble.

"Things can happen," he says. "Things always can happen. Flak can play a lot of strange tricks. The best evasive action in the world may steer you right into it. Or weather—the air itself—can gum up well-laid plans. But my theory is that a good crew has a far better chance of emerging safely from an unavoidable jam than a poor crew has under the same circumstances."

By the time this is printed, Mike may very well be missing or dead. He says so himself. That's why he wants to remain anonymous.

"If they know my name and then hear sometime that I didn't come back," he reasons, "they'll figure what I've told you is just a lot of bull. They'll forget 400-and-some-odd combat hours without a scratch. But if they don't know my identity, the effect will not be lost and they may learn something. The more they learn, the longer they'll live, and the longer they live, the more they'll learn." ☆

JUST a reminder: it is now winter in Australia and other points Down Under.

You've seen pictures of engines in water-tight pliofilm jackets for shipment. The same principle of water-proof packaging is being applied to other aircraft components as well. The technique is to include some water-absorbing agent, such as silica gel, with the waterproof cover, then brace the component firmly in a sturdy outer package.

In the fight to save equipment from the ravages of humidity, fungus and insects, AAF and QM investigators are testing textiles and other stuffs by the "soil burial" method. The material is buried in carefully prepared soil—a mixture of loam, vegetation and manure—which is a happy growing ground for destructive organisms. Fixed temperatures and humidities are maintained. After a time, the material is dug up and examined. The effectiveness of various protective coatings is tested in this way.

It's especially bad practice to lay any object or put pressure on plexiglas in hot weather. Dents in gun turrets may cause distortion and fatal interference with vision, and if an astrodome is the least bit out of round, the plane may not come back. A deviation of one percent in the aerial navigator's sextant sights will cause an error of seventy miles on the earth's surface.

There is a definite question whether any racial distinction exists in ability to adjust to cold weather. For example, Chinese and Mongolians stand great cold in winters on the Gobi, and Admiral Peary's best traveling companion, who reached the pole with him, was Matthew Henson, a Negro.

Before the Japs came, anthropologists found tribes on some Pacific islands who had forgotten what war was. Incidentally, in several of the various Eskimo languages there is no word for war.

Cockpit covers are sometimes "must-nots" rather than "musts." In the wet tropics, tight covers prevent movement of air and the condensing moisture plays tricks with instruments. The same principle applies to general supplies. *Don't* tuck material under a cozy, tight tarpaulin. Better, put the cover over a ridge-pole, leaving air space above the supplies. In addition, stake out the edge of the tarpaulin so that it leaves a free space a couple of feet above the ground for ventilation. Make sure the supplies themselves are off the ground.

Remember in an emergency that cotton from your first aid kit makes good tinder. You can produce sparks with a knife and the flint imbedded in the bottom of your match box (it's GI). ☆

Prepared by the Arctic, Desert and Tropic Information Center

THOSE TROUBLE-SHOOTING URS

Here's what happens to Unsatisfactory Reports.

MOST disliked report in the AAF is the Unsatisfactory Report (UR), for it spells TROUBLE in capital letters. Yet, it is the one report that is a sure cure for trouble—if properly handled.

A complete UR, submitted on the proper form (red-bordered AAF Form 5-4, revised 2-18-43) the same day an unsatisfactory condition is discovered may save lives and equipment. It may lead to a design change, a modification or issuance of a new Tech Order.

Landing gears are reinforced, tail assemblies are redesigned and special instruction sheets are issued because experience proving the need for changes is passed along to the right persons in the AAF via URS.

Every UR received is incorporated in a semi-monthly UR Digest, which lists the type of equipment that malfunctioned or failed, the number of such failures reported by the entire AAF, the cause, if known, and recommended action.

The Digest (TO No. 00-65), distributed on the basis of individual needs, advises all AAF, Navy and British organizations of the nature of faults discovered in our planes and equipment. In addition to outlining necessary corrective action, the publication describes symptoms which warn of trouble, thus permitting dangerous conditions to be corrected before they cause failures.

More than 12,000 Unsatisfactory Reports are received by the Air Service Command's maintenance division at Patterson Field, Ohio, every month. Many of them result in extensive research and tests over a period of months.

Some URS cover conditions which are not of extreme seriousness. The priority for handling such reports is determined by the number received on particular malfunctions. The more widespread the occurrence of the same type of failure, the more quickly will action be taken by Air Service Command and Materiel Command engineers. So that all difficulties may be dealt with in order of their importance,

it is essential that they be reported promptly.

If discovery is made of a serious malfunction or failure that threatens lives, planes or equipment, a preliminary report should be rushed by telephone, teletype or radio to Headquarters, ASC, Maintenance Division. Speed is vital.

When the brake pedal of a P-47 fell forward and jammed in the foot-trough during a landing, the pilot lost control of the plane and it veered from the runway into a ditch. A UR filed promptly by the 5th Air Force, listed a "missing washer" as the likely cause of the mishap.

As a result of investigation which indicated wholesale omission of the washer when the planes were produced, headquarters, ASC, immediately ordered inspection of the 2,800 other Thunderbolts of the same model and corrective action where necessary.

A UR from Walterboro Field, S. C., revealed the washer had been omitted also from another type of P-47. Consequently, the "bug" was eliminated from 300 planes of that series.

Thus, prompt handling of two URS probably saved many lives and planes. The total value of the aircraft affected by the assembly line error was \$233,000,000.

Fundamentally, the UR is nothing more than a written diagnosis of ailments and malfunctions of airplanes and equipment. It may be prepared by any individual assigned or attached to the AAF.

The Air Service Command immediately can prescribe remedies for more than 80 percent of the complaints by drawing upon the reservoir of information it has gathered from aircraft manufacturers, technical field representatives, tactical squadrons and service depots all over the world.

The other 20 percent of the reports—those disclosing structural or material weaknesses, defective assemblies or excessive wear—are referred promptly to the engineering and production divisions of the Materiel Command for intensive investigation. This action sometimes leads

to design modification, material substitution, closer supervision of inspection or rearrangement of accessory equipment.

In one sense, our combat airmen today are redesigning the AAF's planes and equipment through the system of reporting unsatisfactory operation or performance. Often the remedial measures adopted upon recommendations from the field are standardized in later Tech Orders.

For example, on March 16, 1944, a UR was made out by an A-20 squadron overseas. The complaint was that the pilot's emergency canopy release on the A-20C was difficult to reach, particularly when the top armor-plate section of the pilot's seat was swung into erect position.

A suggested remedy, worked out on one plane, was described with photos in a UR. As a result, Materiel Command engineers on May 10 recommended to the Air Service Command that other A-20 squadrons be authorized to follow the same procedure, which calls for lengthening the cable and rerouting it, to prevent chafing, through fairleads to a pulley near the forward edge of the canopy from which the release handle is suspended. A spring clip holds the handle in place.

Here was an instance of redesigning by tactical crew members. And the job was first-class, good enough to be recommended to other squadrons.

A 10th Air Force B-24 squadron suggested provision of a mechanical brake to hold the Liberator's top turret in azimuth, because prolonged attacks of seventy minutes or more required the turret to be held into the wind and resulted in overheating and burning-out the amplidyne. The armament laboratory at Wright Field developed a one-pound, hand-operated brake and recommended preparation of kits for installation in planes encountering similar enemy attacks of long duration. This was another example of development of new equipment upon the suggestion of a tactical unit.

Because more than (Continued on Page 41)

It takes awhile for new customers of the orthopedic ward to become sold on the calisthenics program as presented by PT instructor Sergeant Rochester. One of the sergeant's best salesmen is Tail Gunner Gordon who has sampled the exercises long enough to reap the dividends of speedy physical improvement.

AAF CONVALESCENT TRAINING PROGRAM



By Lt. ... Lent
AIR STAFF

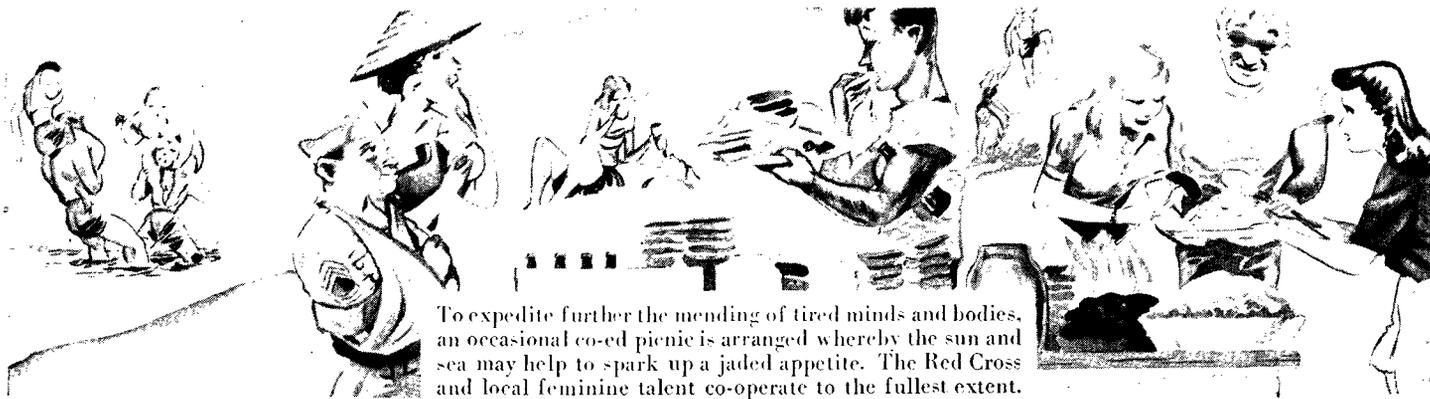
Training classes at the regional hospital may be short on formality but they are long on ingenuity and participation. Sometimes the patients themselves play the professor's role. Sergeant Ryan was a big-league magazine illustrator in civilian life and here he puts a little zing into the aircraft recognition course.



Instead of stringing beads and counting the cracks in the ceiling, ambulatory tenants put their time to functional use. Three dayrooms and a library have been completely furnished with the products of the wood-working shop.



At the farm adjoining the Convalescent Center, returned airmen have an opportunity to renew acquaintances with things of the soil. To some members, this is a brand new type of mission. Co-pilot Davis is now being briefed for the "milk run" while bombardier Brown picks up some real eggs to drop off at the officers' mess.



To expedite further the mending of tired minds and bodies, an occasional co-ed picnic is arranged whereby the sun and sea may help to spark up a jaded appetite. The Red Cross and local feminine talent co-operate to the fullest extent.



NOTES ON WOMEN'S ACTIVITIES IN THE AAF



BIDDING THE BOYS GOODBYE IN COMFORT

There is no time quite so precious to an Army man as those last few brief days in his staging area when, for the last time until he returns from combat, he has a chance to be with his wife, mother or sweetheart. Typical of these many staging areas throughout the country is that of the 21st Bombardment Wing at Topeka, Kan., where highly trained bombardment crews come for a period of not more than seven days for final processing before taking off for overseas duty.

Wives, mothers and sweethearts come there to bid their men farewell but arrive to find "no room at the inn." The 21st Bombardment Wing stations, like scores of others throughout the country, are located in farming communities, which ordinarily have little demand for transient housing, and proper hotel accommodations are purely wishful thinking.

"You cannot imagine what it's like," said one woman among the first to arrive dusty and tired at such a station in its early days. "to get here, hoping that these last few days will be ideal ones and then find you have no place to stay or no way of finding out what's available, no place to sit out the hours while you're waiting

to see your husband, no place to leave the baby you've brought to see his daddy, no one even to give you any information."

Although charged with the major task of meeting commitments for his crews in all theatres of war, Brig. Gen. Albert F. Hegenberger did not forget the truism that in war, morale conditions make up three-quarters of the game. And high morale, he realized, is not built by improperly housed wives, mothers and

sweethearts, especially when it is only a matter of days until their men "shove off," some never to return.

General Hegenberger directed that the officers' wives club launch a project known as the Combat Crew Wives' and Mothers' Club and that it sponsor such facilities as a reception and information desk, lounge room, nursery, rest rooms and Red Cross program. Later the group became part of the women's volunteer section of the Personal Affairs Division.

They took over a farmhouse adjacent to the officers' mess on the Topeka field and renovated it for use as headquarters for women visitors. Volunteers man the information desk every day, welcome newcomers, receive messages and help with transportation and housing problems.

After a tiresome trip the visitors can bathe and rest in one of several bedrooms in the club house, read and relax in attractive lounges and place their small children in a nursery equipped with cribs. In their spare time they join the wing and base wives to knit and sew for the Red Cross.

HIS KINGDOM FOR A 'UKE'

It may be years since a lot of GIs gave up trying to be another Heifetz, Larry Adler or Benny Goodman. But now when they are stationed at some bleak outpost in the North Atlantic or on a lonely

Pacific atoll, they would trade this month's pay check for that clarinet Mom finally gave away because nobody used it any more.

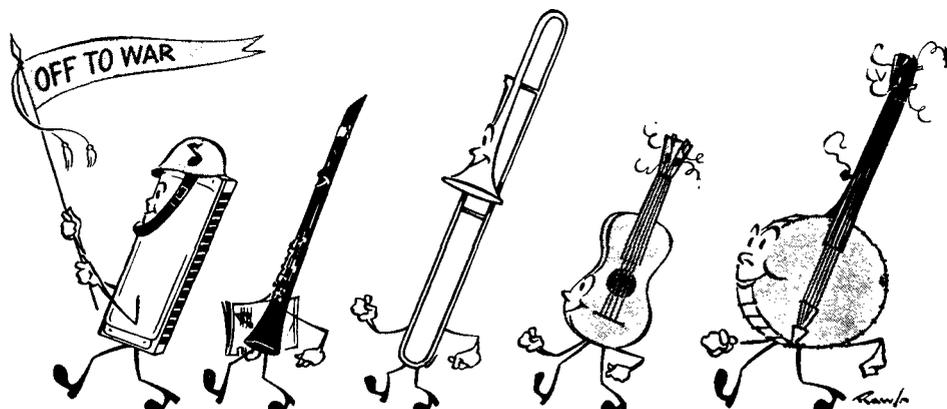
Chances are, these men can't get musical instruments where they are now, the folks back home can't send them because generally they can't even find one to buy these days. But lying unused and forgotten in the country's attics and storerooms are literally hundreds of thousands of discarded harmonicas, accordions, guitars, violins, "ukes," trombones and the like.

An organization known as Music for the Services collects these instruments from all parts of the country, repairs them if necessary and sends them, together with sheet music and books of instruction, to isolated posts all over the world. Very often they are delivered to our men by air, for occasionally there is some last-minute space available just large enough to tuck away a violin or a "sax" after the rest of the cargo has been put aboard planes heading overseas.

AAF women volunteers are active in the nation-wide drive to ferret out a bumper crop of instruments this summer. Mrs. Stuart Godfrey, wife of Brigadier General Godfrey, of the Air Engineers, founded Music for the Services, and Mrs. Carl Spatz, wife of Lieutenant General Spatz, is the Air Forces representative for this all-service group.

"Music means a lot to our boys overseas and the least we can do is send them instruments which are now lying about unused," says Mrs. Spatz, who admits being the only non-musical member of a family which includes a concert-pianist daughter and an accomplished guitar-playing chief of the U. S. Strategic Air Forces in Europe. "We are filling requests all the time for harmonicas and other instruments that can no longer be purchased. All instruments collected should be turned over to the special services officer at any AAF station. He will see that they are put in condition and started on their way."

Communications concerning Music for the Services should be addressed to Mrs. Carl Spatz, 206 Duke Street, Alexandria, Virginia. ☆



DO YOU NEED A LAWYER?

By Brig. Gen. L. H. Hedrick
The Air Judge Advocate

ILLUSTRATION BY SGT. CHARLES OVERMAN



It takes a specialist to draw an ironclad will or a foolproof power of attorney, so see your AAF Legal Assistance Officer.

The following article is the first of a series written for AIR FORCE by General Hedrick.

JOHNNY SMITH was a conscientious sort. He had worked hard as an automobile salesman, and by the time his induction notice came he had things in shape for his mother and sister to live comfortably for the duration. He had managed, by watching his dimes, to buy a home. The mortgage was small, and with Sis's job and Johnny's allotment there would be enough to keep up the monthly payments. So Johnny was in good spirits the day he went off to war. He had done handsomely by the home folks. Now he was ready to serve his country.

As one would expect of a fellow like Johnny, he made a good soldier. In no time, he won a stripe, then a second, and by the time he went overseas he had a third.

The other day, Sgt. Johnny Smith was killed in action over France.

When his estate came up for settlement, it developed that in arranging things for Mom and Sis, Johnny neglected something important. He hadn't made a will. He had intended to, but, as he told Mom and Sis one night, his was a pretty simple estate and wouldn't require much handling. So he kept putting it off. He put it off too long.

Johnny didn't know how important it was. In the absence of a will, the laws of descent in his home state required that

his property be distributed in equal shares to his mother, his sister and his brother, Bill. Johnny had almost forgotten about Bill. In fact, Bill was the kind of a no-good brother a fellow would just as soon forget.

Today, Bill is insisting that Johnny's house be sold so that he can get his share of Johnny's estate in cash. That's his privilege under the law, and there's nothing Mom and Sis can do about it. They'll have to sell.

A will would have prevented this. With half an hour's trouble and no expense, Johnny could have protected Mom and Sis and left Brother Bill out in the cold where he belonged. The legal assistance officer of Johnny's outfit would have been glad to help.

MAYBE Johnny didn't know there was a legal assistance officer at his field. Or if he did know, maybe he hesitated to bother him with a small matter. The legal assistance officer would have known, as Johnny apparently didn't, that a will may be just as important for a small estate as for a large one. The legal assistance officer, a competent lawyer, would have told Johnny Smith that unpreparedness in legal matters often is costly and even tragic. He would have assured Johnny that the AAF recognizes legal assistance as one of its responsibilities, a service to which military men and their dependents are entitled. It would have been Johnny's for the asking.

Nearly every AAF installation in the United States has at least one legal assistance officer. It is his business to get all men squared away on their legal affairs. Despite the efforts of the AAF in this regard, there are many men overseas today who still need help on legal problems. If, in such cases, a legal assistance officer is not available—this is true in

many places overseas—an AAF enlisted man or officer can get help by writing direct to The Air Judge Advocate, Legal Assistance Division, Headquarters Army Air Forces, Washington 25, D. C. He must, of course, state his problem fully, giving all facts which might conceivably have a bearing on the question.

Every case requires a separate study. It would take volumes to set out a system of rules to cover all wills. It will be the purpose of this article to point out some of the common blunders that get estates into trouble—blunders that almost invariably can be avoided by consulting a lawyer and following his instructions.

Too many men attempt to write their own wills. Thousands of estates have run into trouble because the testator left a homemade will or simply signed a standard will form which he bought at the corner drugstore. A mechanic wouldn't attempt to remove his own appendix. No more should he try to write his own will.

Here is a common difficulty into which untrained will-writers stumble. A will has an attestation clause which must be signed by witnesses who actually saw the testator sign the document and declare it to be his last will and testament. Each witness also must actually watch the other witnesses sign. Many wills have been declared void because one of the witnesses stepped out of the room momentarily and did not see all the signatures inscribed. Others have become worthless because the persons who drew them didn't know that the laws of the States concerned required three witnesses instead of two. Difficulties frequently arise because the witnesses are not available to prove the validity of the will when the time comes for probate. Wills have been scrapped because one of the beneficiaries served as a witness.

Settlement of a simple estate needn't involve tedious legal procedure. Again the case of Johnny Smith—and it is used here because Johnny is just like thousands of other Johnnies in the Army. A competent lawyer or legal assistance officer probably would have advised him to leave his property to his sister in trust for his mother during the balance of the

latter's life, after which it would go outright to his sister. This is often a better arrangement than leaving property to two people jointly, as legal titles grow complicated in proportion to the number of people involved.

Johnny also would have been advised, no doubt, that he could save trouble and expense for his heirs by appointing either his mother or his sister executrix to serve without bond. Unless this is specified in the will, the person appointed by the probate court to administer an estate is required to give a surety bond in an amount equal to the total value of the property other than real estate. In Johnny's case, since he doubtless had complete confidence in both his mother and his sister, a bond would have been unnecessary.

A will can be made to provide all manner of safeguards for the beneficiaries. Suppose, for example, the testator fears that his wife has not the necessary business experience to manage his property until the children come of age. Through his will, he can appoint a guardian. In the absence of such a provision, the probate court normally will place the management of the property in the hands of the children's mother as the closest relative.

HERE is a point about estates that servicemen should read and understand. If the arrears in pay of a man killed in action amount to more than \$500, the Government insists that an administrator be appointed for the estate to make sure that the money gets to the rightful heirs. A will, properly written, names the person who will administer the estate, thus simplifying the court proceedings and expediting payment to the heirs.

A question that stumps many testators is what to do with a will after it is executed. This is important because a lost will is difficult to establish in court. A soldier should send his will home with instructions to the family to put it in a place where it unquestionably will be found in the event of his death. He should inform every person named in the will, especially the executor or executrix, where it is to be kept. If it is to be sent to a person unfamiliar with probate proceedings, he or she should be told that after the death of the testator the will should be taken to the nearest probate court. This is the safe procedure, because the probate court always will be able to advise properly as to the next step.

A will is not something to be tucked away and forgotten. An estate often gets into a jam because the testator fails to change his will to keep it in line with his own financial or family status. A man gets married and forgets to make a new will. Children are born and he fails to change his bequests to provide for them. A man divorces his wife and neglects to name a new beneficiary. Every man should

review his will periodically to make sure that it covers his situation and desires. This is no less important than making a will in the first place. The most satisfactory way to change a will is to make a new one. Erasures and insertions will make it void, and making a codicil—the legal term for a postscript to a will—is as much bother as starting from scratch.

Most people don't know that in some States a will is revoked by the birth of a child. In other States, a child not men-



**A good way
to get hurt . . .
and hurt badly . . .
is to jump off a
crew stand.
Use your head and
use a LADDER
always.
You can't help
win the war if
you're laid up
in ward 1.**

tioned in the will gets his proportionate share of the estate just as if the father died without a will—or intestate, as the lawyers say. This intestate share of a minor child must be set aside in a trust fund until he comes of age. It is desirable in most cases to leave the property to adults, either outright or in trust for the children with appropriate provisions as to expenditures for education and maintenance.

A will is, of course, inoperative until after the death of the testator. To a soldier, especially one overseas or expecting to go over, it is equally important to

provide for proper handling of his property while he is away. Take a case. Cpl. Bill Jones is serving overseas. He has an automobile, which his wife is using while he is away. One day, Mrs. Jones has an accident and smashes up the car. The insurance company is willing to pay for the damage, but there is a hitch. Bill Jones will have to indorse the company's check, and Bill is somewhere in the South Pacific.

Bill Jones should have executed a power of attorney giving his wife the authority to indorse checks made out in his name. Of course, one can make the power as broad or as narrow as one wishes. It may authorize the person named in the document to do as he sees fit with whatever property the grantor owns. On the other hand, it may limit the grant of power to indorsing checks or collecting rent on the home.

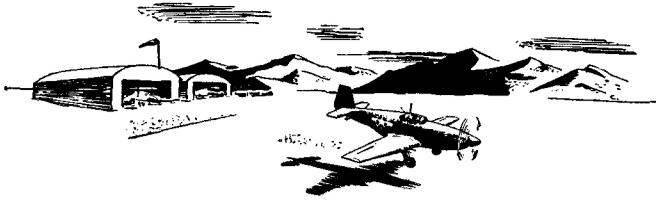
A word of caution: think well before executing a power of attorney. Keep in mind what it means to authorize someone else to sign your name, to let someone else write checks on your bank account, to let someone else buy for you and sell for you. Be sure that the person to whom you give such authority is completely trustworthy. Be sure that he is capable. Be sure that you can rely on his judgment.

There are limitations on the usefulness of powers of attorney. These should be understood. Since powers of attorney are revocable at will, some individuals and institutions refuse to honor a power of attorney without proof that it is valid and subsisting, and such proof is hard to produce. Likewise, death of the grantor automatically revokes a power of attorney, and it is difficult indeed to prove to the satisfaction of a banker that a fighter pilot based in Normandy is still alive.

It might be good business, therefore, for a soldier, in addition to executing a power of attorney, to transfer his property to the name of his wife or some other close relative in whom he has complete confidence. Then there is no need for his signature in transactions involving his property. This is at least a partial answer to the question of the limited usefulness of a power of attorney.

Most of you who will read this article were civilians not so long ago. You have become engaged in, or are subject to, an extremely hazardous occupation. Because your activities and places of residence are unpredictable from one day to the next, your ability to handle your affairs has been greatly curtailed. Everyone in military service owes it to himself and his family to get and keep his legal affairs in order.

If this article has done no more than to convince you that even a simple estate can bog down when it is improperly handled, it has served its purpose. The answer is to see your legal assistance officer. You cannot afford to wait. ☆



FLYING SAFETY

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

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

WHIRLING PROPS—SUDDEN DEATH

Air authorities have been harping on the dangers of revolving propellers since the advent of the first plane. But just recently, six more AAF members were killed when they walked into whirling prop blades.

One of them, a corporal, stepped out of a B-24 before the engines were stopped, took a few steps in the wrong direction and was killed instantly. Then, a navigator forgot to take along his chute, jumped out of the plane to get it after the engines were started and walked right into a prop.

Another trained airman met his death when a pilot landed to discharge a radio operator who had become airsick. In spite of the fact that the engineer had been instructed to watch the man and inform the pilot when he was clear, the radio operator marched directly into the propeller.

This should be enough to prove to skeptics that there isn't any future in wrestling with props. A few men have been known to come out of a prop encounter mangled, but alive. Not very many, however.

PARACHUTING TECHNIQUE

The importance of learning the correct body position to assume before pulling a parachute ripcord was spotlighted in a P-38 pilot's report on an emergency jump into the Pacific.

"I cleared the ship perfectly," the pilot said, "but, unfortunately, I made no attempt to control my body position. When the chute opened my right leg was tangled in the shrouds. The chute billowed open and closed three times before I could pull myself up and get untangled."

As a result of observations and tests, OFS recommends that the jumper have his feet together and legs straight when opening the chute. This position tends to prevent fast tumbling and rolls. With elbows close to his sides, the jumper should look directly at the handle, grasp it and then yank hard.

While in a free fall, it is almost impossible to establish body position in relation to the earth. That fact, however, should cause no undue concern. The important rule to remember is to straighten out, with feet and legs together, before the ripcord is pulled.

ENGINEERING COURSE

So they may become better combat flyers through complete knowledge of their planes, all pilots taking the B-17 course at Hendricks Field, Fla., attend an engineering ground school.

The 48-hour engineering curriculum consists of lectures and lab work. Mock-ups and parts of planes are displayed in the classrooms so pilots can apply theory to actual mechanisms. Thus, a better understanding of the various complex systems is gained.

FIRST-HAND INFORMATION

Pilots in B-24 transition school at Maxwell Field, Ala., now receive weather briefing from meteorology instructors before each mission. Previously, flight commanders obtained the weather information and passed it along to the pilots.

KEEPING TABS ON TRAFFIC

A handy method for recording the position of local traffic is used in the control tower at Chanute Field, Ill.

A chart, approximately 8 by 18 inches, is marked off at half-inch intervals to represent each 500 feet of altitude over the local range. As an airplane is assigned an altitude for practice range orientation or for actual instrument let-downs, tower operators place a numbered miniature airplane at the proper level on the chart. To the marker recording a transient plane there is attached a card carrying the plane's number and its estimated time over the range.

Thus, the operators, who also handle the voice range, can tell at a glance at what levels planes are flying.

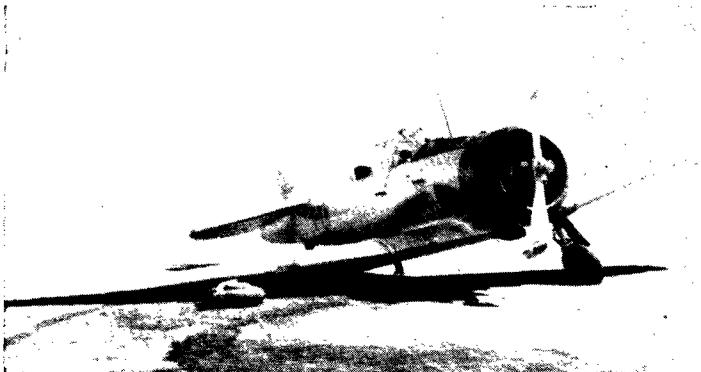
LET THERE BE LIGHT

A flash light is a small object, but the lack of one cost the AAF a medium bomber. It happened on a night mission when the flight engineer had no light to make emergency adjustments.

All flight engineers in that command now draw flash lights before any mission.

Improper landing technique, which one AAF pilot failed to correct, caused him to groundloop and damage two planes in as many months. He cracked-up the AT-6 (left) while he was an aviation cadet in advanced single-engine school in Arizona and the P-39 (right) exactly

sixty days later in Airacobra transition school in Florida. In both mishaps, which were strikingly similar, the right landing-gear was broken off. With the P-39, the pilot disproved the earlier-held theory that a plane equipped with tricycle landing-gear could not be groundlooped.



NAVIGATORS' INFORMATION FILE

Distribution of the new Navigators' Information File is underway. Resembling the Pilots' Information File in size and makeup, NIF contains 224 pages, illustrated in two colors. The book is divided into sections dealing with navigational practices, tactical operations, the navigator's responsibilities, weather and emergency procedure.

Distribution of NIF is governed by AAF Reg. 62-15, 28 February 1944.

A copy is being supplied each rated navigator and navigation cadet through operations officers. Regularly established AAF files, base operations offices, groups and squadrons get two copies. NIF also is available to training activities where needed for instructional purposes.

Overseas theatres and "alerted" areas may obtain NIF, at the direction of the commanding officer, by requisition on the local Air Service Command distribution center.

Whereas PIF is brought up to date on

a regular monthly schedule, it is planned to revise NIF whenever the occasion demands. Revisions may or may not be on a monthly basis.

All rated navigators in the continental United States are required by regulation to read NIF and keep up with revisions, signing a certificate of compliance. Comments, suggestions and criticisms are invited. Address communications: Headquarters AAF, Office of Flying Safety, NIF Unit, 1018 Buhl Building, Detroit 26, Mich.

TO COMPLIANCE CHARTS

To insure prompt compliance with Tech Orders, the 2nd Air Force requires all its units to maintain a daily-posted, ready-reference chart in their engineering offices. Base technical air inspectors keep a consolidated chart, which is made current weekly.

The size of the charts is governed by the number of assigned aircraft.

A code has been devised for marking the charts. The symbols and their meanings:

- Red cross—Immediate action TO.
- Red diagonal—Action as soon as possible.
- Red dash—Action as soon as practical.
- Black cross—Compliance at engine change.
- Black diagonal—Compliance at depots.
- Vertical black line—TO not applicable.
- Green triangle and date—Compliance accomplished.

A rescinded Tech Order is indicated by drawing two red lines through the TO column along with the date. When a plane is transferred to another base, two red lines and the date are placed in the airplane column.

Reproduction of a typical chart is seen at the left.



TRAFFIC SIGNALS FROM SCRAP

To prevent collisions between planes and ground vehicles at Lakeland Field, Fla., tower-controlled traffic signals, one of which is pictured above, have been constructed from scrap materials and installed at intersections of runways and roads.

Lights for each runway are connected on one series and all crossbound traffic can be regulated by the tower attendant's pressing a single button.

Scrap lumber, No. 10 cans, wire, red and green glass, light sockets, 60-watt bulbs and paint were used in producing the signals, which are mounted parallel to the edges of the runways.

DOUBLE CHECK

Failure to check the fluid level in hydraulic systems resulted in two B-25 belly landings at an airfield in the mid-west recently. Henceforth, both pilots and maintenance crews will be responsible for making such checks before flights at that field. ☆

TECHNICAL ORDER COMPLIANCE CHART										
TECHNICAL ORDER NO. AND DATE	DATE RECEIVED	FORMS AFFECTED			OTHER FORMS	TO KIT REQUIRED	B-17		B-17 AT-24	
		60A, 60B, 61	41B				F	F	G	
01-6088-17 4-15-43	5-1-43	60A			YES	42-5060	42-1092	42-31096	42-10037	5-3-43
01-20EF-63 9-22-43	10-1-43	60A		00-20A	NO	10-5-43	12-15-43	10-5-43	10-5-43	
01-20E-109 11-30-43	12-11-43	60A			NO	12-15-43	12-15-43	12-15-43	12-15-43	
01-20EF-62 11-2-43	1-4-44	60A			YES	12-15-43		+	+	
01-20EF-60 1-15-44	2-1-44	60A			YES	+	=	+	+	
01-20-16 3-18-44	3-20-44	60A		00-20A REPLACED 3-22-44	NO	3-20-44		3-20-44		
01-20-16 3-27-44	3-28-44	60A		00-20A -2	NO	3-28-44		3-28-44		

P. & I. SAYS:



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

CAMP SPRINGS, D. C. — After making a normal landing, a P-47 pilot crashed into a parked refueling unit as he was easing into a ramp. The flyer said he could not see the truck because the sun was shining directly in his eyes.

P & I COMMENT: When visibility is restricted for any reason, a taxiing pilot must halt his plane and wait for wing tip guides.

PERRY, Fla. — A P-40 pilot was directed by a member of a line crew to taxi his

plane off a crowded ramp. He hit a soft spot, nosed the ship up and damaged the propeller.

P & I COMMENT: A pilot must never taxi from a hard surface unless he is absolutely sure of the turf. Complying with requests from careless linemen may get him in trouble. If there is any doubt, he should cut his switches and allow linemen to tow the plane away.

STUART, Va. — The pilot of a B-17E on a celestial navigation mission buzzed this village and several nearby towns. After the demonstration, the plane crashed into the side of a 3,200-foot mountain peak, killing the pilot and all members of the crew.

P & I COMMENT: The course of the mission led nowhere near the crash area. Moreover, the pilot had been briefed to fly at not less than 4,500 feet. The violation of orders cost the life of the pilot, who had decided to buzz his home town, and the lives of ten other men who prob-

ably had no particular interest in a close-up view of a Virginia village at night.

OSCODA, Mich. — A P-40, whose pilot had failed to adjust the rudder pedals, veered to the left on take-off, ground-looped and nosed up. The right pedal was in full forward position and the pilot could not correct for the groundloop.

P & I COMMENT: Always adjust rudder pedals before take-off. Be sure that the rudder is in neutral position when the adjustment is made and that the pedal latch is securely in place.

GOLDSBORO, N. C. — A P-47 pilot, knowing his brakes were defective, taxied his ship down the ramp. His right brake failed to hold when he attempted to stop. The plane swung around on the left wheel causing the right wing tip to smash into a parked plane.

P & I COMMENT: Aircraft never should be taxied when brakes are known to be below par. If the plane must be moved, the pilot should call for a towing tug. ☆

WHAT'S YOUR AIR FORCE I. Q.?

Forget your KP strategy for a moment and give mental heed to this month's AIR FORCE Quiz. It's a toughie, so don't be over-eager. Credit the usual five points for each correct answer. A score of 85 or above is excellent on this one; 70 to 80, not bad; 60, fair; below 60, your guesswork is off the beam.

1. The distance in statute miles from Guam to Tokyo is approximately
a. 450 miles c. 2,650 miles
b. 4,200 miles d. 1,600 miles
2. A flight officer holds a status equivalent to that of warrant officer, junior grade.
a. True b. False
3. The name popularly given to the C-56 is the
a. Skytrain c. Commando
b. Lodestar d. Skytrooper
4. The horsepower developed by each engine of the A-20G is
a. 900 c. 1,200
b. 1,700 d. 1,500
5. The 75 mm cannon in the nose of the B-25 has an effective range of about a
a. Mile c. Quarter of a mile
b. Half mile d. Two miles
6. The P-61 is popularly known as the
a. Black Widow c. Baltimore
b. Kingcobra d. Atenger
7. In ditching a B-17, the landing is best made in a glide with engines off.
a. True b. False
8. The southernmost island in the Philippine group is
a. Luzon c. Samar
b. Mindoro d. Mindanao
9. The Commanding General of the 9th Air Force is
a. Lieut. Gen. Lewis H. Brereton
b. Lieut. Gen. James H. Doolittle
c. Maj. Gen. John K. Cannon
d. Maj. Gen. Nathan F. Twining
10. A straight line from Rabaul to Tokyo would pass through
a. The Philippines c. The Marshalls
b. The Marianas d. The Solomons
11. The primary circuit is open on a battery system when
a. The engine is idling
b. The switch is off
c. The engine is running at cruising speed
d. The breaker points are open
12. The Jap aircraft popularly referred to as the Tojo is a
a. Two-engine fighter
b. Two-engine bomber
c. Single-engine fighter
d. Four-engine bomber
13. The base pay of enlisted men is increased by what percentage when they serve beyond the continental limits of the United States?
a. 20 percent c. 15 percent
b. 5 percent d. 10 percent
14. The eight .50 caliber guns of the P-47, firing in salvo, can shoot how many rounds per minute?
a. 1,000 c. 2,500
b. 4,000 d. 6,000
15. The normal landing speed of the B-24D is approximately
a. 140 mph c. 125 mph
b. 95 mph d. 105 mph
16. The yearly base pay of an AAF General is
a. \$10,000 c. \$5,000
b. \$15,000 d. \$8,000
17. Two of the three types of ammunition used in aerial machine guns are tracer and armor-piercing. Name the third.
18. The glider CG-13 has a towspeed of approximately
a. 50 mph c. 150 mph
b. 300 mph d. 275 mph
19. McChord Field is located nearest to
a. Pensacola, Fla. c. Seattle, Wash.
b. Dover, Del. d. Santa Fe, N. M.
20. Identify the two controls held by this P-47 pilot:



Answers on Page 63

TROUBLE-SHOOTING URs

(Continued from Page 34)

400 Unsatisfactory Reports from all parts of the world are received by the Air Service Command's UR unit every day and because preservation of lives and materiel frequently hinges on prompt corrective measures, no UR is filed away. As rapidly as each one can be reviewed and tagged with an ASC reference number, it is forwarded to one of the technical sections of the maintenance division.

There a technical specialist examines the UR, checks it against others to see if it reflects a previously reported trouble, consolidates available information for the answer and submits his report for the UR Digest. Sometimes the answer simply is a reference to a newly issued TO. Sometimes it is advice that the trouble covered in the UR resulted from non-compliance with existing directives and instructions.

If the answer is not available to the

ASC or the UR indicates that a change in design or material may be necessary, the report goes to the Materiel Command's engineering division. If defective assembly or workmanship is reported, the UR is channelled to either the production division or the inspection division of the Materiel Command. The division concerned may, in turn, forward the report to the manufacturer for corrective action.

Each agency carries on research and tests and when the fault and method of correction have been determined, appropriate action is taken in the form of issuance of a new TO, change in design or material, modification or more rigid inspection. Disposition of all cases is recorded in the UR Digest.

Greatest hindrance to expeditious handling of URs is the failure of the reporting unit to furnish complete information.

When the red-bordered form contains necessary exhibits and full details concerning previous maintenance or repair,

possibility of sabotage and unusual operational conditions as well as required routine data, action can be taken promptly and production of better equipment and improvement of maintenance procedures will soon result.

If information is incomplete, however, additional correspondence may be required and extensive research and tests to duplicate the reported condition may have to be carried out over a period of several months, thus unnecessarily delaying realization of the UR system's purpose. ☆

PICTURE CREDITS

52: Ewing Galloway and T/Sgt. Roger Coster, AIR FORCE Staff Photographer.

All other illustrations secured through official Army Air Forces and Signal Corps sources.

Requests for prints of photographs for official use and publication appearing in AIR FORCE should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.



To permit paperwork, inescapable even under combat conditions, each compak includes a set of stock records and a portable file desk.

PORTABLE INVASION DEPOTS

By Capt. Robert V. Guelich

AIR FORCE STAFF

Compaks, with a month's supply of plane repair parts, are the ASC's solution of AAF maintenance problems at advanced bases in France.

WHEN our air units moved from the British Isles to captured airdromes and landing strips in France, many of the aircraft maintenance headaches encountered in the early stages of the Mediterranean invasions were averted by the presence of compact 200-pound supply kits, which make up the AAF's new "front line" depot.

These combat pack-ups, or "compaks" as they are termed officially, are the Air Service Command's answer to the problems that plagued many of our early invasion operations—floods of unnecessary supplies, lack of proper repair parts, immobile stock bins and warehouses, shipping losses and the like.

The compaks were developed after extensive conferences with supply experts from all combat theatres, service tests in Sicily and Attu, and months of simulated combat operations at the AAF Tactical Center. The ASC assembled supplies and parts essential to the operation of a group of planes for a period of thirty days, packed them in sturdy, waterproof cases with hinged doors and built-in-bins, enclosed sets of stock cards and a file desk—and yet held the weight of each box to 200 pounds. This packaged warehouse was developed for all fighters and bombers, complete to the dash number (P-38G-15).

From 96 to 180 boxes, depending on

the type of aircraft to be serviced, comprise a compak. They contain a month's supply of some 700 items—the repair parts a mechanic needs to keep his plane in flyable condition under combat.

A compak can be moved without cranes, carried on trucks and loaded in a C-47. In the cross-Channel move from England, boxes were loaded in trucks assigned to each air group and ferried to the Continent. On the other side, the vehicles were driven directly from invasion barges to airdromes where ground crews piled out, unloaded their supplies and immediately began their service and repair business. Supplies were given the mobility of men and trucks. The AAF had solved its major problem, moving supplies to advance airdromes as fast as men and planes.

Until November of 1942, the AAF had been limited to defensive operations so its then standard supply system could not be given a fair test. Invasion of North Africa soon showed up the shortcomings of a slow-moving supply organization. This action also proved the need for more scientific packaging of aircraft supplies.

During unloading operations many cases filled with water and sank. Others fell apart from rough handling and their contents were damaged by salt water. Once ashore, many of the crates were too large to be transported through narrow



Designed for transportation by plane or truck and for easy handling at a base, none of the boxes of a compak weighs more than 200 lbs.

French streets, through railroad tunnels and bridges, too heavy to be transported on foreign railway cars. Because of bulk shipment of supplies and inadequate labelling, much equipment piled up at railheads and never reached the AAF units which were expecting it. And no one knew where to find stray equipment for there was no satisfactory stock record or tracing system in existence that could keep up with advancing units.

These experiences in North Africa convinced Col. Oakley G. Kelly, one of the first to work on plans for a maintenance and repair package for squadrons and groups overseas, that a complete change

in the supply system was essential. With his assistants, Maj. Frank Blair and Capt. Gerard R. duKet, he compiled data on the average rate of consumption of spare parts by tactical units. This necessitated provisions for accelerated wear and battle damage in active war zones with compensating allowances for salvagable material. The goal was to eliminate excessive supplies of large and heavy items, such as wings, provide additional quantities of fast moving parts and assure prompt delivery of all items to advance airdromes.

Air Service Command assembled data from all theatres and built the first compaks in time to send two of them by air to Attu in early 1943. Others later were service tested during the Sicilian and Italian invasions. They proved their worth, and soon they were being assembled on a production-line basis at ASC depots throughout the United States.

With the establishment of the 9th Air Force as our invasion air force, mobility and rapid movement were of paramount importance. From November, 1943, until May, 1944, compaks were directed primarily to the 9th Air Force—three for

from which the new planes will operate. When planes and parts meet, they move as a unit to each new airdrome location.

Now that bases have been set up in France, replacement compaks are shipped direct to the operational airdrome without having to be channelled through England. This plan will be followed in future offensive movements in the Pacific and other theatres where our air forces constantly are leap-frogging ahead, necessitating a rapid flow of first and second echelon supplies to each new base, free of the delays encountered in requisitioning and awaiting delivery of minor repair parts from large depots far behind "front line" airdromes.

THIRD echelon maintenance (and some fourth) is accomplished by "service teams" that move up with machine shop equipment to support each combat group. The service team of the 9th Air Service Command includes a service squadron and many of the units formerly attached to the old-type service group. Two teams comprise the new service group and each is responsible for maintenance and repair of one combat group of fighters or bombers. Mobile depots and the permanent ASC depots of England and France back up the forward moving service groups.

Supplies of repair and maintenance parts for the 8th Air Force in England were practically complete for invasion operations as early as January, 1944. By the end of April, the 9th Air Force—living in tents and under strict field conditions in order to "keep mobile"—was prepared

for its ride across the English Channel to operate from continental bases against the Germans. There were a few emergency shipments in C-87s that returned to the States to pick up supplies of new electrically-heated suits, special types of spark plugs and photographic paper and supplies. With the influx of many hundreds of C-47s for airborne operations, there also was a rush to build up supplies for the cargo planes. By the first of May, however, all was in readiness for D-day.

Since exact rate of consumption of the many thousands of parts in all of our combat aircraft cannot be precisely estimated, provision is made for redistribution of surpluses and for rapid replenishment of compaks that have shortages.

From Italy, where the supply of airplane tires was believed to be adequate for at least one year of operational flying, came an emergency order for 4,000 bomber tires. The crisis was severe; Vesuvius had erupted and its molten ashes had solidified to blanket our airdromes like crushed glass. Tires were shredded by the thousands every day. Replacements had to be pulled from every depot in the States and rushed to Italy.

To meet all contingencies, the ASC has evolved a highly efficient system of filling overseas emergency requisitions from its three overseas depots—Newark, N. J., Miami, Fla., and Oakland, Calif. Ninety percent of all emergency requisitions are filled in fifteen days. For the 9th Air Force during invasion operations, many requisitions were filled in forty-eight hours, few in more than ten days. ☆



Before a carton is placed in a compak box, it is waterproofed by being dipped in beeswax.

each group, providing a ninety-day supply, with replacements following.

New problems poured in on ASC as fast as the supplies for the combat pack-ups. The P-51 had an engine change, requiring all new parts, modifications were made in the P-38 and in all other planes. This made it necessary to revise the stock supply tables for each airplane every ten days. Despite continuous changes, ASC accelerated its assembly rate until it was packing supply compaks at the rate of 45 per month in early June.

Each compak is earmarked for specific groups of airplanes before they come off the production line. Upon shipment overseas, the theatre air service commander then directs each compak to the field

To replace damaged wing-tips, boxes of new ones are sent to advanced bases in compaks. Removal of one wing-tip does not disturb the others, for each is anchored and cushioned.



Red Stars and Blue Stars

(Continued from Page 5)

He knew what a "mechanic" was, but the term "engine-mechanic" surprised him and the designation "engineering administration officer" stumped him completely. But these minor difficulties were the only ones encountered in probing into each other's language and nomenclature.

The relations between the officers and men of both armies were exemplary. Our non-coms were especially well treated. Occasionally, a Soviet officer would salute an American sergeant. We, too, were diplomatic enough not to wait always for the salutes of Soviet officers in lower grade.

The Soviet commander seemed to be interested in us personally, and he surprised us by remembering by name those, regardless of grade, who had been in conferences with him and the Red Air Force staff in Moscow.

We were not displeased when Soviet soldiers showed us their wound scars and recounted their military exploits, because we realized their laurels were hard won in battles that had cost their people plenty. Our industrious Soviet engineers invariably were wounded men returned from the front. The clinking of their medals chimed intriguingly with the clanking of the steel mats they so ably laid for our runways.

Sometimes, we learned, you have to boast back at the Reds. They liked that, too. After we had finished a particularly satisfying joint effort of bragging, my Soviet officer companion smiled at me impishly.

"Soviet might plus American technique," he boasted.

"You mean mighty American technique," I bragged, in return.

"Da, Da," he agreed, heartily.

Men of both air forces were always relaxed and comfortable in each others' company. We shared our recreations and many firm friendships were made. Our political conceptions were practically never discussed and neither we nor they gave each other any reason to feel that any differences existed.

While the Reds came to our movies in greater number than we to theirs, their official concerts offered us a most popular form of entertainment. At all concerts the "Star Spangled Banner" was played and the program also included Gypsy jitterbugging and Soviet shimmy for our special benefit.

Some of us were concerned at first about the American soldiers' whistling as

a sign of applause. For the Reds, the whistle is a mark of disapproval. But after an announcement was made at one of the concerts explaining the meaning of the GI demonstration, the Soviets completely reversed their pattern and thereafter whistled with us whenever they were pleased with a performance.

We also were heartily welcomed and hospitably treated by the Soviet civilians. At first our men were restricted to the station areas but soon they were given the freedom of nearby towns and villages,



Finest materials and workmanship went into most structures at the new bases but emergency measures were sometimes required. This control tower, for instance, was built from packing cases.

where they were pampered by the older residents and well liked by the girls with whom they danced at the Soviet Non-Coms club. Russian dance music and steps, except rarely performed folk dances, were found to be of the same type the men had known in America.

Joining us in our outdoor sports, the Reds soon became expert at horseshoes and volleyball and they watched with growing interest when we played baseball. Many of our men played pitch and catch with the Red Army women, who gained additional respect because they threw from the shoulder and not from the hip as most American women do.

But we didn't have to look for favorable evidence about the Soviet Army women. Their hard work and ability were apparent everywhere. With the Red Army men, they stood guard for us, dug trenches, performed dangerous demolition duties, served as crew members on transport planes, drove trucks, unloaded freight, sawed timber and did paperwork.

The army women were friendly but reserved, both they and our men remaining somewhat shy of each other because of the official relationship that existed.

There was less formality on the part of the women KPs who ministered to us like big sisters, coaxed us to take extra helpings at the table, sang to us, kidded with us and learned our language promptly.

Only two days after our arrival, the women were announcing meals by shouting: "Soup's on." And soon their commonest expressions were "what's buzzin' cousin?" and "okey dokey."

We will never forget Tosya who, during our early days at the base area, served us steak three times a day while she sang to us with one of the most charming voices of the countryside.

There were unforgettable scenes as well as personalities in the Soviet project. We can vividly recall, for instance, the moment we thirteen officers, who composed the original AAF echelon assigned to the USSR for the inter-Allied undertaking, sat down for the first of our military conferences in Moscow with the well-groomed, high-ranking officers who were our opposite numbers in the Red Air Force.

And we'll always remember our thoughts as we arrived at the base area in the dead of winter to find practically all the buildings in the neighborhood demolished by the retreating German Army. Available facilities were few and bleak, and trophies of battle still littered the fields. It was hard to visualize that from this scene of chaos could rise the fine bases necessary

for the shuttle system.

The landing some months later of the transcontinental photographic mission, which preceded the launching of shuttle-bombing operations, gave us a terrific lift for then we knew achievement of our purpose was at hand.

Finally came the big day. Indescribable was the thrill we experienced when the first group of red-nose, checkered-tail Mustangs flashed over our most-forward airdrome, harbingers of the Fortresses which were only a few miles from completion of the first shuttle run. Nerves tingled as the Soviet Airacobras scrambled up from the base and climbed hell-bent for heaven to give top-cover to the American fighters.

As the bombers settled on the landing strip, we saw complete fruition of months of planning and toil. The big job had been done. Men speaking different tongues but essentially the same language had proved what whole-hearted cooperation between two nations can accomplish. ☆

ON THE ALERT!

TIMELY ADVICE FROM THE AIR INSPECTOR

Administrative ★ Tactical ★ Technical

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

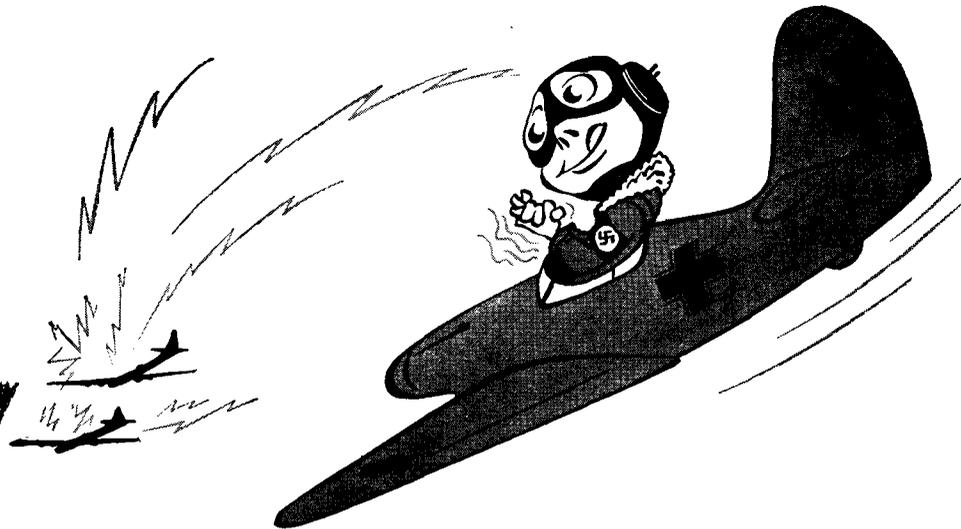
► **Know It—Do It—Check It:** The commander of an Infantry regiment overseas told an observer:

"My men know their weapons and tactics thoroughly. My effort is simply to require them to do the things they know must be done—posting security, dispatching patrols, seeking a field of fire, retaining their equipment and making sure that it is in working order. You have to check all the time."

This admonition is as true in the AAF as it is in the Infantry. Most men in the AAF have reached the point where they know what must be done. The pilot knows he must conserve precious gasoline to get back home; the radio operator knows he must adhere to net discipline; the crew chief knows that he must rigidly follow TOs. But knowing is not enough. The job must be done and checks must be made to see that it is done right.

► **Be Sure It's Oxygen:** Are frequent checks made on the receiving and distribution of oxygen and other gases? Servicing of oxygen tanks with a combination of oxygen-hydrogen can cause an explosion fatal to crew and plane.

► **Radio Compass Dehydrators:** Each radio compass dehydrator should be checked to be sure its air vent is not blocked. Reports reveal that in some cases this air vent has been covered with a piece of masking tape, thus preventing the dehydrator from serving its purpose.

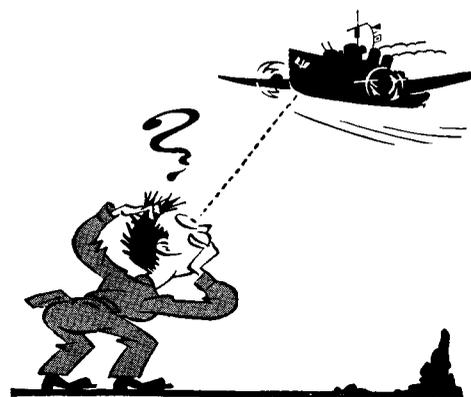


CARTOONS BY JIM RAWLS

► **Radio Silence:** "Hey, Pete, when are you going to raise your wheels?" . . . "You're out of formation, Shorty." . . . This sort of radio chatter on a combat mission may be the tip-off for an enemy reception committee to get busy. An overseas report points out that formations of fighters should be able to take off, form head on course and go to a target without even pressing a mike button. It takes practice with visual signals and plenty of will power—in brief, "air discipline."

► **Service Records:** Most common deficiencies and irregularities noted in inspections of Service Records at Ports of Aerial Embarkation were the following: Failure to show basic training, flying status, immunizations, correct beneficiary or address of beneficiary, reading of Articles of War, sex morality lecture, allotments or discontinuance of allotments and military occupational specialties. These items should be checked frequently.

► **Say 'Plane'—Not 'Ship':** Use of the word "ship" to designate aircraft has led to serious confusion between personnel of the Army and personnel of the Navy, Marine Corps and Coast Guard. All Army personnel will discontinue use of the word "ship" to designate aircraft. (WD Memo. W95-44, 13 May 1944.)



Also on the subject of correct terminology, the AAF is now using the term "fighter" in place of "fighter-bomber," "pursuit" and "interceptor." (AAF Reg. 80-3, 12 May 1944.)

► **Co-pilot:** It is imperative that the co-pilot know the pilot's job almost as well as the pilot does himself. The co-pilot is never "sold short" in combat organizations overseas.

► **Officers' Messes and Clubs:** With some Army airbases and other installations closing or curtailing operations, officers' messes and clubs are facing the problem of dissolving or of fitting their needs to a lesser number of officers. This requires good sound management and planning.

If a field closes, the mess or club usually must be liquidated on short notice. Sufficient cash must be available at once to pay off all obligations. The sale of equipment and other fixed assets in a hurry may prove difficult or even impossible. If the cash reserve is inadequate, the officers on duty at the base may be required to "dig" for whatever amount of money is short. At stations where the number of officers is being curtailed, the club or mess operation must be sharply reduced to put it on a self-supporting basis.

Each commanding officer and each member of a board of governors of an officers' mess or club should take inventory of the situation now and make sure that these institutions are operating on such a basis that there will be no embarrassment if the station is closed or its program curtailed.

► **Your Shoes:** Let's be practical about the care of shoes. Par. 13b (4) (c) 3, AR 615-40, requires regular application of properly prepared lubricants (dubbin). In some instances this directive has been disregarded because the use of dubbin on

shoes makes a high gloss impossible. The use of dubbin, however, prolongs the life of shoes, keeps them soft and comfortable and makes them more waterproof. Therefore, at inspections it must be insisted upon that shoes be well cleaned, dubbed and brushed. It isn't necessary that they "sparkle." (Sec. III, WD Cir. 182, 1944.)

Attention is also invited to WD Cir. 168, 1944, which restricts sales and purchases of shoes by all Army personnel. All military personnel will cooperate in conserving shoes and acquire the minimum number of shoes compatible with their needs.

► **Watch It, Mechanic:** Inspections show the need for more care by maintenance personnel while making repairs to prevent foreign matter, such as metal filings, wire, bolts and rivets, from entering recesses and causing damage to aircraft and engine.

► **Emergency Procedures:** Aircrew members are reminded that in a tight spot they may be only as good as their ability

to carry out emergency procedures—repairing guns in flight, operating auxiliary radio equipment, bailing out, ditching the plane, and so on.

► **Bottles, Caps and Containers:** All AAF personnel who want to assure a continued supply of refreshments at their Exchange (and who doesn't), must do their bit in the conservation of bottles, caps and containers. Because of the acute shortage of these articles, Sec. V, WD Cir. 137, 1944, directs that the highest possible degree of conservation and salvage be exercised.

► **Lights Out:** Keesler Field, Miss., went all out on the light saving program and reduced its power consumption for a month 11.4 percent, a saving of more than \$1,000. A contest for the best suggestion for saving electricity was won by Pfc. George DeBoer, who recommended that someone in each barracks and office be responsible for turning off lights not needed. He was awarded a \$50 war bond.

Additional light savers recommended for general adoption:



Keep only a single night light burning in the latrine. Turn on others as needed.

Refrain from using oversize lamps or unauthorized electrical appliances.

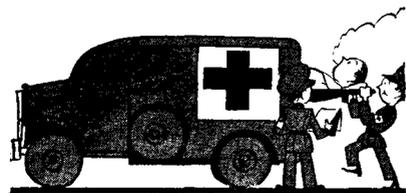
Do not use orderly rooms or offices after hours for visiting, personal letter-writing or other unofficial activities.

► **Lights On:** Are all field obstacle lights operating? ☆

HERE ARE THE ANSWERS

Q. How is an individual carried on the organization Daily Sick Report when hospitalized at a station other than that to which assigned?

A. The Adjutant General advises that "if an individual is sent from a station hospital to a regional station hospital, to a station hospital at another post, or to a general hospital, for further observation and treatment, his name will be entered on the Daily Sick Report of his organization on the date of the change



of his status, the disposition being entered by the medical officer of the unit as 'transferred to . . . hospital (place) for observation and treatment and observation only.' The enlisted man's name will not be carried on the Daily Sick Report of his organization thereafter unless he is returned to his organization and needs additional hospitalization. If the individual is sent to a regional station hospital at his home station from a dispensary, entry will be made on the Daily Sick Report as long as he is hospitalized at that hospital."

Q. May a private, under Sec. V, WD Cir. 287, 1942, filling the T/O position of a staff sergeant, receive the pay and allowance of a staff sergeant?

A. No. The Adjutant General advises that the cited circular was not a

directive authorizing the promotion of enlisted men to the grades of first sergeant and staff sergeant without the issuance of proper orders by competent authority, but was instead a change in the distribution of enlisted grades. The circular in no way changed the regulations which require that appointments to enlisted grades be made by written orders issued by properly designated authority.

Q. May time as a commissioned officer in the Women's Army Auxiliary Corps be counted in computing eligibility for promotion as a WAC officer?

A. Yes. Commissioned service in the WAAC will be counted. (Par. 1d [1], AAF Reg. 35-18, 20 April 1944.)

Q. May allotments to dependents (Class E) be made for any period desired?

A. No. All Class E allotments will be made for an indefinite period. If through error an expiration date or period is indicated, it will be disregarded by the Office of Dependency Benefits. Class E allotments will continue to be paid by the Office of Dependency Benefits until a request in writing for discontinuance is received by that office.

Q. May an officer count time in the RCAF in the computation of service as pilot?

A. Yes. Officers, warrant officers, flight officers and enlisted men of the

Army of the United States, on duty with the AAF, will be credited with service as a rated pilot of heavier-than-air aircraft in the armed forces of co-belligerent nations at 100 percent. Senior and Command Pilot ratings, however, will continue to be granted upon the basis of service as a rated pilot in the military or naval service of the United States. (AAF Memo. 35-39, 20 May 1944.)

Q. Is an enlisted man still required to keep his WD AGO Form No. 28 (Soldier's-Individual Pay Record) in his personal possession at all times?

A. Not at all times while in the continental United States. Par. 12, ch. 9, 31 March 1944, AR 3-45-155, states that the enlisted man is required to carry the individual pay record book on his person when traveling individually or away from his organization, and at all times when outside the United States.



ROLL OF HONOR

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

DISTINGUISHED SERVICE CROSS

Blakeslee, Donald J. M., Col.
Brown, Henry W., Lt.
Conger, Paul A., Capt.
Cort, George P., T/Sgt.
Fields, Virgil C., Jr., Maj.
Haberle, Frank J., Lt.
Johnson, Robert S., Capt.
Luskis, Carl J., Lt.
Mohler, William A., T/Sgt.
Schilling, David C., Lt. Col.
Smith, Donavon F., Lt.
Steele, Henry P., Lt.
Truluck, John H., Lt.
Woody, Robert E., Capt.

DISTINGUISHED SERVICE MEDAL

Chauncey, Charles C., Maj. Gen.
Connell, Carl W., Brig. Gen.
Eaker, Ira C., Lt. Gen.
Hoag, Earl S., Brig. Gen.
Wilson, Donald, Brig. Gen.

LEGION OF MERIT

Alexander, Frank, M/Sgt.
Arnold, Leslie F., Col.
Bailey, Charles F., M/Sgt.
Baldwin, William G., Lt.
Beekman, Milton R., Maj.
Billen, Theodore L., Lt.
Borkardt, Bernard E., M/Sgt.
Borum, Fred S., Brig. Gen.
Brooks, Russell J., Sgt.
Brown, Robert C., Maj.
Bryan, William H., M/Sgt.
Hurt, Byron T., Jr., Col.
Burwell, Harvey S., Brig. Gen.
Caidell, Jack E., Col.
Connelly, William F., M/Sgt.
Craigie, Laurence C., Brig. Gen.
Douglass, Kingman, Col.
Dye, Josiah E., M/Sgt.
Erway, Charles G., S/Sgt.
Fox, Francis I., M/Sgt.
Glover, John Tom, Jr., Capt.
Goodwill, Forest W., M/Sgt.
Groudis, Walter J., M/Sgt.
Graham, Harold D., T/Sgt.
Hagins, Newton D., Maj.
* Harrington, Vincent F., Maj.
Herman, Isadore, Capt.
Hezlep, John B., T/Sgt.
Ingersoll, Harold B., Maj.
Ivers, James Jr., Capt.
Jackson, William H., Lt. Col.
Johnson, Bernard F., Lt. Col.
Marshall, Warner, Jr., Capt.
Myers, John A., Capt.
Olike, Harold W., T/Sgt.
Owens, Ray L., Brig. Gen.
Petrowsky, Joseph A., M/Sgt.
Pucci, Joseph, T/Sgt.
Royce, Ralph, Maj. Gen.
Sadowsky, Charles, Capt.
Sauvage, Russell E., Maj.
Schenk, Earl L., W/O
Smith, Sory, Col.
Sorensen, Karl L., M/Sgt.
Standish, Alexander, Maj.
Sturm, Peter K., Capt.
Sutterlin, Frederick J., Col.
Teats, Edward C., Lt. Col.
Tenney, Frank F., Jr., Capt.
Tipton, James V., M/Sgt.
Ulosovich, Michael, M/Sgt.
Usher, George L., Brig. Gen.

SILVER STAR

Akers, Wayne H., T/Sgt.
Albright, Charles O., T/Sgt.
Baird, Alton, T/Sgt.
Barlow, William N., S/Sgt.
Beckham, Walter C., Capt.
(& OLC)
Beeby, Barclay B., Lt.
Bigham, Harvey H., T/Sgt.
Blakeley, Everett E., Capt.
Bolick, Robert H., S/Sgt.
Bowman, Charles H., Lt. Col.
Brooks, Norman E., Lt.
Butler, William David, Lt.
Cely, William F., Lt.
Class, Kenneth A., T/Sgt.
Conley, James W., Lt.
Conley, Robert J., S/Sgt.
Craig, Horace C., Maj.
Crapsey, Arthur H., Lt.
De Mara, Marco, Lt.
Derrick, Charles E., Sgt.

* Posthumous

Dobbs, Max F., S/Sgt.
Dowell, Kenneth F., Lt.
Duke, Alexander, Lt.
Edwards, George P., Lt.
Everett, Le Roy B., Jr., Capt.
Farrell, Frederick B., Lt.
Farrell, William R., Lt.
Ferguson, Joe C., S/Sgt.
Fiorelli, William J., S/Sgt.
Fogarty, Robert J., Jr., Lt.
Gabreski, Francis S., Maj.
* George, Louis R., Lt.
Glenn, Joseph A., Jr., Capt.
Green, Raymond E., Lt.
Griffith, Rockford C., Lt.
Hedrick, William J., Lt. Col.
Hubbard, Glenn E., Maj.
Jeffrey, Thom Stanley, Jr., Lt. Col.
Joel, Milton, Maj.
Jones, William M., Capt.
Kidd, John B., Lt. Col.
Kreidler, Howard E., Maj.
Ladd, Kenneth R., Lt.
Lamont, Howard, S/Sgt.
Laszewski, Emil S., Lt.
Lauterbach, Theodore G., Lt.
Lipscomb, John P., Capt.
Ludt, Marvin D., Capt.
McCarragher, Edward R., S/Sgt.
McConnell, Bernard E., T/Sgt.
Magnuson, Clifford E., Lt.
Miller, Paul B., Jr., Lt.
Morwood, Roger, Lt.
Mullins, Grover C., T/Sgt.
Kidd, John B., Lt. Col.
Murtha, Regis J., Lt.
Nelson, Anton L., T/Sgt.
Normand, Charles G. Y., Lt. Col.
Norton, Harvey B., Sgt.
Osborne, Robert J., S/Sgt.
Owens, Joel A., Jr., Capt.
Parsons, Leonard A., S/Sgt.
Pecosky, Michael, S/Sgt.
Post, Robert F., Maj.
Prater, Clifford J., S/Sgt.
Preddy, George E., Capt.
Rein, William E., S/Sgt.
Rimmerman, Gen. Maj.
Rudolf, Raymond F., Maj.
Smith, Albert E., T/Sgt.
Thorup, Louis G., Lt. Col.
Timme, Arthur C., Sgt.
Valenta, Irvin E., Lt.
Watts, Ernest L., Lt.
Wheaton, Elmer M., Capt.

OAK LEAF CLUSTER TO SILVER STAR

Travis, Robert F., Brig. Gen.

DISTINGUISHED FLYING CROSS

Allen, George C., Lt.
Allen, Glen R., S/Sgt.
Allen, James G., Lt. (& OLC)
Allen, John Harold, T/Sgt.
Allen, John P., Jr., Lt.
Allen, Ronald S., Lt.
Allen, Roy H., T/Sgt.
Allen, Robert E., S/Sgt.
Allen, Robert E., Jr., Lt.
Allen, William G., Cpl.
Alley, Bert A., Lt.
* Allison, Andrew J., S/Sgt.
Allison, George A., T/Sgt.
(& OLC)
Allison, Robert G., Jr., Lt.
Allton, Dale W., Sgt.
Allum, Ethan E., S/Sgt.
Altizer, James H., Sgt.
Altman, Allen A., T/Sgt.
Amaacker, Homer J., T/Sgt.
Amick, Cecil Denham, Lt.
Ammons, Vernon G., Lt.
Amphlett, Jack B., Lt.
Anderhald, Virgil J., S/Sgt.
Anders, Forrest S., Lt.
Anderson, Arnold R., S/Sgt.
Anderson, Charles D., S/Sgt.
Anderson, Charles W., Lt.
Anderson, David M., Lt.
Anderson, Donald G., Lt.
Anderson, Dwight K., Lt.
Anderson, Edmund B., Lt.
Anderson, Eugene C., Lt.
Anderson, Everett M., Sgt.
Anderson, Garnet W., Lt.
Anderson, George R., Lt. Col.
Anderson, John H., Capt.
(& OLC)
Anderson, John L., T/Sgt.
Anderson, John M., Sgt.
Anderson, Joseph A., Maj.
Anderson, Kenneth H., Lt.
Anderson, Melvin M., Lt.
Anderson, Milton A., Lt.
Anderson, Noel M., Lt.
Anderson, Roy U., S/Sgt.

Anderson, Robert A., Cpl.
Anderson, Robert H., Lt.
Anderson, Robert P., Lt.
Anderson, Samuel E., Col.
Anderson, Wilbur M., F/O
Anderson, William E., Jr., T/Sgt.
Anderson, William G., S/Sgt.
Anderson, William L., Lt.
Anderson, William W., Jr., Lt.
Andreucci, Lewis F., T/Sgt.
Andrews, Aaron L., Lt.
Andrews, Allen L., Lt.
Andrews, Charles C., Capt.
(& 3 OLC)
Andrews, Gordon J., F/O
Andrews, Walter E., Sgt.
Andrews, Willie A., T/Sgt.
Andridge, Herbert W., Jr., Lt.
Angel, Gordon, S/Sgt.
Arnold, David W., Capt.
Arnold, Robert M., S/Sgt.
Aronack, Sanford N., Lt.
Aronson, Harold, Lt.
Aronson, Albert M., Lt.
Arooth, Michael, T/Sgt.
(& OLC)
Arrieta, Mark B., S/Sgt.
Badeau, Clement S., Sgt.
Badillo, Nicholas, T/Sgt.
Baird, Joseph C., Sgt.
Baird, Robert W., Jr., T/Sgt.
Baisden, Ira R., S/Sgt.
Bakeberg, Arthur O., Sgt.
Baker, Charles F., Lt.
Baker, Harold, S/Sgt.
Baker, Harrell W., S/Sgt.
Baker, Harry J., Lt. (& OLC)
Baker, Howard D., Cpl.
Baker, Jack R., T/Sgt.
Baker, Joe B., Jr., Capt.
Baker, John H., S/Sgt.
Baker, Sterling A., Lt.
Banks, Warren B., Lt.
Banks, William D., Lt.
Banks, William M., Capt.
(& 2 OLC)
Banner, Robert R., S/Sgt.
Banning, Richard E., Lt.
Banta, Jack O., S/Sgt. (& OLC)
Banta, Keith B., S/Sgt.
Barba, Andrew M., Lt.
Barber, Edwin L., T/Sgt.
Barber, Keenan C., Capt.
Barber, George A., Lt.
Barbour, Charles C., Lt. (& OLC)
Barbus, Paul L., S/Sgt. (& OLC)
Barcak, George J., Lt.
Barclay, Billie B., Lt.
Barnes, Clayton J., Lt.
Barnes, Donald A., Lt.
Barnes, George R., Lt.
Barnes, Joshua H., Jr., Capt.
Barnes, Lloyd C., S/Sgt.
Barnes, Russell L., S/Sgt.
Barnett, Charles E., T/Sgt.
Barnett, George C., S/Sgt.
Barnett, Thomas C., T/Sgt.
Bartholomew, Aubrey R., S/Sgt.
Bart, Harold H., Lt.
Barton, Ivan K., Sgt. (& 2 OLC)
Barton, James R., Lt.
Barton, Roger D., Lt.
Barts, Robert I., Sgt.
Bartuska, George Jr., Lt.
Bartz, Richard A., T/Sgt.
Baryovitch, Stanley, T/Sgt.
Berk, Robert H., Lt.
Beck, Walter W., F/O
Beck, William J., Jr., Capt.
Becker, Clyde S., Cpl.
Becker, Donald W., Lt.
Becker, Raymond Arthur, Lt.
Becker, Robert L., Lt.
Recker, Robert W., Lt.
Beckstrom, Kenneth W., Lt.
Bedford, Franklin P., Lt.
Bedford, John R., Lt.
Bedwell, Philip G., S/Sgt.
Beene, Eugene H., Col.
Beem, Arlo D., S/Sgt.
Breman, Chandler J., S/Sgt.
Beers, Leonard A., S/Sgt.
Beerwert, Dillman J., S/Sgt.
Beeson, Henry R., Lt.
Behan, Joseph F., Lt.
Behr, Norman B., T/Sgt.
Bell, Philip L., Lt.
Bell, Charles A., Lt.
Bell, Eulon C., Jr., S/Sgt.
Bell, Howard D., S/Sgt.
Bell, Jack B., Lt.
Bell, James L., Lt.
Bennett, Hugh D., Lt.
Bennett, Jack W. W., Lt.
Bennett, James W., Lt.
Bennett, Joe L., Lt.
Bennett, John W., Lt.
Bennett, Kenneth G., Lt.
Bennett, Lewis T., Jr., S/Sgt.
Bennett, Norman B., Jr., Lt.
Bennett, Richard, Lt.
Bennett, Robert L., T/Sgt.
* Bennett, Robert R., Lt.
Bennett, Stuart M., Lt.
Bennette, Thomas W., Jr., Lt.

Berry, Austin L., Maj.
Berry, Henry F., Lt.
Berry, John E., T/Sgt.
* Berry, Rex, Lt.
Berry, Richard T., S/Sgt.
Berry, Robert K., Lt.
Berth, Donald R., S/Sgt.
Bertrand, John R., Lt.
Berezansky, Andrew, T/Sgt.
Binding, Bud B., Lt.
Birchard, Glen R., Lt. Col.
Bird, Donald C., Sgt.
Bird, Ira M., Lt.
Bird, Luther C., Lt.
Birlew, Donald W., Capt.
Bisgard, Richard L., Capt.
Bishop, Earl C., Jr., Lt.
Bishop, John W., Lt.
Bishop, Leicester B., Lt.
Bishop, Lyle D., Lt.
Bishop, Paul A., Lt.
Bishop, William H., Pfc.
(& OLC)
Biskup, Ernest, S/Sgt.
Bissel, Ray, Cpl.
Bitney, Robert V., Lt.
Bitter, Emile V., Jr., S/Sgt.
Bitter, Frederick J., Lt.
Bixler, Robert H., Lt.
Bixler, Gordon H., S/Sgt.
Blachly, Ross L., Lt.
Black, Perry O., Lt.
Black, Robert C., Lt.
Black, Robert E., Lt.
Blackburn, Daniel B., S/Sgt.
Blackledge, Lyle P., S/Sgt.
Bleeker, William R., Lt.
Blevins, Paul R., Lt.
Blight, Charles W., Lt.
Bliss, Charles R., Lt.
Blitz, Rudolph C., Jr., Sgt.
Bloche, Arthur H., S/Sgt.
Blocher, Maurice H., S/Sgt.
Block, Joseph H., Lt.
Block, Robert C., S/Sgt.
Bockman, Clifford H., S/Sgt.
(& 2 OLC)
Bockman, Elmer E., F/O
Bodell, Walter, Sgt.
Bodenhamer, Don, Jr., Lt.
Boedt, Robert O., T/Sgt.
Boet, Paul J., S/Sgt.
Boffa, William E., Sgt. (& OLC)
Bohland, Richard, S/Sgt.
Bohman, Carl V., Lt.
Bohnert, Herbert J., Jr., Lt.
Bohney, Richard G., Lt.
Boisclair, Leonard D., S/Sgt.
Boiteau, John A., S/Sgt.
Bojack, Charles K., Lt.
Bolen, Merle, Sgt.
Boley, Lyle T., Lt.
Bolling, Charles, S/Sgt.
Bolling, James A., Lt.
Bologna, Joseph M., T/Sgt.
Boly, William A., T/Sgt.
Bomar, John E., Lt.
Bomicino, William J., Lt.
(& 2 OLC)
Bon, Robert D., Lt.
Bonner, Hughie R., Lt. (& OLC)
Bonnicksen, Andrew P., T/Sgt.
Bonones, Luther P., S/Sgt.
Bonsteel, Francis T., Jr., Lt.
Bonus, Robert M., Capt.
Booker, Cleburn U., S/Sgt.
Booker, George H., Lt.
Boone, Joseph H., Lt.
Boone, Louis E., T/Sgt.
Boone, Mark P., F/O
Booth, Douglas E., Lt.
Booth, William H., Maj.
Bradley, Raymond A., Capt.
Bradrick, Leroy, S/Sgt.
Bradshaw, Fred D., Lt.
Bradt, Tony L., Cpl.
Brady, Henry G., Jr., Maj.
Brady, John D., Lt.
Brady, William R., S/Sgt.
(& OLC)
Brady, Willis E., Lt. (& OLC)
Bradron, Richard H., T/Sgt.
Bragg, Kendrick R., Jr., Lt.
Brainard, Wayne A., Lt.
Bralley, Richard G., Lt.
Braman, Jay L., S/Sgt.
Bramer, Delmer C., T/Sgt.
Branch, James L., S/Sgt.
Brandeberry, Earl K., S/Sgt.
Brandias, Dale F., T/Sgt.
(& OLC)
Brandon, Lloyd A., S/Sgt.
Brandt, Martin D., S/Sgt.
Brandt, William M., Lt.
Brandt, Henry P., S/Sgt.
Brice, Winston R., S/Sgt.
Bridges, James N., Lt.
(& 2 OLC)
Bridges, Phillip, Capt.
Briggs, Wayne F., S/Sgt.
Brightman, Jack M., Lt.
Brill, Carlos O., Sgt.
Brinberry, Wm. O., Lt.
Brindley, Arthur E., M/Sgt.
Brinkley, Frederick A., Lt.
Brinkley, Ralph F., Lt.
Brinkman, John T., S/Sgt.

Brown, Harry L., T/Sgt.
Brown, Harry M., T/Sgt.
Brown, Harry W., Capt.
Brown, Howard T., S/Sgt.
Brown, Jack O., Lt.
Brown, Jack O., Capt.
Brown, Jack R., Lt.
Brown, James C., Lt.
Brown, James J., T/Sgt.
Brown, John D., Sgt.
Brown, John K., Jr., Col.
Brown, John T., Jr., Lt.
Brown, Keith S., Lt.
Brown, Kenneth Jr., Lt.
Brown, Kenneth V., T/Sgt.
Brown, Lawrence R., Pfc.
Brown, Leonard H., Lt.
Brown, Lewis E., F/O
* Brown, Maxton, Lt.
Brown, Noble, T/Sgt.
Bruce, Forrest D., S/Sgt.
(& 2 OLC)
Bruce, Robert D., Jr., Capt.
Bruch, George A., S/Sgt.
Bruckheimer, David O., Lt.
Brumagin, Deloras R., T/Sgt.
Brun, Edwin E., S/Sgt.
Bruni, Edward J., Lt.
Bruner, Robert W., T/Sgt.
Brunswick, Carl J., T/Sgt.
Bruskotter, James E., S/Sgt.
Bryan, Archie L., S/Sgt.
Buchanan, Walter E., Lt.
Buchanan, William D., Lt.
Buchinsky, Frank J., S/Sgt.
Buck, Ambrose H., Lt.
Buckalew, Samuel E., Jr., S/Sgt.
Buckard, Clyde L., S/Sgt.
Buckingham, Elvin E., S/Sgt.
Buckle, Henry C., T/Sgt.
Buckie, William P., Capt.
Bucci, William J., S/Sgt.
Burbank, Fred C., Capt.
Burchard, James, Col.
Burdick, William A., Lt.
Burford, Edgar C., Lt.
Burgan, Curtis A., Capt.
Burgan, Virgil, S/Sgt.
Burgess, Lawrence E., Lt.
Burger, Roger H., Lt.
Burgess, Elwyn C., S/Sgt.
Burgoyne, George E., Lt.
Burke, Charles A., T/Sgt.
Burke, Sylvester V., Capt.
Burke, Jack C., S/Sgt.
Burkhart, Harry R., Lt.
Burkot, John S., S/Sgt.
Burley, Enoch P., Lt.
Burnett, George P., Jr., Lt.
Burnett, Harry, Jr., Lt.
Burnett, Robert F., Capt.
Burnham, Arthur L., S/Sgt.
Burns, Richard H., Lt.
Burns, Harmon E., Capt.
Burns, John P., Capt.
Burnside, Ernest W., S/Sgt.
Cabas, Victor N., Lt.
Cameron, Harold D., Jr., Lt.
Cameron, Robert D., Capt.
Cameron, William R., Maj.
Cammack, Herbert R., T/Sgt.
Camp, Frank B., Capt.
Camp, Kenner O., Lt.
Campanella, Matthew J., Sgt.
Campbell, Benton D., S/Sgt.
Campbell, August W., Capt.
Campbell, Clyde, T/Sgt.
Campbell, Curtis K., Lt.
Campbell, Henry L., Lt. (& OLC)
Campbell, Herbert J., T/Sgt.
Campbell, Jack L., Lt.
Campbell, Leland V., S/Sgt.
Campbell, Leonard W., Lt.
Campbell, Ralph K., Lt.
Campbell, Richard A., Lt.
(& OLC)
Campbell, Robert B., Capt.
Campbell, Robert L., Lt.
Campbell, Robert W., Lt.
Campbell, Thomas W., T/Sgt.
Campbell, William B., Lt.
Campbell, William F., Lt.
Caputo, John A., Lt.
Carbery, Duward A., S/Sgt.
(& OLC)
Carcione, Anthony R., Lt.
Card, John H., III, Lt.
Card, Robert G., S/Sgt.
Cardamon, Frank M., S/Sgt.
Cardwell, Burt J., Lt.
Cardwell, Kenneth H., Lt.
Care, Raymond C., Lt.
Carens, Vernon H., S/Sgt.
Carey, John A., Capt.
Carey, Max, Capt.
Carey, Richard C., S/Sgt.
(& OLC)
Cargill, William D., Lt.
Carlin, Henry J., Lt.
Carliste, Genevieve I., Capt.
Carlson, Earle W., Lt.
Carlson, Carl R., Lt.
Carlson, Arthur L., Lt.
Carlson, Clyde P., Lt.
(Continued on Page 57)

GROWTH OF OUR CIVILIAN AAF



Civilian employees of the Air Service Command are seen as they learn construction details of an aircooled engine. Scenes like this have been common since 1941 when the AAF began training 500,000 men and women for the world's largest undertaking in aircraft overhauling and repair.

By Brig. Gen. Elmer E. Adler

CHIEF, PERSONNEL AND TRAINING DIVISION, AIR SERVICE COMMAND

“WANTED: Half a million men and women for vital jobs in the AAF; technical skills required for eighty percent of applicants.”

This was the civilian force needed when the AAF started to build the world's largest aircraft repair industry in the fall of 1941. During the following two years, despite keen competition for machinists and experienced mechanics from the booming aircraft industry, 500,000 men and women were employed, trained and molded into the AAF's Air Service Command—the home-front repairmen and stockboys for our sixteen Air Forces throughout the world.

Today, these civilians are doing the technical job in the States that GIs are doing overseas—overhauling engines, repairing damaged aircraft and equipment, expediting the flow of supplies from warehouses and embarkation points to our bases in theatres of operations.

But few of these employees had any technical skills. Thirty-four percent were men over 38 years of age who had to be trained for new jobs—engine maintenance, repair of accessories, machine shop work, job and shop supervising. Forty-four percent were women, many of whom never had worked before. They had to be trained for clerical work and office supervision as well as for repair and overhaul of aircraft.

Before ASC could begin servicing and supplying the mushrooming AAF, it had to embark on an extensive training program—a program for which there was no

pattern. Although confronted by problems never before tackled on a large scale by any government agency, ASC successfully developed a civilian training organization—one of the first formally established under the War Department—which was distinctive not only in size and the wide number of technical subjects taught, but in the fact that it was a “full-time” operation.

When the Air Service Command was created in October, 1941, apprenticeship courses for the few hundred civilians being trained lasted four years. Imminence of war and increasing production of planes necessitated rapid expansion of repair and supply depot personnel, so the courses were consolidated and shortened to six month periods and less. Still, the training program could not accommodate the thousands of civilians being employed each week.

Specialized courses in engine assembly, stock records, gyro instrument repair and about seventy other subjects were standardized. Because existing textbooks and manuals were too old and involved, 150 new training manuals were written to speed up the educational program; instruction was limited to periods of two to fifteen weeks. Actually, training was put in capsule form and prescriptions were made according to the qualifications and adaptability of each new employee. Ultimately, civilians were trained for new and specialized jobs at the rate of 60,000 a year—more than any other school or university in the world.

How 500,000 men and women were molded into the world's largest aircraft repair industry since the fall of 1941.

Although ASC was destined to grow into one of the largest semi-industrial organizations ever conceived, training proved to be more than a problem of mechanics and stock clerks, there was a need for shipping and transportation experts, office managers and personnel advisors, aeronautical and civil engineers, purchasing agents and contract lawyers, accountants and financial consultants. All of these had to be trained in new and specialized phases of work before they could be molded into their important roles as an unmilitarized civilian army expediting the logistical requirements of the AAF's aerial battles against the enemy.

Major problems through all stages of this industry-building program were to obtain personnel in the face of competition for skilled labor by essential war industries and competition for draft-eligible personnel by the armed services.

ONE of the greatest handicaps in obtaining personnel was the wage advantage which private industry held, in many localities, over the Civil Service rates which ASC installations were required to pay. After many months of experience and planning, and based upon ASC's comprehensive, detailed breakdown of its mechanical and unskilled trades (the only classification ever made of 950 previously ungraded jobs), a locality wage plan was developed by Headquarters, Army Air Forces, approved by the War Labor Board and later adopted by all of the air force commands, which permitted AAF installations to meet private industry wage scales according to prevailing rates and living costs in their respective localities.

To avoid hindering ASC's operations while releasing draft-eligible men for military service presented a paradoxical problem. The men were needed as civilians in the AAF, yet expansion of the Army necessitated drafting them. Because induction of large numbers of them before replacements had been trained would actually have hindered the AAF, their orderly withdrawal was effected by adapting the replacement schedule system, which had been developed by Selective Service Headquarters, to the peculiar deferment situation which existed in the ASC installations. This adaptation proved

extremely satisfactory and earned the commendation of the War Department's Deferment Committee. Air Service Command personnel who were responsible for working out the first of these ASC schedules were later called upon by Headquarters, Army Air Forces to assist other AAF installations.

AFTER we had procured new employees, we were confronted by the difficult problem of properly training them for jobs. Mechanical aptitude of our applicants dropped so low that we had to introduce a special course on the use and care of basic hand tools for many of the people we were forced to accept for mechanic training didn't know how to hold a wrench or hammer. It was a pleasant surprise, therefore, to discover that these persons, with little or no knowledge of tools, were eager to learn their proper use and caught on quickly when shown how to handle them.

Simultaneously, at the other extreme we were teaching our highly skilled technicians to repair and adjust a new, delicately designed auto-pilot, with its gyroscopes and its scores of electrical and control cable connections.

Rapid expansion of shop facilities and personnel made it essential to inaugurate courses for supervisors and foremen. The training courses of ten to twelve hours in private industry were developed into a comprehensive 52-hour course by ASC, and more than 21,000 men and women have learned shop supervision from this course.

Job management was the central theme of the early classes; experience taught that additional emphasis was necessary on personnel relations and on analysis of job efficiency under each supervisor. At the same time, because the young foremen were subject to the draft, more stress was directed to the necessity of passing on knowledge to subordinates who might have to replace department heads.

Supplementing the job and supervisor

training programs are on-the-job instructional courses to facilitate upgrading of employees. An average of 500 workers a month are sent to factory schools to familiarize themselves with new equipment. These workers then return to conduct shop classes, teaching other workers new repair and maintenance procedures.

★ ★ ★ ★ ★ ★ ★ ★ ★ ★
HELP . . .

★ circulate AIR FORCE so that
 ★ every man in your activity
 ★ gets a chance to read the
 ★ service journal. Don't let
 ★ this copy become a "gold
 ★ bricker"—keep it working.

★ **READ IT . . . PASS IT ON!**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★
 The educational program also utilizes the facilities of thirty state-supported co-operating schools and two contract schools. In the twelve main ASC depots, more than 200,000 have received pre-service training.

As students, men and women are treated alike; in machine shop work, welding, instrument repair and stock tracing, women generally are better than average, while they are frequently as good as men in the heavier sheet metal work and aircraft repair. Approximately 90,000 women are in the employ of ASC on jobs ranging from teletype operators to electroplaters, from storekeepers to electricians, from photographers to crane operators. They have stepped into thousands of jobs formerly held by men now serving the armed forces overseas.

Although it was feared at first that male students might not accept shopwork instruction from women instructors, the women solved this problem themselves by proving complete mastery of their respective jobs.

The first woman trainee in propeller work at one of our depots was the chief instructor's wife. So quickly did she learn that she was added to the teaching staff and, after her husband died a few months later, succeeded him as head instructor.

Without a pool of aircraft mechanics to draw upon, faced by the high labor turnover common in the aircraft industry (75 percent) and confronted by shortage of manpower in all areas, we began hiring blind and crippled workers on an experimental basis. When they proved they could perform duties capably in certain occupations, more were hired for placement according to their abilities. Four blind workers at one depot proved able to pack bolts and nuts as fast as eleven normal workers.

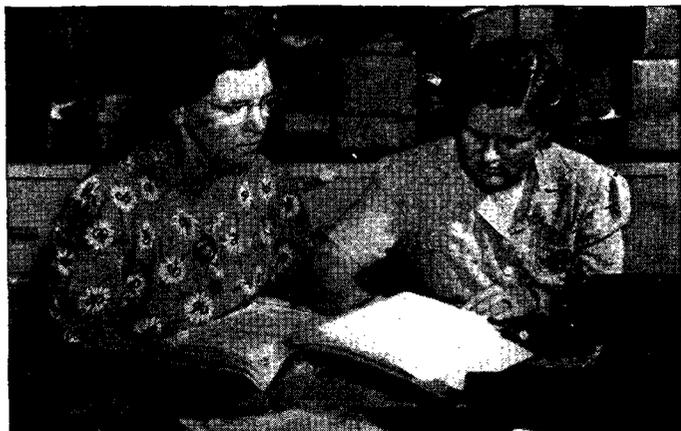
Special recruiting caravans helped us through one critical labor-shortage season by enlisting the services of an extra 1,000 employees.

Despite the rapid increase of workers with middle-aged men and women tackling jobs entirely new to them, with the blind and crippled replacing able-bodied workers, the incidence of accidents was reduced forty percent and accident severity seventy percent. The saving to ASC through "accidents that didn't happen" was 3,544,000 man hours of work. For this record, ASC was awarded the nation's highest safety honor for 1943, the "Distinguished Service to Safety" citation of the National Safety Council.

Our task of keeping the planes of the AAF flying has been accomplished. We have trained personnel to be versatile repairmen capable of repairing and maintaining equipment manufactured by all aircraft and accessory companies. Our men have been responsible for engineering and producing many original modifications while turning out rush jobs and expediting supplies for overseas squadrons that are completely dependent upon the work of the folks back home, our civilian AAF. ☆



An old hand at precision repair work shows a trainee the proper way to perform a delicate operation during mechanical instruments class at the Miami Air Depot. He advises a gentle touch with that hammer.



Besides working at the mechanical trades, for which they show marked aptitude, many of the 90,000 women employed by the ASC are engaged in office pursuits. Workers seen above are checking a stock record.



A Report on Army Air Forces Training Devices

► Overwater Jumps

Correct technique for parachute jumps into water is the subject of a new training film being released by Training Aids Division. The motion picture, produced by Materiel Command and the Office of Flying Safety, is composed of film shot during the actual test jumps into the Atlantic Ocean.

Recommended as a "must" for all aircrews, the film takes you from the escape hatch of a B-24, through all the necessary actions until you are safely tucked away in a one-man life raft.

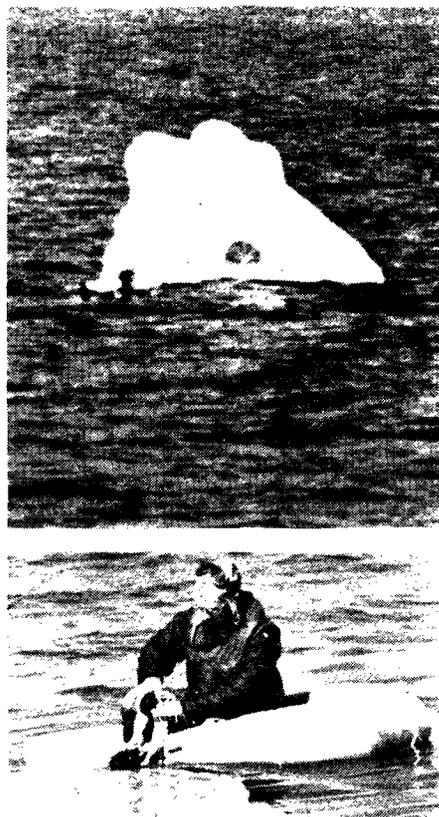
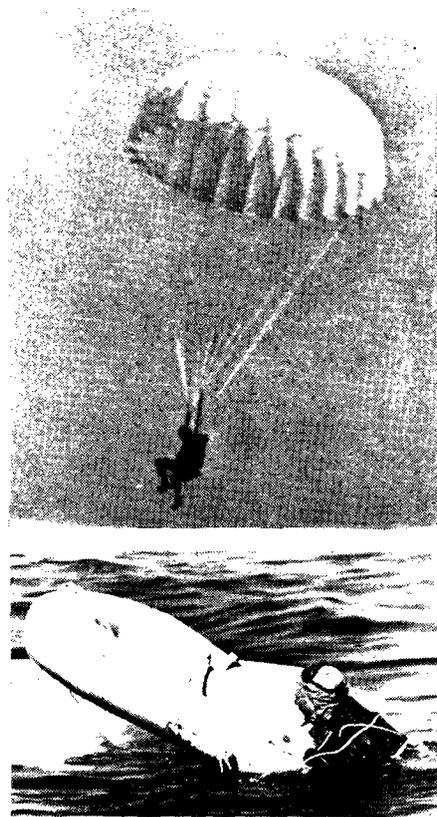
"Parachuting into Water" disproves one fallacy and establishes the value of several procedures the jumper must follow if he is to stay out of trouble. The fallacy, that of letting go of the harness just before striking the water, was voted incorrect when jumpers found it almost impossible to judge distance over the water accurately. If you let go of the harness too soon, there is great danger of falling into the water from a distance too great to survive the shock of impact.

Procedures recommended for overwater jumps are:

- (1) Throw away all equipment that you won't need.
- (2) Follow instructions in the Pilot's Information File.
- (3) Keep your legs straight and feet together when you pull the ripcord.
- (4) Settle back in the sling.
- (5) Undo chest strap so you'll be able to inflate your Mae West.

- (6) Undo leg straps if you are securely seated in the sling and have time.
- (7) Ride chute harness into the water and inflate Mae West. Leg straps can be undone or slipped over the legs in the water if necessary at this time.
- (8) If you do not have a raft, get away from the parachute and stay away.
- (9) If you have a raft, work upwind away from the canopy to avoid tangling in the lines. For the same reason, keep the life raft between you and the floating chute while inflating the raft. Salvage parachute for sail, cover and extra lines.
- (10) Carry a serviceable knife where you can find it. It will help if you become tangled in the lines.

These photographs taken from the training film show (Frame 1) the jumper after he has unfastened his chest strap and as he attempts to unfasten his leg straps. In Frame 2, he has inflated his Mae West on striking the water and is working upwind away from the floating chute. The life raft has been inflated between the jumper and his chute in Frame 3. After climbing into his raft (Frame 4), the jumper is hauling in the chute for later use.



The training film is a camera record of test jumps made by three officers into the Atlantic Ocean off the coast of Florida on February 3 and 4, 1944. Two jumps each were made by Lieut. Col. E. V. Stewart, chief of the parachute unit, Materiel Command; Lieut. Col. M. W. Boynton, chief of the medical safety division, OFS, and Lieut. Col. W. M. Angus, chief of the safety education division, OFS. The first jumper was a veteran of 436 jumps, but he was a non-swimmer. The second had seven static line jumps to his credit, was a swimmer, but he had never jumped into water. The third jumper was a swimmer, but he had never jumped before.

Each officer wore a pneumatic life vest, a standard B-8 back-pack parachute with three-point snap release and standard ripcord, a one-man seat-pack life raft tied or snapped to his chute harness and a reserve chest-pack parachute.

Procurement number for "Parachuting into Water" is TF 1-3665.

► Devices Catalog

A new Training Devices Catalog, completely indexed and containing all necessary data on standard training devices, has been distributed to appropriate AAF activities. This catalog supersedes the previously published Synthetic Devices Catalog.

Bound in loose-leaf form to permit deletions and additions as developments demand, the catalog is composed of four main sections covering more than 160 different subject-classified devices. It emphasizes standardization of nomenclature, provides a time-saving ready reference and index guide and includes a chart showing the application of the various training devices described.

General information is offered on how to obtain devices, who provides for housing and operating and maintenance personnel, and the procedure for developing and standardizing new devices.

Descriptions and illustrations are provided for each major commercially manufactured device currently procurable and in use, with individually tabulated data

on official availability, power, maintenance and personnel requirements, shipping data, property class, stock number, technical order, specification and the like.

There is a listing of more than 100 locally constructed devices—trainers, cut-aways and mock-ups—arranged according to subject material with information available to the field listed directly with each device.

▶ *AAF Organization Film Strips*

Three film strips have been made available to supplement Training Film 21-1236, "Organization of the Army," which did not contain a description of the organization of the Army Air Forces. They are FS 1-748, "Organization of the AAF-Part I, Headquarters Section"; FS 1-749, "Organization of the AAF-Part II, The Commands," and FS 1-750, "Organization of the AAF-Part III, The Air Forces."

▶ *Proper Use of Training Films*

Experimental studies conducted by both military and civilian agencies indicate that men's knowledge of subject matter presented in a film is materially increased by supplementing the film with an introductory explanation or a follow-up quiz.

Air Forces Manual No. 13, "How to Use Training Films," has been designed to provide the instructor with a summary of principles which lead to effective training film utilization. Photos and drawings in the booklet assist in visualizing the basic points described.

▶ *AFTAD Regulation Revised*

The revised AAF Regulation 50-19, "Training—Training Aids," published under date of 27 May 1944, defines ex-

actly what are and what are not training aids. It circumscribes the limits of responsibility of all headquarters and other AAF agencies as they affect training aids from the development stage to the use of the completed aid. The revised regulation is recommended for careful study by training aids officers and others in the AAF concerned with training aids.

▶ *Marking Film Cans*

At the suggestion of film library officers, all confidential and secret training films delivered on initial distribution henceforth will have the metal can marked in red to assist in identifying such classified subjects. The cans for confidential and secret films will have a red stripe around the rim and a red stripe across top and bottom. It is recommended that film librarians go through their present list of films and mark all confidential and secret films in a similar manner.

▶ *Maps on Film Strips*

Briefing officers and other personnel interested in solving the problem of bulkiness in maps are referred to a series of five film strips recently released:

FS 1-688 Maps of Mediterranean Sea Area.

FS 1-689 Maps of Southwest Pacific Area.

FS 1-690 Maps of Northwest Pacific Area.

FS 1-691 Maps of India, China and Japan.

FS 1-692 Maps of Europe, Scandinavia and Russia.

Each of these film strips contains a master index map providing an adequate key to the 50 to 75 detailed section maps.

Used with any standard film strip projector, the maps can be thrown on a screen for detailed study by a group, thereby affording all the advantages of wall size maps and at the same time overcoming all the disadvantages of bulk and weight which are encountered with wall maps.

▶ *AFTAD's Publication*

The AFTAD Bulletin, approved technical publication of the Training Aids Division, is published for the purpose of directing all pertinent information regarding training aids into the channels where the information will be put to best use.

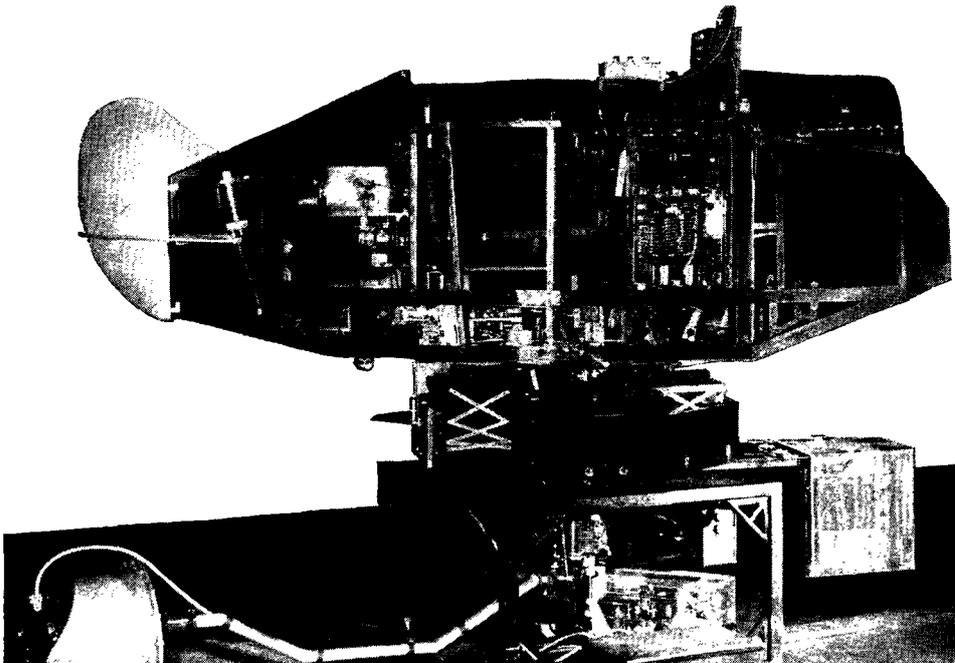
The different sections of the Bulletin present such information as general training aids policies, correct procedure and channels for obtaining various training aids, listings of training aids officers, suggested training aids programs, uses of training aids, status of projects in preparation and approximate dates of release, new developments, evaluations of standardized training aids, ideas from the field on suggested uses of training aids, station allocations, shipments of devices from manufacturer or stock to AAF activities, notices of training aids available for exchange, delivery status of devices, reviews of new films and new publications, and information from other commands and air forces and the Navy which is of value to training aids officers.

The "Local Construction" section of the Bulletin is the medium for dissemination of complete data and plans for training aids which are not on standard procurement but which have been found useful at some AAF base. Construction of these aids can be accomplished at any base from printed photographs, drawings and accompanying descriptions in the Bulletin. This section also serves as a medium of exchange of ideas from the field on the uses and modifications of standard training aids.

AAF personnel are invited to contribute articles and photographs of interest to training aids activities. This Bulletin is distributed to headquarters of all activities concerned with training aids. Requests for copies should be addressed to your headquarters. ☆



This AN-T-18 trainer was modified at the department of teletype and Link trainer, Chanute Field, Ill., by inclosing the fuselage and mechanism with plexiglas and plicofilm for instructional purposes. Requests for all types of instrument flying and landing trainers such as the C-3, C-5 and AN-T-18, popularly called Link trainers, should be submitted through channels to AFTAD.



WHERE TO GO

Information on the availability of training films and film strips, recognition materials, training devices and training publications may be obtained from the Chief, Training Aids Division, Army Air Forces, 1 Park Avenue, New York 16, N. Y., upon request through channels. AAF Regulation No. 50-19 explains fully the functions of the Training Aids Division.



By Capt. Benjamin J. Grant
AIR FORCE Staff

SOMETHING was up, something big. The urgent note in the Commanding General's voice made that clear.

Addressing a group of officers and their wives on the beach at Nags Head, N. C., he said, "I want you to get our own Air Corps relief organization started—now."

They knew what he meant—a society to provide for the dependents of men killed or injured while serving with the Army Air Forces. It had been a pet idea of the Arnolds and other Air Corps old timers. Now the time for it had come. Nobody asked why all the rush. Questions didn't seem in order just then.

It was August, 1911. The president had declared a national emergency. The Army, including the Army Air Forces, had been swollen by Selective Service inductees, volunteers, National Guard troops and Reserves. The country was getting ready for bad news.

Today, it can be told why General Arnold spoke with such urgency. AAF groups were being ordered out to take over a system of defensive offshore bases. Men who a few weeks earlier had been bankers and salesmen and clerks were flying off to strange lands. They were to leave almost without warning. Anything could happen. There would be serious dislocations at home. There would be distress cases.

General Arnold knew that distress at home means bad morale in the Army.

This concern over dependents was an old story among Army air officers. For years, it had been extracurricular problem Number 1 at many an Air Corps station. By the very nature of their business, Air Corps personnel lived hazardous lives. As someone used to put it, "By comparison with the rest of the Army, the Air Corps has a wartime casualty rate when

the country is at peace." The Air Corps expansion of the 1930s, accomplished principally by calling reserve officers to extended active duty, complicated the problem. Nine out of ten flying men in the Air Corps were ineligible for help from the Army Relief Society, whose charter prohibited benefits to any except dependents of deceased *Regular Army* personnel. Local post funds, established unofficially at many AAF stations, were inadequate and results were hit-or-miss.

In those days, General Arnold (Colonel Arnold then) was commanding officer at March Field, Calif. Conversations with many senior officers of the Air Corps led him and Mrs. Arnold to the conviction that a national society, set up with Air Corps problems in mind, would be the only satisfactory solution. Some day, there would be such a society. They would see to it. And they did.

Minds met at Nags Head that weekend in August, 1941, on the broad policies and aims of the society. By Monday letters had been written to interested persons all over the country. Details requiring attention were listed and catalogued.

By December 8, 1941, when war was declared, many meetings had been held in Washington and the handful of founders had their plans well in mind. War was bound to affect those plans. For the duration, many of the AAF problems would be shared by other branches of the service, and Army Emergency Relief was set up to provide for distress cases throughout the Army as long as the war should last. To avoid duplication, the AAF group agreed that their society would be inactive as a relief organization but would accept unsolicited bequests, legacies and gifts to be added to its fund for use after the war. With the return of peace, the AAF organization would inherit a big assistance job.

Accordingly, in March, 1942, the Army Air Forces Aid Society was incorporated in the District of Columbia "to collect and hold funds and to relieve distress of personnel of the Army Air Forces and their dependents, including dependents of honorably retired or discharged and deceased personnel thereof, to provide for their education, and to secure employment for honorably retired or discharged personnel and their dependents and the dependents of deceased personnel."

WHAT all that legal language boils down to is that the Army Air Forces, through a voluntary association of its members and friends, proposes to offer a helping hand to the wives and children of those members of the AAF family, both officers and enlisted men, who don't get back. It proposes to aid those who are injured while serving with the AAF. It proposes to see that education is provided for the children of men killed or incapacitated while serving with the AAF.

In short, so far as funds and conditions permit, it will be the business of the society to make good a motto of the Commanding General, "The Army Air Forces takes care of its own." And this means more than financial aid; it means assistance on personal problems, advice, services of many kinds.

The Army Air Forces Aid Society is not an emergency proposition but an organization which, conceived during peace, will continue as a permanent establishment after the war. As the AAF had peculiar assistance problems long before its first plane was shot down in this war, so the AAF will have peculiar assistance problems in the years following the war. Logically then, when the wartime relief organizations are inactivated, the Army Air Forces Aid Society goes into action.

Today, it is getting ready for the job ahead. With volunteer help, the society is keeping books on a fast-growing mem-

Through this volunteer relief organization, the AAF plans to assist in solving the post-war problems of its personnel.

bership. Every mail brings membership applications—hundreds of them, although the society has been as good as its promise that as long as the war lasts there will be no drive for members or for contributions. But such voluntary contributions as are made, the society is authorized to accept and hold for the day when its benefits are offered to qualified persons.

THE public response to this unadvertised society has been remarkable. Today, it has upwards of 100,000 members. Contributions have ranged from school boys' quarters to five-figure gifts from more affluent friends of the AAF.

There are stories galore in these contributions. One popular general officer's autograph is being sold at a dollar apiece by his secretary, the proceeds going to the Aid Society. An irate citizen, letting off steam after reading of Jap atrocities, sent Lieut. Gen. James H. Doolittle a \$10,000 treasury note and told him in an accompanying letter to "light yourself a cigar or cigarette with the enclosed"; General Doolittle passed it on to the Aid Society, which got it exchanged for a depositable check. A fifteen-year-old girl celebrated

her first pay day by sending in \$1.50 and promised at least that much every Saturday. The society received \$375 from 30 American-born Chinese workmen at Pearl Harbor, who said the gift was made in appreciation of the first bombing of Tokyo. Several officers clubs at AAF stations have made substantial gifts.

Hundreds of persons and organizations, wishing to honor the memory of an AAF relative or friend in some more substantial way than by sending the customary flowers to the family, have contributed to the Aid Society's memorial division. No matter how small the contribution, the name of the individual so honored is entered on the Memorial Roll of the society, and the family is notified by card that a sum has been donated in the name of the deceased person; the card gives the name of the donor but not the amount of the gift. The money collected in this way goes into the regular fund, not earmarked for any particular purpose.

From AAF men in North Africa, the society received a gift of \$413.84 as a

"memorial to those gallant officers and enlisted men" who died in the bombing of the Ploesti oil fields. A Kansas mother sent \$100 as a Christmas gift in memory of her son who was killed in action with the AAF. A group of merchants gave \$307 in memory of a home town boy who lost his life on an AAF mission. Students of a South Dakota high school took up a collection of \$9.45 in honor of a deceased alumnus. A business firm contributed in memory of a mother who had two sons in the AAF.

Not all the gifts are in cash. A woman donated a set of original letters written by Lincoln, Stanton and Grant, authorizing the society to sell them if it wished. The manuscripts and rights of numerous books, songs and articles have been given to the society.

Now to answer some questions:

Who are the officers of the society? President, Robert A. Lovett, Assistant Secretary of War for Air; Vice President, Mrs. Henry H. Arnold; Treasurer, Robert V. Fleming, Washington banker; Secretary, Maj. Gen. J. M. Bevans, Assistant Chief of Air Staff, Personnel; Comptroller, Brig. Gen. L. W. Miller, Air Budget and Fiscal Officer. Board of Trustees: General Arnold, Mrs. Arnold, General Bevans, Representative John M. Costello, Mrs. Howard C. Davidson, Mrs. James H. Doolittle, Mr. Fleming, Lieut. Gen. Barney M. Giles, Mr. Lovett, Maj. Gen. B. E. Meyers, Floyd B. Odlum, Capt. Eddie Rickenbacker, Brig. Gen. C. R. Smith, Thomas J. Watson and Charles E. Wilson.

Will there be any distinction between officers and enlisted men in the right to receive benefits? No.

What does membership in the society have to do with the right to receive benefits? Nothing at all. Benefits of the society will be administered without regard to membership.

What are the advantages of membership? The right to vote at meetings and the personal satisfaction of having contributed to a good cause.

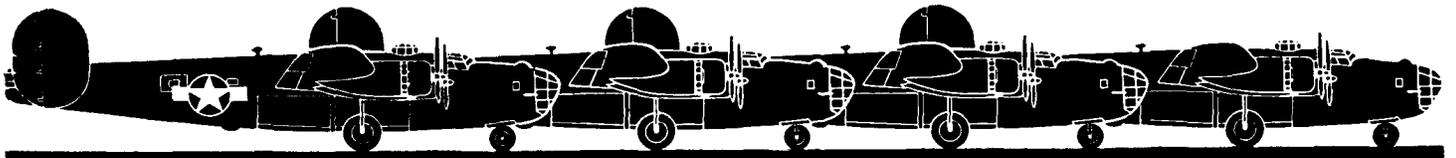
Who is eligible for membership? Anyone, military or civilian, who wants to support a good cause.

Are donations to the society deductible for income and estate tax purposes? Yes.

What are the membership classes and dues? Patron members, \$100 membership fee, no annual dues; life members, \$50 membership fee, no annual dues; benefactor members, \$5 a year; members at large, \$1 a year.

What is the address of the society? Washington, 6, D. C.

As vice president, Mrs. Arnold is the active head of the organization. With no compensation except the satisfaction of making a happy dream come true, she and many other AAF wives are devoting themselves to the ideal that the AAF must, in fact, take care of its own. ☆



ON THE LINE

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

TCC MECHS RECONSTRUCT GERMAN GOTHA 242 GLIDER . . .

A large German Gotha 242 glider—reconstructed from piles of wrecked aircraft on an airfield in Italy by Troop Carrier Command glider mechanics who had never seen a Nazi motorless aircraft—is now in the hands of U. S. aircraft research experts.

The glider, similar to the type used in the German air invasion of Crete, was built on a captured airfield by a small group of mechs who worked with strange equipment, improvised tools, no technical information and no previous experience in constructing gliders.

When Allied forces captured an airfield near Naples, a pile of wrecked Gotha gliders, demolished by the Germans in their hasty evacuation of the area, was found. Military authorities wanted a complete "German glider." The job was one to be done by an air force depot unit. But none was available. So they gave First Lieut. Nicholas F. Miller, now com-

manding officer of a 9th Troop Carrier Command glider echelon in England, the task with the assistance of twelve glider mechanics.

No technical information concerning the aircraft was available. But Lieutenant Miller and his men had experience in repairing AAF CG-4A gliders and the American "know-how." So they went to work.

Out of the rubble of broken fuselages, wings and rudders riddled by shrapnel, and myriad minute parts damaged almost beyond recognition by the fleeing Jerries, a flyable Gotha took shape. Mechanics often entered mined areas to procure essential parts from debris of shattered aircraft strewn about the field. The tires came from a wrecked English bomber. The dope used for sealing fabric construction was from captured Italian stores from another airfield. Tape and other minor necessities were made from raw materials. New tools were improvised for strange bolts, nuts and screws.

One of the most difficult parts of the glider to reconstruct was its twin-tail section. Some inevitable souvenir-seeking GI had cut out the tail swastikas.

The work was divided among the mechanics according to their special abilities. The fuselage was completely rebuilt by Staff Sgt. Clarence E. Garner, Meriam, Kan.; Staff Sgt. Porter L. Morgan, Brownfield, Texas, and Sgt. Francis L. Nash of Willcox, Ariz.

Pvt. Seymour Markowitz, Brooklyn, N. Y., handled most of the fabric work while Pfc. George H. Koebbe, Jackson, Mich., repaired the glider's twin booms, filling up shrapnel holes in the plywood.

Sgt. Carlin Hattan, Parsons, Kan., installed the windows and cockpit while doors and other woodwork were done by Sgt. Clifford R. Kuborn, Artesian, S. D., and Sgt. Allyn D. Clark, Wisconsin Rapids, Wis.

The tail section and minor repair jobs through the aircraft were taken care of by Sgt. Paul C. Thompson, Los Angeles; Cpl. Vance D. Bolin, Tulsa, Okla.; Pfc. Leonard R. Cain, Dodson, Texas, and Pfc. Vincent J. Lukason, Worcester, Mass.

Working long days under constant threat of enemy air attacks and standing guard on the aircraft at night, the men finished their job in five weeks. The result was a flyable glider—identical in every respect to the original flown by the Nazis.

The aircraft itself, known to the AAF men who built it as the "Fabric Fortress," is designed to carry two pilots and 21 soldiers or a maximum freight load of 5,300 pounds.—PRO, Hq, 9th Air Force.

Standing by the German Gotha 242 glider are the TTC men who reconstructed and assembled it from wreckage piles of several such aircraft left demolished on an airfield in Italy by hastily-evacuating Germans. The reconstruction job, done under combat conditions without benefit of depot facilities, was for the sake of military research and experimentation. The Nazi glider, a high wing, twin-boom monoplane, has been dubbed "Fabric Fortress" by its recreators: front row (left to right) Sgt. Carlin Hattan, Sgt. Clifford R. Kuborn, First Lieut. Nicholas F. Miller, Sgt. Paul C. Thompson, Cpl. Vance D. Bolin and Pfc. Vincent J. Lukason; back row, Pfc. George H. Koebbe, Staff Sgt. Clarence E. Garner, Staff Sgt. Porter L. Morgan, Pfc. Leonard R. Cain, Sgt. Allyn D. Clark and Pvt. Seymour Markowitz. Not in the picture is Sgt. Francis L. Nash.



CUTS TIME FOR ELECTRICAL CHECK . . .

An electrical mock-up containing all the necessary switches, wiring and electrical instruments necessary for checking the electrical system of a C-87 airplane engine on its mount prior to installation has been developed at an Air Transport Command base in England by Master Sgt. Herbert H. Van Bibber, Bensonville, Ill., veteran line chief with 22 years' AAF experience.

Effecting a saving of ten man hours on the installation (or forty hours altogether) the device has increased greatly the effective use of the ATC C-87s on the England-Africa shuttle run, according to engineering officers at the base.

Formerly, to test the electrical system

WHAT'S WRONG WITH THIS PICTURE?



DOWN under the B-24 nacelle, a B-2 turbosupercharger takes the spotlight for the ON THE LINE camera for the August session of finding the boners. A "Just so long as the thing operates" attitude during installation or servicing means tough going for the turbo. The proper hookup of all parts is essential to effective engine powering in flight, according to AN 03-10DA-1, which is not the case in this

picture, purposely posed the wrong way in the interest of better maintenance practices.

The two mechs who appear in the picture are Cpl. Dwight Brooks (left) and Pfc. Robert Magenheimer, both of the 4100th Base Unit, Section B, Patterson Field, Ohio. Corporal Brooks can point out seven mistakes in the picture, which are listed on Page 63. Can you find any more?

on C-87 engines following an engine change, the engine had to be mounted on the plane itself and checked through the instruments on the plane's cockpit.

The mock-up is powered by an ordinary 24-volt aircraft battery and is equipped with an inverter to change the 24-volt DC into 115-volt and 45-volt AC. In making the tests all engine instruments such as oil pressure, manifold pressure, tachometer and fuel pressure gauges are tested on the 45-volt current off the inverter.

The plane's regular 24-volt DC is used to test the systems which govern the cowl flap motors, propeller governor, starter, intercooler shutters, priming solenoid, oil temperature, carburetor air temperature and fast feathering solenoid.

Included in the device is a main junc-

tion box fitted with relays and fuses so that if a short circuit is present in the engine wiring system, it blows a single fuse and doesn't wreck the entire system, at the same time also enabling the mechanic to trace the source of trouble without delay.

The whole affair is mounted on a 24" by 24" wooden table and was constructed by Sergeant Van Bibber out of materials salvaged from wrecked aircraft.

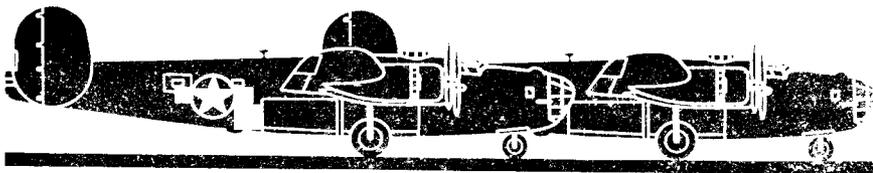
In addition, the device can be used on engines already mounted. It is adapted for this purpose by employing a transmitter—the same as mounted on the engine itself but with an additional dial—with a pointer calibrated for the various instruments to be tested. By using the transmitter on the mock-up for his test purposes the mechanic can determine whether it is the instrument or the engine

transmitter that is out of order.—Staff Sgt. James Winchester, Air Transport Command.

RED TAPE HAS CERTAIN MERITS . . .

Supply Division. Air Service Command, comes forward to state the case for red tape (that gremlin of every GI) with facts that only proper channeling of requisitions and the careful usage of right nomenclature for right parts will deliver the goods—and on time.

Requisition confusion stems from failure at AAF base supply depot to inaugurate and keep up-to-date a stock control system and stock balance and consumption reports. Without accurate base depot count of the stations it supplies, surpluses and famines will exist in the same command. (Continued on Next Page)



ON THE LINE (Continued)

Only correct nomenclature should be used for requisitioning parts! Mechs are prone to use homemade or general descriptions. Trade names or standard nomenclature are acceptable, *provided* complete stock number is added.

Maximum stock levels are carefully gauged and when replenishing items are needed to bring stocks up to par only those items needed should be ordered, *not extras*.

The practice of ordering a few extra just for good measure may create shortages in areas where parts are needed critically.

Stock record cards should be checked in compliance with TO 00-35A-6. Screen all reparable items and eliminate items beyond economical repair or those known to be excessive in the theatre. The job of keeping parts moving to places most in need requires unceasing cooperation.

Stock controls make possible monthly or semi-monthly ordering and eliminate more frequent orders which are wasteful. Handling, shipping space, containers and transit procedures are conserved; desk and paper work are cut down.

Expendable items are obtained more expeditiously by use of AAF form 81 *with correct stock number*. Accuracy avoids delays! Activities apt to give items incomplete and improper identification, garble the supply network. For best results use stock lists, TOs and illustrated parts catalogs in conjunction with form 81.

DESIGNS PORTABLE PARACHUTE BIN . . .

For squadrons constantly on the move which operate their own parachute departments, a portable and collapsible parachute bin has been designed and built by Master Sgt. Willard W. Young, Petuluma, Calif., non-commissioned officer in charge of the parachute department of the "White Knights" fighter squadron of the 13th Air Force Fighter Command in the South Pacific.

Weighing 75 pounds, this parachute bin when set up is eight feet long, five feet high and sixteen inches wide, and will hold twelve parachutes with equipment such as life raft and jungle kit. Each parachute compartment is two feet in length, twenty inches high and sixteen inches deep.

The bin is made of three-ply plywood with two- by four-inch base and main supports and one-eighth-inch cable cross-bracing at the back of the bin, turn-buckled taut. ☆



As the advancing movement of the war against the Germans makes new bases available mechs of the AAF go right along doing the same work—only the surroundings and pitch of intensity changing with combat conditions. Above, somewhere in France, (left to right) Staff Sgt. Edmund Fernholts, Arcadia, Wis.; Staff Sgt. Alfred Zigler, Kansas City, Mo., and Cpl. Arnold Blakeslee, Los Angeles, repair a bullet-torn fuel line. Below, at one of the USSR airfields used by the AAF, (left to right) Master Sgt. John M. Bassett, Silver Springs, Md., Lenin Boykov, Leningrad, and Master Sgt. Michael Cajolda, Philadelphia, all skilled aircraft mechanics, repair a B-17 engine. This trio is one of several of the combined Soviet-American ground crews.



ROLL OF HONOR

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

(Continued from Page 47)

Carlson, David E., Sgt.
Carlson, Edwin L., S/Sgt.
Carlson, Ellis E., S/Sgt.
Carlson, John R., T/Sgt.
Carlson, Maurice W., S/Sgt.
Carlson, Robert W., Lt.
Carlson, Walter J., T/Sgt.
Carlstrom, Joseph L., S/Sgt.
Carlton, Clyde W., S/Sgt.
(& OLC)
Carnes, Benjamin F., T/Sgt.
Carney, Arthur, S/Sgt.
Carney, Thomas J., Pfc.
Caroff, Wayne J., Lt.
Carpenter, Darwin K., Lt.
Carpenter, David E., Capt.
Carpenter, Frederick S., T/Sgt.
Carpenter, George, Capt.
Carpenter, Glenn S., T/Sgt.
Carpenter, Henry B., Capt.
Carpenter, Kenneth D., S/Sgt.
Carpenter, Leslie M., Jr., F/O
Carr, Benson V., Lt.
Carr, Byron L., Lt.
Carr, David E., S/Sgt.
Carrier, Robert A., S/Sgt.
Carroll, D. M., T/Sgt.
Carroll, Delwin E., T/Sgt.
Carroll, James J., Lt.
Carroll, John W., Capt.
Carroll, Rayburn, Sgt. (& OLC)
Carter, Roger M., Capt.
Carter, William H., Lt.
Cartmill, Reece D., T/Sgt.
Cartwright, Anthony L., S/Sgt.
Cartwright, Harrison W., T/Sgt.
Carter, William W., S/Sgt.
Case, James H., Lt.
Case, Robert E., Lt.
Case, Spencer F., Lt.
Casey, James F., Lt.
Casey, John R., Jr., Lt.
Casey, Leroy V., Capt.
Casey, Louis S., Lt.
Casey, Martin D., S/Sgt.
Casey, Robert N., S/Sgt.
Caslin, Harold E., Capt.
Casselbury, Clifford, S/Sgt.
Cassidy, William P., Lt. (& OLC)
Casteel, Carroll W., Lt.
Castle, Robert H., Lt.
Castro, Edwin W., S/Sgt.
Castro, Joaquin, Lt.
Cathcart, Charles O., Lt.
Cattin, Richard L., F/O
Caton, Carroll D., S/Sgt.
Cator, William E., Sgt.
Caulble, Lloyd F., T/Sgt.
Caudill, Carl M., Lt.
Caudin, Roger, S/Sgt.
Causley, Marie, S/Sgt.
Cavallo, James J., S/Sgt.
Cavanaugh, Timothy J., Lt.
Cavedo, Kermit B., Lt.
Cavett, Norval P., Lt.
Cawley, Richard A., Lt.
Cawthick, Joseph S., T/Sgt.
Cecil, Floyd M., Lt.
Cecil, Thomas J., Lt.
Ceely, David L., S/Sgt.
Celli, Bruno M., S/Sgt.
Cenicola, John T., S/Sgt.
Ceronio, George E., Sgt.
Chacon, Arturo C., S/Sgt.
Chaddock, Robert B., Lt.
Chadwick, Warren J., S/Sgt.
Chaffino, Pedro V., Cpl.
Chamberlain, Everett B., Lt.
Chamberlain, William V., Lt.
Chamberlain, William Le Grand, Capt.
Chambers, Harry K., S/Sgt.
Champion, Fred, S/Sgt.
Chance, Lyttleton E., Sgt.
Chandler, Berry, Lt.
Chandler, James A., Lt.
Chandler, Paul W., Jr., Sgt.
Chaney, Francis C., Lt. Lt.
Channell, John S., Sgt.
Chapman, Ernest A., Lt.
Chapman, James A., Cpl.
Chapman, William T., Jr., Lt.
Chapman, Wilson M., Lt.
Charleston, Wilbur R., S/Sgt.
Charlet, Edward J., T/Sgt.
Charnell, John F., Lt.
Chast, Robert, Lt.
Chatterley, Archie W., Lt.
Cheaney, Philip N., Lt.
Chely, Joseph E., Lt.
Cheney, Guy P., S/Sgt.
Chenoweth, Stuart C., Lt.
Cherezian, Herant G., T/Sgt.
Chezem, Charles E., T/Sgt.
Chizem, Russel H., S/Sgt.
Chiarello, Frank J., S/Sgt.
Chilcott, Robert M., Lt.
Child, Edward S., Lt.
Chiles, Scaborn H., Lt.
Chilton, Edward C., S/Sgt.
Chima, Cornelius P., Capt.
Chisholm, Henry C., Lt.
Chisholm, Henry V., Capt. (& OLC)
Chiverton, Byron J., T/Sgt. (& OLC)
Chmelik, Theodore F., Lt.
Choice, Hudson, S/Sgt.
Chisum, Henry E., Lt.
Chisum, George E., F/O
Chisum, William C., Cpl. (& 3 OLC)
Christen, Arthur P., T/Sgt.
Christensen, Borden W., T/Sgt.
Christensen, Cyril M., T/Sgt.
Christensen, Frank J., Jr., Lt.
Christian, Clyde A., T/Sgt.
Christian, James W., Lt.
Christian, Shannon, Maj.
Christian, Vesper S., S/Sgt.
Christiansen, Carl, M/Sgt. (& OLC)
Christiansen, Kenneth P., Lt.
Christiansen, Carl A., T/Sgt.
Christie, George M., Sgt.
Christie, Homer R., S/Sgt.
Christofferson, Lester O., S/Sgt. (& 2 OLC)
Chudars, Stephen M., S/Sgt.

Church, Warren E., Lt.
Churchill, Norman V., F/O
Cieri, Anthony, Capt.
Cihak, Erwin F., Lt.
Cimaglia, John D., Capt.
Cinquigrana, Vincent E., Jr., Pvt.
Clamp, Charles G., Jr., Lt.
Clancy, William L., Lt.
Clark, Charles D., Lt.
Clark, Charles D., Capt.
Clark, Charles R., Lt.
Clark, Clarence W., S/Sgt.
Clark, Dudley R., Lt.
Clark, Ernest B., S/Sgt.
Clark, Elmo E., F/O
Clark, Frank H., Lt.
Clark, Garne, S/Sgt.
Clark, Ivan, Jr., S/Sgt.
Clark, Joseph H., S/Sgt.
Clark, Lawrence D., Lt.
Clark, Leonard J., Sgt.
Clark, Milton L., Lt.
Clark, Paul H., Pvt.
Clark, Walter R., S/Sgt.
Clark, William, F/O
Clark, William G., Lt.
Clark, William J., Sgt.
Clarke, Robert J., Lt.
Clarkson, George, Sgt.
Clatfelter, Paul L., T/Sgt.
Clay, Martin D., S/Sgt.
Clayton, Clay D., Sgt. (& OLC)
Clayton, Lewis F., S/Sgt.
Cleveland, Alton B., Jr., S/Sgt.
Cleland, Gordon E., Lt.
Clemens, Michael L., Lt.
Clement, Richard W., Lt.
Clements, Albert W., Lt.
Clements, Richard E., Lt.
Clements, Stanley C., S/Sgt.
Clemenzi, Edmond J., Lt.
Clendensen, William F., S/Sgt.
Cliff, Robert E., T/Sgt.
Clifford, George A., S/Sgt.
Cliff, Oscar G., Jr., Lt.
Clifton, David S., Capt.
Clifton, James J., Lt.
Clifton, John W., T/Sgt.
Cline, Thomas H., Capt.
Cline, William J., Lt.
Clingman, William P., S/Sgt.
Clonch, Thomas M., S/Sgt.
Cloney, Clifford R., S/Sgt. (& OLC)
Clos, Drexel H., T/Sgt.
Cloud, Vivian A., Capt. (& 2 OLC)
Clymer, Harvey C., Lt.
Coombs, Joseph B., Lt.
Coard, John N., Sgt.
Coats, Richard W., S/Sgt.
Cobb, Bradford E., Sgt.
Cobb, Charles L., Lt.
Cobb, Elmon R., Capt.
Cobb, James O., Capt.
Cobb, Willard S., M/Sgt.
Cobega, Mitchell A., Capt.
Coble, Bartholomew K., Lt.
Cochran, Donald D., Jr., Lt.
Cochran, William L., S/Sgt.
Cochrane, Alexander M., S/Sgt.
Cockersole, Alex G., Lt. (& OLC)
Code, George W., Lt.
Coffey, Noel F., Lt.
Coffman, Dennis E., S/Sgt.
Coffman, Robert F., Sgt.
Coghlan, John N., Lt.
Cogswell, Robert W., Lt. (& OLC)
Cohen, Max, S/Sgt.
Cohen, Stanley, Lt.
Cole, Henry G., Jr., F/O
Colasunton, Robert J., Lt.
Colby, Franklin H., Capt.
Colby, Lyle G., T/Sgt.
Colchagoff, George D., Lt.
Coldiron, Owen J., S/Sgt.
Cole, Edgar B., Maj.
Cole, Howard L., Sgt.
Cole, Melvin R., S/Sgt.
Cole, Robert F., T/Sgt.
Cole, Willie L., S/Sgt.
Coleman, Francis J., Lt. (& OLC)
Coleman, Leslie F., T/Sgt.
Coleman, Robert C., S/Sgt. (& OLC)
Colley, Robert V., Pfc.
Colquhoun, Robert E., Lt.
Coll, William F., T/Sgt.
Collard, John E., Lt.
Colleran, Robert J., Maj.
Collette, Joseph E., S/Sgt.
Collette, Robert W., F/O
Collins, James B., Lt. (& OLC)
Collins, Matthew C., Lt.
Collie, David T., S/Sgt. (& OLC)
Collier, Ben F., Lt.
Collier, Charles E., Lt.
Collier, Jack M., Lt.
Collins, James J., Lt.
Collings, Robert S., Sgt.
Collins, Elwood E., Lt.
Collins, Frank J., Lt.
Collins, Hal H., Jr., T/Sgt.
Collins, Harvie L., S/Sgt.
Collins, Hector J., S/Sgt.
Collins, Homer J., S/Sgt.
Collins, James W., T/Sgt.
Collins, Richard H., Lt.
Collins, Theron U., Jr., Capt.
Collins, Thomas F., Maj.
Collinsworth, J. D., Lt.
Colony, John W., Lt.

Colton, Francis R., S/Sgt.
Columbus, Thomas B., Lt.
Covard, William P., Sgt.
Combs, Mack, Sgt.
Combs, Richard A., Lt.
Combs, Stanley, Lt.
Combs, Victor R., T/Sgt.
Comer, Cecil C., Lt.
Cometh, Lawrence, Capt.
Comotofski, Eugene J., Lt.
Compo, Anthony, S/Sgt.
Compton, Keith K., Col. (& OLC)
Compton, Leonard D., T/Sgt.
Comstock, Harold E., Lt.
Condon, William F., Jr., Lt.
Condy, William L., Capt.
Conger, Paul A., Capt.
Conkle, Leonard L., Lt.
Conlee, Howard M., T/Sgt.
Conley, David M., Maj.
Conley, Harry M., Capt.
Conley, John E., Lt.
Conley, Joseph J., S/Sgt.
Conley, Robert, S/Sgt.
Connelly, Loras J., S/Sgt.
Conn, John G., Lt.
Conn, Myron R., Capt.
Connally, Edwin W., Sgt.
Connelly, Joseph W., Capt.
Connolly, James K., A/C
Connolly, John E., T/Sgt.
Connor, Edward D., Jr., S/Sgt.
Connors, Wayne S., Capt.
Conradi, Arthur, Jr., Capt.
Conroy, Neil P., Lt.
Conroy, Paul F., Lt.
Conway, Robert J., F/O
Conway, Roger J., Lt.
Coogan, Jay G., S/Sgt.
Cook, Bobby A., Capt.
Cook, Charles H., Lt.
Cook, Charles R., Lt.
Cook, Clarice A., T/Sgt.
Cook, Claude T., T/Sgt.
Cook, Joseph J., S/Sgt.
Cook, Luke J., F/O
Cook, Leonard J., Lt.
Cook, Leonidas B., S/Sgt.
Cook, Louis G., Lt.
Cook, Max J., Lt. (& OLC)
Cook, Walter V., Capt.
Coole, Fred C., Lt.
Coole, Richard B., S/Sgt.
Coole, Russell E., Lt.
Cooley, Willis M., Lt.
Coombs, William F., S/Sgt.
Coomes, Harry R., Lt.
Cooney, Jacob M., Lt.
Cooney, Robert M., Sgt.
Cooper, David L., F/O
Cooper, Earl J., Maj.
Cooper, Hal R., S/Sgt.
Cooper, Henry A., S/Sgt.
Cooper, Jack A., S/Sgt.
Cooper, James L., Lt.
Cooper, James N., Capt.
Cope, William S., Capt.
Copenhaver, Edward A., S/Sgt.
Corbin, Bernard L., Lt.
Corcoran, John E., Jr., T/Sgt.
Corrill, Clark, Capt.
Cordell, Richard N., Lt.
Cords, Warner J., S/Sgt.
Corley, Quinn M., Maj.
Corn, George J., Jr., Sgt.
Cornell, Harold F., Sgt.
Cornette, Charles M., Lt. (& 2 OLC)
Cornwall, Glenn H., T/Sgt.
Cornwell, Amos B., S/Sgt.
Coronios, Harry, Lt.
Corrie, Robert B., Lt.
Corrigan, Robert E., Lt.
Corrigan, Robert E., Lt.
Corsaro, Sabatino, Lt.
Corry, Arthur S., S/Sgt.
Corser, Frank M., S/Sgt.
Corwin, William H., Capt.
Cosart, Darrell R., Lt.
Costello, Robert, Capt.
Coteller, George J., S/Sgt.
Cotlier, Allan, Lt.
Coulson, John, S/Sgt.
Coulter, Arnold G., T/Sgt.
Coulter, Orville K., T/Sgt.
Coulter, Richard R., Lt.
Counce, James D., S/Sgt.
Couturey, Robert C., Lt.
Courtright, Earl W., T/Sgt.
Couvillion, Stanley J., S/Sgt.
Covett, Wayne L., M/Sgt.
Covin, Bedford L., Lt.
Cowan, James D., S/Sgt.
Cowan, Leroy W., S/Sgt.
Cowan, Randall, S/Sgt. (& OLC)
Cowan, Wesley D., T/Sgt.
Coward, James S., Lt. Col.
Coward, William S., Jr., Maj.
Cowen, Hiram M., S/Sgt.
Cox, Albert C., S/Sgt.
Cox, Arthur E., Cpl.
Cox, David C., Lt.
Cox, Don F., Lt.
Cox, James R., F/O
Cox, Robert T., Lt.
Cox, Thomas E., Lt.
Cox, William R., Lt.
Cox, William Y., Jr., S/Sgt.
Coxwell, Jonathan E., Maj.
Coyne, Charles B., S/Sgt.
Coykendall, Ralph A., T/Sgt.
Cozad, Edward G., S/Sgt.
Cozens, Robert C., Capt.
Craft, Winfred, Capt.
Craig, Dornan S., Capt.

Craig, Horace C., Maj.
Craige, John E., T/Sgt.
Crawford, Charles O., Capt.
Crawford, Robert A., Capt.
Crandell, John A., Jr., Lt.
Crane, Edwin R., Lt.
Crane, Gordon R., Sgt.
Crane, Joseph F., F/O
Crans, Chester S., T/Sgt.
Craven, Charles W., Lt.
Crawford, James M., S/Sgt.
Crawford, Ray, Lt.
Crawford, William E., Lt.
Creasey, Elmer C., Sgt.
Creeluis, William R., F/O
Creel, Linton G., S/Sgt.
Cressman, Mahlon W., S/Sgt.
Cressman, Arthur R., S/Sgt.
Creswick, Bernard C., Sgt. (& OLC)
Crews, Sidney W., Lt.
Crich, Jack M., Lt.
Crichton, Douglas E., Lt.
Crim, Harry C., Jr., Lt.
Crippon, George J., T/Sgt.
Criswick, Walter C., S/Sgt.
Crist, Danny M., Lt.
Criswell, James B., Lt. (& OLC)
Crivois, Albert, T/Sgt.
Crocker, Charles J., Lt.
Crocker, Emery B., Lt. (& OLC)
Crockham, Otis, S/Sgt.
Cromer, Daniel H., Maj.
Cronin, John J., Lt.
Crooks, James H., Lt.
Crooks, Robert D., Lt.
Cropper, Ernest E., S/Sgt.
Crosby, Harry M., Lt.
Crosby, Luke J., S/Sgt.
Cross, Jack L., Lt.
Cross, Louis D., Lt.
Cross, Willard A., Lt.
Cross, William A., T/Sgt.
Crossett, Jack C., Lt.
Crossey, Donald W., S/Sgt.
Crossey, Robert H., Capt.
Crouch, Wilbur E., Lt.
Crouch, William C., T/Sgt.
Crow, Robert T., Jr., Lt.
Crowder, John P., Jr., Maj.
Crowder, Robert W., S/Sgt.
Crowder, Charles H., Lt.
Crowley, Richard S., Lt.
*Crowley, Elmer L., S/Sgt. (& OLC)
Crownover, Joseph C., Lt.
Crowthier, John K., T/Sgt.
Cruikshank, Arthur W., Jr., Capt.
Cruit, Harold E., Lt.
Crutchfield, James F., Lt.
Cruz, Eduardo S., Sgt.
Crysler, Charles J., Lt.
Csontos, John P., Jr., S/Sgt.
Csontos, Oliver M., Pfc. (& OLC)
Cugier, Theodore T., S/Sgt.
Culbert, Clinton P., Lt.
Culbertson, Norman C., S/Sgt.
Culender, Joe P., Lt.
Cullum, Felder W., Maj.
Culp, William K., Capt.
Culpepper, Claude A., Capt.
Culver, James H., T/Sgt.
Cumberland, Horace W., Lt.
Cummings, Earl W., Lt.
Cummings, Joseph F., Lt.
Cummings, Truman W., Lt.
Cummings, William R., Cpl.
Cunat, Rudy J., Jr., S/Sgt.
Cunio, Frank L., Jr., T/Sgt.
Cunningham, Cletus A., Capt.
Cunningham, Don F., Capt.
Cunningham, John F., Lt. (& OLC)
Cunningham, Ronald W., S/Sgt.
Cupp, Ole E., Capt.
Cupp, Ray V., S/Sgt.
Cupper, Robert J., S/Sgt.
Curdes, Louis E., Lt.
Currey, Vernell, S/Sgt.
Currie, Alden H., Lt. (& OLC)
Currie, Alexander D., Lt. (& OLC)
Currie, Herman C., Lt.
Currie, Robert P., Lt.
Curry, William L., Lt.
Curtis, Alden B., S/Sgt.
Curtis, Ferd J., Lt.
Curtis, Floyd W., Sgt.
Curtis, Howard S., Lt. (& OLC)
Curtis, Joseph R., Lt.
Cushman, Joseph A., Sgt.
Cusintine, Peter J., Jr., S/Sgt.
Custis, John K., Lt.
Cutforth, Charles Clifton, Lt.
Cuzack, Paul, Cpl.
Cweeney, Thomas T., Capt.
Dabolt, Robert L., Lt.
D'Agata, Charles, T/Sgt.
Dager, Walter C., S/Sgt.
Daggett, William E., Lt.
Dahl, Arvid S., Lt.
Dahlgren, Douglas G., S/Sgt.
Dahlberg, Douglas G., Lt.
Dailey, John F., Jr., Lt.
Daily, Marion L., T/Sgt.
Dale, Don, Lt.
Daley, John A., Lt.
Dallas, Raymond E., T/Sgt.
Dalrymple, Edwin, Lt.
Daly, Donald J., T/Sgt.
Daly, Edward J., Capt.
Daly, Herbert B., T/Sgt.
Daly, Raymond E., Lt.
Daly, William J., Jr., Lt.
Damm, Russell J., S/Sgt.

Damsz, Thaddeus M., Sgt.
Dana, Joseph R., S/Sgt.
Dagaher, Allen W., S/Sgt.
Danby, Jack E., Lt.
Dando, Donald A., S/Sgt.
Daniel, Jack H., S/Sgt.
Daniels, Claude G., S/Sgt.
Daniels, James T., S/Sgt.
Daniels, Luther M., M., T/Sgt.
Daniels, Patrick H., III, Lt.
Danis, Henry L., S/Sgt.
Dannacker, Carlos E., Lt.
Darity, Culmer H., S/Sgt.
Darity, George J., Jr., Capt.
Darby, Howard G., M/Sgt.
D'Arcangelo, Emilio, Sgt.
Darling, Arthur J., T/Sgt.
Darragh, Fred K., Jr., Lt.
Darrow, George R., F/O
Dau, Ray S., Lt.
Daugherty, Paul P., Sgt.
Dauphin, Ray, Capt.
David, Aaron A., S/Sgt.
David, Dan H., Lt. (& OLC)
David, Herman W., Sgt.
David, James K., Lt.
David, Nolan J., S/Sgt.
David, Stephen J., Lt.
David, William B., Col.
Davidoff, Louis, S/Sgt.
Davidson, Collier H., Capt.
Davidson, Leslie L., Lt.
Davidson, Robert B., Sgt.
Davidson, William R., Lt.
Davies, Edwin R., Lt.
Davignon, Norman L., S/Sgt.
Davis, Adrian A., Lt.
Davis, Albert C., S/Sgt.
Davis, Alfred T., S/Sgt.
Davis, Billy T., S/Sgt.
Davis, Calvin C., T/Sgt.
Davis, Charles W., S/Sgt.
Davis, Clifton C., Lt.
Davis, David Harold, Lt.
Davis, Don M., Lt.
Davis, Edward W., F/O
Davis, Emmett S., Maj.
Davis, Ernest S., F/O
Davis, Eugene C., T/Sgt.
Davis, George H., Lt. (& OLC)
Davis, Glen P., Sgt.
Davis, Harley B., Lt.
Davis, Harvey, M/Sgt.
Davis, Haven J., T/Sgt.
Davis, Herbert L., Capt.
Davis, Howard C., S/Sgt.
Davis, Jack A., T/Sgt. (& OLC)
Davis, James, Lt.
Davis, Jesse C., Capt.
Davis, Jimmie N., Sgt.
Davis, John M., Lt.
Davis, Lewis C., T/Sgt.
Davis, Marvin, Lt.
Davis, Max E., Capt.
Davis, Mercer P., Capt.
Davis, Richard C., Capt.
Davis, Robert E., Capt.
Davis, Robert H., Lt.
Davis, Roy B., Jr., S/Sgt.
Davis, Walter R., S/Sgt.
Davis, William D., T/Sgt.
Davis, William H., Lt.
Davis, Zias D., Lt.
Davitt, Richard S., T/Sgt.
Davitt, William J., Capt.
Davoren, Albert J., Jr., Lt.
Day, Edward W., S/Sgt. (& OLC)
Dawson, John M., Lt. (& OLC)
Dawson, Madison E., Cpl.
Dawson, Richard B., T/Sgt.
Dawson, Robert M., S/Sgt.
Dawson, Thomas W., Jr., S/Sgt.
Dawuske, Carl W., Lt.
De, John R., S/Sgt. (& OLC)
Day, Raymond L., S/Sgt.
Day, Voorhis H., Lt.
Dayhuff, Harry J., Lt. Col.
Dean, Joseph S., Lt.
Dean, Marvin E., S/Sgt. (& OLC)
Deach, Zach W., Lt. (& OLC)
Deardth, Charles H., Lt. (& OLC)
Dearth, Edwin K., T/Sgt.
Debartolo, Francis, T/Sgt.
De Baun, Clyde E., Lt.
De Boyer, Eugene C., Lt.
De Boyer, Paul, T/Sgt.
De Boyer, Edward, S/Sgt.
Decelles, Robert W., S/Sgt.
Decker, Kenneth R., S/Sgt.
Decker, Richard E., Capt.
Deer, Joe H., Lt.
Deets, John T., Jr., S/Sgt.
Deffendill, Charles E., S/Sgt.
De Ford, Earl H., Col. (& OLC)
De Graffenreid, Edwin L., Lt. (& OLC)
De Gregorio, Italo N., Pvt.
De Haven, Robert M., Lt. (& OLC)
Decker, William N., Maj.
DeHany, William A., Capt.
DeHaven, John B., T/Sgt.
Delano, Edward J., T/Sgt.
DeLambre, Samuel J., S/Sgt.
DeLcamp, Robert G., Lt.
Del Conte, Albert A., T/Sgt.
Dell, Chester R., S/Sgt.
Dell, Leonard E., Lt.
DeLmonico, Frank J., S/Sgt.
DeLoach, Ralph K., Capt.
Del Villaggio, Carl P., Cpl.
Demitropoulos, Andrew P., Lt.
Demoss, Edward L., T/Sgt.
De Moss, Lloyd K., Capt.
Dempsey, Jack D., Capt.
Dempsey, James C., Jr., Lt.
Dempsey, Robert C., Maj.
Dempsey, Thomas M., Sgt. (& OLC)
Dempsey, Timothy W., Lt.
De Muijnck, Jimmie M., S/Sgt.
Dennault, Francis P., Lt. (& OLC)
Denoyer, John C., S/Sgt.
Denmead, Donald R., Sgt.

(Continued on Page 63)

German Fighters



Our Targets in Japan



Jap Deserters

B-29 TARGETS. Japan's heavy industries, now targets of the 20th Air Force, are concentrated in less than ten main cities in Japan proper. The country's largest steel smelters are at Yawata, target of the first two B-29 raids, on the island of Kyushu. The naval base of Sasebo, hit on the second raid, also is on this island.

Tokyo, stretching out to its port, Yokohama, is the farthest eastward of the important cities. A new metropolis, Nagoya, containing great textile mills lies 160 miles westward. Further west is Kyoto, and thirty miles from there is the city of Osaka, with a population of 3,350,000 and many industrial factories. Kobe, the port of Kyoto and Osaka, has 1,100 factories itself.

Japanese-held territories contain important industries, too, such as the aluminum plants in Formosa, hydro-electric plants in Korea, and the Mukden Arms Manufacturing Company in Manchuria.

One thing that must be remembered is that Tokyo isn't going to burn down and blow away the first time it is attacked on a big scale. The idea that this city is merely a collection of paper houses is wrong. Tokyo is bigger than Berlin and smaller only than London and New York. It has a population of about 7,000,000 and covers 217 square miles. The center of the city, rebuilt (with a lot of American help and money) after the earthquake in 1923, is like a modern occidental city. It has big steel and concrete buildings and broad streets which were built as fire-breaks in the outlying, flimsily-constructed districts.

The experiences of the 1923 earthquake will help the Japanese when our bombs start taking the town of Tokyo apart. Because they have long expected another earthquake, they built their business and industrial sections especially to withstand shock, concussion and flames. Special architectural techniques, some of them first displayed by Frank Lloyd Wright when he built the Imperial Hotel—the only building to stand up during the quake, have enabled the Japanese to construct buildings which can withstand terrific shocks.

The industrial belt of Tokyo strings out some 18 miles from the center of the city with factories, shipyards, naval bases, piers, warehouses and arsenals reaching down the Bay of Tokyo to Yokohama. Yokohama has some 4,500 factories and

huge wharves capable of handling large ships.

GERMAN METHODS. One crack German unit which had seen a lot of action in Africa, Sicily, Italy and USSR led a fairly tough life, analysis shows, as well as developing some reasonably smart tactics.

Because their aircraft were scarce, the fighter group was subject to call from daybreak until nightfall, strenuous duty which had many pilots close to cracking. They were often given "Gewaltauftrage," a type of order which must be accomplished or else the pilot must not return. Most of these were for two kinds of missions—interception of Allied reconnaissance craft or long reconnaissance flights of their own.

If a pilot was ordered to get an enemy reconnaissance plane, he *had* to get it. If he ran out of ammunition, he was supposed to ram the plane. On long range reconnaissance, the members of this group were usually given some escort. The maps they carried contained no markings or notations which would give military information in case they were shot down, and the pilot and his cover pilot were not permitted to communicate with each other by radio. Often, when they came in after a mission, one pilot would have to go immediately to headquarters for questioning. Then the other pilot was permitted to land and he also was questioned. The pilots were given no chance to get together, compare notes or make up a story before reporting.

The outfit flew ME-109-G6s, equipped with five machine guns, three of one kind and two of another. The planes had very high grade, bullet-proof windshields. An expensive, extra-high explosive ammunition, which could penetrate bullet-proof windshields, was issued sparingly to old-time pilots.

JAP TRAINING. The Japanese Army gives its pilots training which resembles considerably the nursing along, from bush leagues to minors to majors, received by

American infielders before the present war.

A Jap pilot gets his primary, basic and advanced training in southern Japan and in Manchuria. From there he is moved to Formosa for operational training which consists of flying bombers and fighters over the Chinese east coast.

After learning how to kill defenseless people and how to bomb unarmed targets, the pilot goes to the Hong Kong-Canton area where the Japs control a few hundred square miles. He will meet American in-



terception in this area, and normally flies only ten or twelve missions. He then goes to Burma and from there to the Philippines and South Pacific islands.

By the time he gets to the islands he is a fairly well-trained pilot with combat experience and a good knowledge of his plane and of battle formations.

When he is relieved from South Pacific duty, under the Japanese system of rotation, he takes the same route home he took out.

Used as a flight, squadron or element leader, he passes on his knowledge to younger pilots on tours of duty in Burma, Hong Kong-Canton and Formosa. Then he gets a rest in his homeland—that is, if he gets there.

HERE'S HOW. Some more of Dr. Goebbels' weird propaganda broadcasts were put on the air just after a heavy Allied raid over Germany recently. The Nazis first said that "an attempt" to bomb them had been made, then claimed they destroyed 123 of our planes, and, some time later, said they had knocked down 136 of our aircraft. The broadcasts, which had little or no facts in them, ended with a rather interesting talk by a Lieutenant Beckmann of the Luftwaffe.

"The great success of our fighter and long range fighter formations is a result of the long and hard schooling of German pilots," he said.

During the last twelve months the German fighter arm has gone through a development which must probably be numbered among the hardest in this war. When the first large formation of four-engine bombers appeared, many a fighter pilot experienced the same psychological effect that infantrymen felt in 1917 when

the faster and more mobile fighter. It is, however, a target which, because of the closeness of its formation, has a strong firepower, effective in all directions."

TANKS. Tanks knocked out by Allied gunfire from ground troops or strafing planes are often quickly and efficiently salvaged by the Germans. In fact, the Nazis' ability to save a tank often amazes our Armored Force officers.

One reason the Germans are often successful in recovering damaged tanks is that they try to get them out of the vicinity very soon after they are hit. Each German tank carries two towing cables 20 to 25 feet long. On each tank the cables are arranged so that one is fastened in front on the right and is laid toward the rear, and the other is fastened in back on the left and is carried toward the front. Thus if one tank is damaged and needs the help of another tank, each will have only one cable to attach or detach.

with cranes. But in any case, the tank men tried — and hard — to rescue their damaged tank.

FIGURING THINGS OUT. Our methods of taking islands away from the Japanese have been giving the little men some cause for thought. The Japs' analysis of one of their battles with us is as follows:

"Consider the enemy's selection of landing points. Perceiving the weakness of our defenses on the lagoon side, he first moved his convoy into the lagoon and anchored there; then, from the lagoon, he commenced his 'roundabout' landings at our rear. Study of this battle reveals several tactical changes which bear mention; namely:

"In planning the defenses of an atoll, remember that the enemy's landing front is not necessarily restricted to the sea side alone. It is essential to have installations on the lagoon side, too.

"Furthermore, for the equipping and organizing of positions, we believe that there must, as a matter of course, be constant instruction and training in night firing, close-quarter combat, the shifting of weapons as opportunity dictates, and the utilization of mobility of men and weapons."

OVER THE HILL. Now that fighting in the South and Central Pacific is getting *really* tough, the Japanese have been having trouble with their young men deserting. Not that there are many places for them to go, but they just want to get away from where they are.

Here is the way one fellow felt:

"Mental power is the thing.

"Shortage of provisions and fuel.

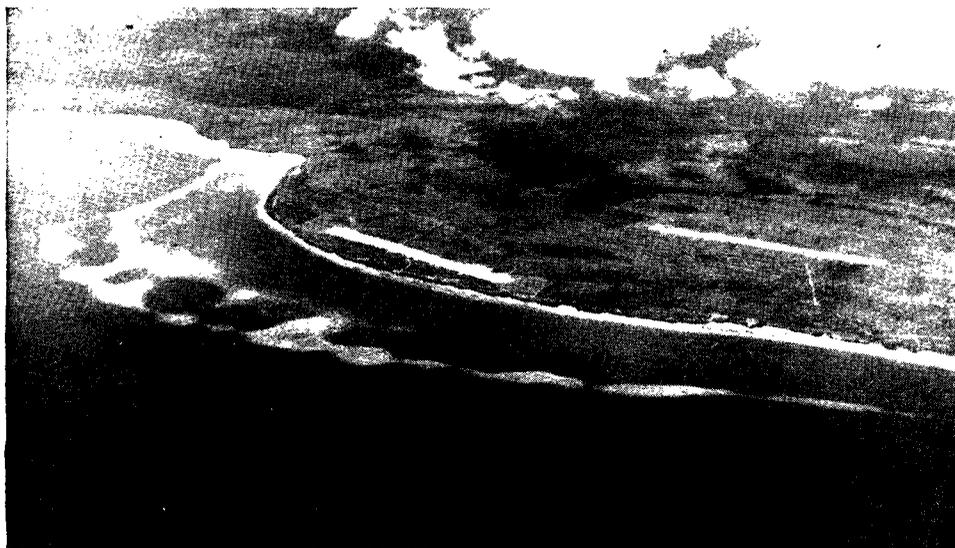
"Regarding a case of desertion we had recently. Was it because of his mental weakness?

When we think of the physical labor, mental fatigue and shortage of supplies we have experienced in the past ten days, it seems we can understand how weak he was. Maybe he had his own idea. Who knows?"

He said the deserter was captured, adding:

"I wonder how he felt . . . Now he has to spend his life as a prisoner. We can't do anything about it because, after all, it was he who committed a crime. I only hope for the best. It is we who feel more pained than he as we stand on guard and watch him."

EXTENSIVE DESTRUCTION. An order recently was sent to certain members of his staff by a Nazi general, and presumably, carried out to the letter. It outlined the destruction of the "last but legally obtained Westphalian ham and the destruction of a large number of Westphalian cakes," at a breakfast. The rest of the general's troops had the regular breakfast of bread and ersatz coffee. ☆



Building but one airstrip on each strategic island has often cost the Japs a concentration of planes in a single AAF attack. Now they are increasing such facilities and dispersing grounded aircraft. These photographs were taken by Capt. L. P. Bachmann of the AIR FORCE overseas staff when Mokmer Field on enemy-held Biak island was struck, with a Japanese loss of twelve planes. Two new strips (above) were being completed nearby and Biak, therefore, needed blasting.

the first large formations of tanks appeared. But the shock was only of short duration. The command realized that the impetus of this enemy weapon could only be met by the same impetus. A mass attack could only be met by a mass defense. The enemy, who attacked in close formation, wingtip to wingtip, had to be fought by the same methods . . .

"Now fighters fight shoulder to shoulder as in an infantry assault . . . (which) mean a re-orientation from individual patrol to patrol-in-formation which imposed on the leader of the squadron the task of being clear about the tactical situation at all times . . . In contrast to the fighter, the bomber flying in close formation forms a stable target whose evasive actions are in no proportion to those of

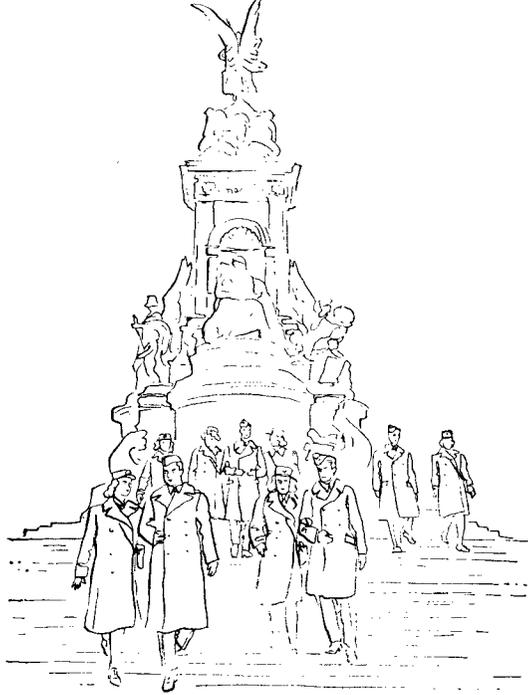
An example of German persistence was shown in one battle when a German tank slid into a ditch and bellied so the tracks wouldn't grip. The tank signalled the one nearest it for help. While gunfire held off our infantry, the tankman fastened the cables, one on each side. The pull was uphill, and the rescuing tank was unable to get the bellied one out.

That night, two more tanks joined the attempt, fastened their cables, but still were unable to get the tank moving. The damaged tank was then stripped and abandoned. Observers say, though, that had the Germans had one of their eighteen-ton half-tracks available the tank would have been rescued. These powerful towing tractors, called *Zugmaschine*, do all kinds of heavy work and can be equipped

AIR WACS OVERSEAS

Working side by side with Air Force men in foreign theatres, Wacs are playing an important part in the success of AAF operations.

Although Air Wacs overseas are now primarily in England, North Africa and Italy, they are destined eventually to see service at AAF stations all over the world. At one time, Air Wacs were assigned principally to replace men performing clerical tasks in England and Italy to enable the latter to participate more actively in the Italian push and the invasion of Normandy. Now that the ball is rolling in Europe, however, many requisitions for Air Wacs received from commands in the Pacific area are gradually being filled. Especially for those jobs which women normally perform have Wacs been in demand but, as these positions are filled, overseas organizations are beginning to use Wacs in a wider variety of AAF assignments. ☆



Blankets, sidewalk, grounds get a going over from these Wacs who have set up light housekeeping in a prefabricated hut at an airbase in England.





Maj. Gen. W. E. Kepner, Lieut. Gen. Carl Spaatz, Maj. Gen. B. M. Giles plan operational flights at fighter station in Britain while in the foreground Lieut. Ruth Adams carries on her regular work.



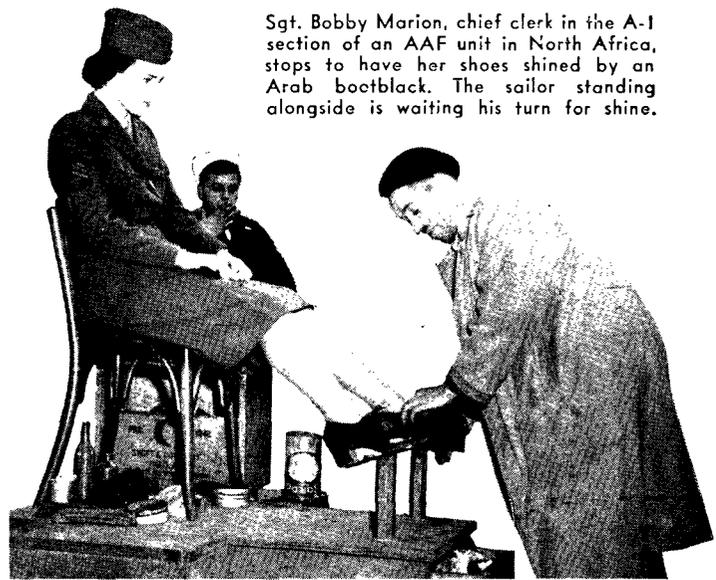
In weather, communications, supply and control offices, Wacs can be found performing important jobs. Cpl. Zelma E. Hazelton, who is an 8th Air Force photo interpreter, is shown above spotting maps.



Mail from home means a lot to these Wacs who crowd into their barracks in North Africa to see whether Cpl. Julia Yonko has a letter for them. They are attached to the AAF Service Command in the Medi-

terranean Theatre of Operations where they are performing a variety of jobs in the photo labs, staff offices, message centers, radar and cryptographic sections and other sections of the command.

Eventually scheduled to move across the Channel for headquarters jobs in France, these Wacs are sure to make use of a knowledge of French. With instructor's help, they speak only French during their meals.



Sgt. Bobby Marion, chief clerk in the A-1 section of an AAF unit in North Africa, stops to have her shoes shined by an Arab bootblack. The sailor standing alongside is waiting his turn for shine.



Their day's work done, these Wacs stationed at a medium bomber headquarters in England whip up a midnight snack. One of the young women has obviously come a long way and expects to go much farther.

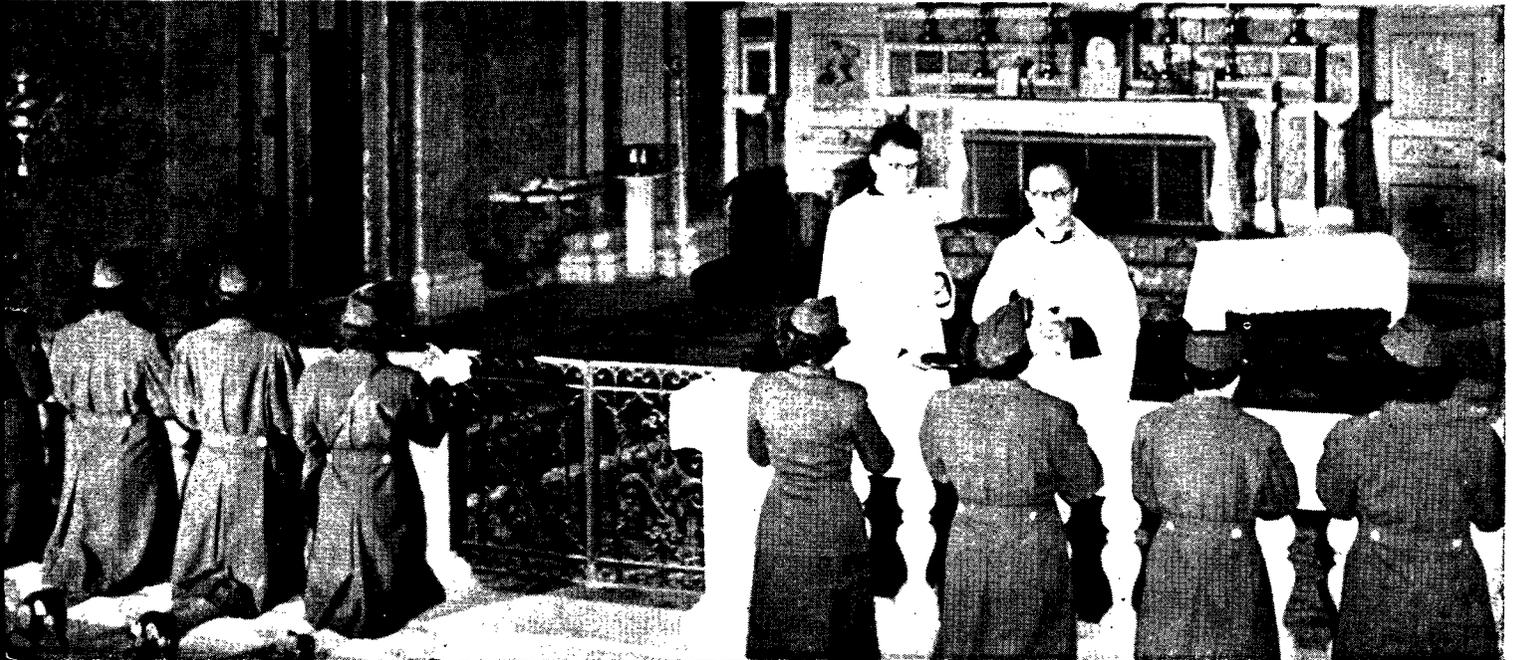


At 9th Air Force headquarters, Sgt. June C. MacWilliams is private secretary to Brig. Gen. Samuel E. Anderson. At the present time the majority of Air Wacs are filling positions as secretaries and typists.



Air Wacs at this telephone switchboard in 8th Air Force headquarters are the connecting link between their headquarters and other AAF commands around the globe. Staff Sgt. Alice B. Stanly (right) is supervisor.

Kneeling before the altar in a small church in southern Italy, eight Air Wacs of the MAAF receive communion from the village priest.



Roll of Honor

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

(Continued from Page 57)

Dennen, Arch A., Jr., Lt.
Dennis, John S., Capt.
Dennis, Robert W., Capt.
Dent, Elliott E., Jr., Lt.
Denton, Guy O., Lt.
Denton, Harris L., Lt. (& OLC)
Derako, Ignatius R., T/Sgt.
Deer, Herbert O., Lt.
Derrick, Daniel F., Lt.
Derringer, William D., Jr., Sgt.
Deruntz, Leo, Lt.
Desmond, Arthur P., Lt.
Dessert, Kenneth O., Maj.
Dethlefsen, Robert E., Capt.
Dettweiler, Richard O., T/Sgt.
Devane, John L., Lt.
Deverger, Claude E., S/Sgt.
Devers, Harry M., Lt.
Deveuve, James P., Lt.
Devine, Daniel A., Sgt.
Devine, James G., Jr., S/Sgt.
Devine, Joseph F., S/Sgt.
Devove, Robert W., Jr., S/Sgt.
De Voss, Virgil E., S/Sgt. (& OLC)
Dewalt, Arthur E., S/Sgt.
Deweese, Cecil D., Lt.
Dewey, George G., Capt.
Dewey, Robert C., Sgt.
De Wolf, Earl T., Lt.
De Wolf, James G., Capt. (& OLC)
Dexter, John H., Capt.
De Young, Clarence R., Lt.
Dibble, Robert E., Lt.
Di Bella, Louis J., Jr., Sgt.
Dickerson, Fred A. S., Sgt.
Dickerson, Harry S., S/Sgt.
Dickerson, Joe P., S/Sgt.
Dickey, Julian A., Lt.
Dickie, Earl B., S/Sgt.
Dickinson, Paul A., 1st Sgt.
Dieffenderfer, James C., Lt. (& OLC)
Diegman, Francis L., S/Sgt.
Dietrich, Donald P., K., Lt.
Digges, Edward S., Lt.
Dilbeck, Boyd W., Pfc.
Dilbeck, Guss M., S/Sgt.
Dille, Marvin E., Lt.
Dillenbeck, Francisco H., S/Sgt.
Dillon, Stephen P., Lt.
Dills, Jay H., S/Sgt.
Diltz, Orrin D., S/Sgt.
Dirworth, Harry B., Lt.
Diruzio, Carmen C., T/Sgt.
Dingwell, Laverne G., Lt.
Dioguardo, Fred J., S/Sgt.
Dipple, Alan N., S/Sgt.
Dirickson, Conwell F., Jr., Lt.
Dirr, George E., Jr., T/Sgt. (& OLC)
Disalvo, Joseph F., Lt.
Disher, Raymond J., Capt.
Disilvio, Joseph, T/Sgt.
Ditchey, Martin W., Capt.
Ditto, Hubert M., Lt.
Divine, Dwight, Lt. Col.
Dixon, Celestia S., Sgt.
Dixon, James V., S/Sgt.
Dixon, Norman E., Lt. (& OLC)
Dixon, Richard B., Capt.
Doar, Jean P., Lt.
Dobson, Benjamin E., T/Sgt.
Dodds, Henry L., T/Sgt.
Dodson, Henry J., Lt.
Dodson, Joe E., Lt.
Doherty, Francis J., Lt.
Doherty, James S., S/Sgt.
Doherty, John J., S/Sgt.
Doiron, Walter A., T/Sgt.
Doiran, Charles F., Lt.
Doiran, James F., S/Sgt.
Dolan, Joseph A., Lt.

Dolan, Thomas C., Lt.
Dolney, Joseph, T/Sgt.
Doman, Russell F., T/Sgt.
Domenick, Rowland, S/Sgt.
Donadio, Edward R., S/Sgt.
Donahay, Homer D., T/Sgt.
Donahue, Francis E., S/Sgt.
Donahue, William H., Pfc. (& OLC)
Donaldson, Donald D., T/Sgt.
Donaldson, Jack B., Lt.
Donley, Harold E., Lt.
Donley, Reece D., S/Sgt.
Donnell, Leroy R., Lt.
Donnelly, James M., S/Sgt. (& OLC)
Donovan, Stanley J., Col.
Donohue, John W., Lt.
Donovan, Bradford P., Lt.
Donovan, Francis, S/Sgt.
Donovan, John B., Lt. (& OLC)
Donovan, Michael E., Lt.
Dooley, Joseph F., S/Sgt. (& OLC)
Dooley, William J., Lt.
Doran, John E., Lt.
Doran, Arnold S., T/Sgt.
Dore, John J., Jr., Lt.
Dorion, Paul P., S/Sgt.
Dorman, Theodore M., Capt.
Dorwart, Robert J., Lt. (& 3 OLCs)
Doss, Carroll P., T/Sgt.
Doss, Charles E., T/Sgt.
Dossy, Don E., Lt.
Doster, Lawrence E., Lt.
Doty, Elmer S., Jr., Lt.
Dougherty, Frank E., Lt.
Dougherty, Kenneth W., Lt.
Dougherty, Edward J., T/Sgt.
Doughty, William R., S/Sgt.
Douglas, Charles E., S/Sgt.
Douglas, Gerald V., Lt.
Douglas, Harold W., Cpl.
Douglass, James B., Lt.
Dove, J. D., S/Sgt.
Dowda, Van D., Lt.
Dowell, Charles W., Capt.
Dowell, Wade G., T/Sgt.
Dowie, Frank D., Jr., Capt.
Dowlin, James M., Lt.
Dowling, George J., Jr., Lt.
Downey, Charles B., Lt. (& OLC)
Downey, Daniel A., Lt.
Downey, Joseph W., Lt.
Downey, Martin H., Lt.
Downing, Andrew H., Jr., Lt.
Downs, Robert G., T/Sgt.
Downs, William F., S/Sgt.
Doyle, Charles J., S/Sgt.
Doyle, Gray H., Lt.
Doyle, Joseph F., Lt.
Doyle, Richard W., Lt. (& 3 OLCs)
Doyle, Roger H., Lt.
Doyle, Thomas E., Lt.
Doyle, Thomas F., Jr., Lt.
Dozier, Jack B., Lt.
Drabnis, Alfred, F/O
Dragert, Maurice A., T/Sgt.

Dracmel, Dean H., Capt.
Dragschitz, John H., S/Sgt.
Drake, Carl H., Sgt.
Drake, Robert W., Lt.
Drake, Steward F., T/Sgt.
Dreasher, Gene R., Capt.
Drees, Fred W., Jr., Lt.
Drees, Joseph R., Sgt.
Dreiszszun, Abraham J., Lt.
Drennan, Billy H., T/Sgt.
Drew, Samuel F., F/O
Drew, Theodore S., Lt.
Drew, Troy, Lt.
Drewes, William W., S/Sgt.
Driggers, Chester A., Lt.
Driscoll, F., S/Sgt.
Driscoll, Hugh T., T/Sgt.
Driscoll, William A., Lt.
Drougas, John J., Sgt.
Droz, Paul C., Maj.
Druwinn, William, Lt.
Dyer, Russell T., T/Sgt.
Duane, James W., Lt.
Ducci, Ercoli, Lt.
Duckworth, Lawrence A., Cpl.
Duclos, Bernard V., Sgt.
Dudas, Louis J., T/Sgt.
Dudash, Charles J., M/Sgt.
Dueliren, Carl H., Lt.
Duell, William S., T/Sgt.
Duerst, John W., Lt.
Duff, David D., Lt.
Duffy, Edward B., S/Sgt.
Duffy, James F., Lt.
Duffy, James M., Lt.
Duffy, John E., Jr., Capt. (& OLC)
Duffy, Lawrence Williamson, Lt.
Duffy, Robert R., S/Sgt.
Dufour, John C., Maj.
Dugger, Fred M., Jr., S/Sgt.
Duke, Paul L., T/Sgt.
Dulaney, Cecil Gordon, Lt.
Dulberg, Herbert W., S/Sgt.
Dumas, James L., Lt.
Dumond, Lloyd T., S/Sgt.
Dunbar, John C., Lt. (& OLC)
Dunbar, Roger D., Capt.
Duncan, Charles V., Lt.
Duncan, Frank A., Lt.
Duncan, Gene, Lt.
Duncken, Allen G., Lt. Col.
Duncan, Robert E., Lt.
Duncan, Vernon D., Lt.
Dunham, Harry H., Lt.
Dunham, William D., Capt. (& OLC)
Dunhill, George L., S/Sgt.
Dunkelberger, Joseph L., Capt.
Dunken, Allen G., Lt.
Dunlap, Donald S., Maj.
Dunlap, John M., Lt.
Dunlap, Wesley W., Capt.
Dunn, James C., Lt.
Dunn, James L., Lt.
Dunn, James W., Lt.
Dunn, Philip H., Lt.
Dunn, Robert J., Lt.
Dunnaway, Donald D., T/Sgt.

Dunteman, John W., S/Sgt.
Duran, Manuel J., S/Sgt.
Durbeck, Arthur G., Lt.
Durke, William S., Lt.
Durham, John C., Lt.
Durham, Leland F., S/Sgt.
Durham, Marvin J., Sgt.
Durig, Wilden J., Lt.
Dreiszszun, Abraham J., Lt.
Dustin, George W., Col.
Drew, Samuel F., F/O
Drew, Theodore S., Lt.
Drew, Troy, Lt.
Druwinn, William, Lt.
Driggers, Chester A., Lt.
Driscoll, F., S/Sgt.
Driscoll, Hugh T., T/Sgt.
Driscoll, William A., Lt.
Drougas, John J., Sgt.
Droz, Paul C., Maj.
Druwinn, William, Lt.
Dyer, Russell T., T/Sgt.
Duane, James W., Lt.
Ducci, Ercoli, Lt.
Duckworth, Lawrence A., Cpl.
Duclos, Bernard V., Sgt.
Dudas, Louis J., T/Sgt.
Dudash, Charles J., M/Sgt.
Dueliren, Carl H., Lt.
Duell, William S., T/Sgt.
Duerst, John W., Lt.
Duff, David D., Lt.
Duffy, Edward B., S/Sgt.
Duffy, James F., Lt.
Duffy, James M., Lt.
Duffy, John E., Jr., Capt. (& OLC)
Duffy, Lawrence Williamson, Lt.
Duffy, Robert R., S/Sgt.
Dufour, John C., Maj.
Dugger, Fred M., Jr., S/Sgt.
Duke, Paul L., T/Sgt.
Dulaney, Cecil Gordon, Lt.
Dulberg, Herbert W., S/Sgt.
Dumas, James L., Lt.
Dumond, Lloyd T., S/Sgt.
Dunbar, John C., Lt. (& OLC)
Dunbar, Roger D., Capt.
Duncan, Charles V., Lt.
Duncan, Frank A., Lt.
Duncan, Gene, Lt.
Duncken, Allen G., Lt. Col.
Duncan, Robert E., Lt.
Duncan, Vernon D., Lt.
Dunham, Harry H., Lt.
Dunham, William D., Capt. (& OLC)
Dunhill, George L., S/Sgt.
Dunkelberger, Joseph L., Capt.
Dunken, Allen G., Lt.
Dunlap, Donald S., Maj.
Dunlap, John M., Lt.
Dunlap, Wesley W., Capt.
Dunn, James C., Lt.
Dunn, James L., Lt.
Dunn, James W., Lt.
Dunn, Philip H., Lt.
Dunn, Robert J., Lt.
Dunnaway, Donald D., T/Sgt.

Egnas, Leif A., Capt.
Egan, John C., Maj.
Egan, Joseph, Jr., Lt.
Egan, Michael E., Lt.
Egan, Wesley W., Lt.
Egnor, Robert W., T/Sgt.
Ehlen, John J., T/Sgt.
Ehlinger, John L., Lt.
Ehrenberg, Jack R., Lt.
Ehrhardt, Clark A., S/Sgt.
Ehrke, Howard S., T/Sgt.
Eichmann, Edward W., S/Sgt.
Erdson, Jordan B., Sgt.
Erdson, Marvin C., T/Sgt.
Embinder, Sylvan P., Lt.
Einer, Arvid H., S/Sgt.
Eisenhart, Clyde L., T/Sgt.
Eissinger, Arnold H., Lt. (& OLC)
Ekas, Frank S., Lt.
Eckberg, Harry A., Lt.
Eckes, Gval, Capt.
Elder, William E., Lt. Col.
Eldridge, Russell H., T/Sgt. (& OLC)
Eldridge, Wayne K., S/Sgt.
Elcazer, James M., T/Sgt.
Etek, John F., S/Sgt.
Elhas, Victor H., S/Sgt.
Eliott, Harold D., F. (& OLC)
Ellenburger, Samue G., Lt.
Ellet, Marshall J., Lt.
Eliffritz, Vernon, Lt.
Ellington, Paul M., Lt.
Elliott, Richard E., Lt.
Elliott, George E., Capt.
Elliott, Robert C., S/Sgt.
Elliott, W. H., Sgt.
Elliott, William M., Lt.
Elliott, Wilson C., T/Sgt.
Ellis, Donald D., S/Sgt.
Ellis, Harry L., S/Sgt.
Ellis, Henry C., Lt.
Ellis, Joseph W., Lt.
Ellis, Robert L., S/Sgt.
Ellis, Stephen P., S/Sgt.
Ellison, Joe A., Lt.
Ellsworth, John A., S/Sgt.
Emeric, Robert P., Pvt.
Elfson, Elford L., Lt.
Elphinstone, Michae P., T/Sgt.
Elrod, William W., Pfc.
Elssasser, Henning F., Sgt. (& OLC)
Elsenberg, Everett A., Capt.
Elsin, Maurice, Lt.
Elzroth, Ralph E., Lt.
Ely, Franklin W., Lt.
Embrey, Ralph C., Lt.
Embry, William P., Capt.
Emch, David W., Lt.
Emerick, Russell S., Lt.
Emmke, Edwin C., S/Sgt.
Emriel, Daniel C., Lt.
Endernton, Charles M., Capt.
Emsley, Horace L., S/Sgt.
Engel, Godfrey, Jr., Lt.
Engle, Kenneth O., S/Sgt.
Engelman, George B., T/Sgt.
English, Albert J., Lt.
English, John P., Sgt.
Engstrom, Marshall J., S/Sgt.
Ennor, John T., Lt.
Enos, Manuel J., T/Sgt.
Ensbarg, Stanford A., Lt.
Ent, Uzal G., Brig. Gen. (& OLC)
Fisher, Isaac A., T/Sgt. (& OLC)
Jones, H. C., T/Sgt.
Kincaid, Thomas, Sgt.
Light, Herbert M., Capt. (& OLC)
Peters, Douglas V. N., Lt.
Piliot, Laverne H., S/Sgt.
Pogurski, Henry A., F. O.

Answers to Quiz on Page 41

- (d) 1,600 miles
- (a) True
- (b) Lodestar
- (b) 1,700
- (a) Mile
- (a) Black Widow
- (b) False. It is best made under power, if possible.
- (d) Mindanao
- (a) Lieut. Gen. Lewis H. Brereton
- (b) The Marianas
- (b) The switch is off
- (c) Single-engine fighter
- (a) 20 percent
- (d) 6,000 rounds
- (d) 105 mph
- (d) \$8,000
- Incendiary
- (c) 150 mph
- (c) Seattle, Wash.
- Left hand: throttle; right hand: control stick.

MISTAKES IN 'ON THE LINE' PICTURE ON PAGE 55

- We sound off with the cooling cap mounted in the wrong position, which will impose excessive heat on the turbo wheel. Result: wheel is subject to warpage, will lose efficiency, and there is risk of the wheel flying to pieces. Check in AN 03-10DA-1.
- Where, oh where, are the safety wires on the nozzle box? Without them, bolts may loosen due to vibration, fall off and result in loss of cap. This will cause turbo wheel to overheat, and the buckets may fall out.
- There is an unwritten AAF law, ON THE LINE, that all bolts must be inserted pointing down or to the rear. Reason is that if the nut comes off, the bolt stays in. Not so in the picture, where the bolts point forward; also incorrect is the use of fiber lock nuts where there is heat. These nuts will burn up and lose effectiveness.
- Dangle, dangle, the balance line is not connected. Somebody had better connect it or the supercharger regulator will not work. Just as an added note here, men, be positive

- the elbow is free from carbon. Else the balance line will be stopped up and rendered ineffective.
- You super-sleuths probably have discovered already that the turbo cooling blast tube has not been installed. It *must* be. Excessive heat on the turbo will cause warpage of the turbo case, also cause the bucket wheel to drag. Your references: AN 03-10DA-1 and TO 01-5EC-2.
 - Whoa there, the expansion universal joint of the exhaust stack is assembled wrong. The male fitting should be to the front, the female to the rear. Here they are reversed which will cause the springs to become overheated and lose their effectiveness. An exhaust flame from an engine is like an acetylene torch: once started, it will burn fast. This is a definite fire hazard—see for yourself in TO 01-5-101.
 - Just as this picture was snapped, FASC's safety director strolled up to ask why a crew chief's stand wasn't used instead of a wobbly ladder. We wonder, too.

CROSS COUNTRY

(Continued from Page 1)

serve in the following grades: captain for squadron, major for group, lieutenant colonel for wing and division and colonel for command headquarters.

Application blanks and authorization to take the WD.AGO Form No. 64 physical examination (modified as specified) and the special selection test for flexible gunnery officers may be obtained from the AC/AS, Personnel, Military Personnel Division, Aviation Cadet Branch, Army Air Forces, Washington, D. C.

☆

A STAFF sergeant of our acquaintance, on temporary duty at the Pentagon in Washington, has returned to his regular post with a nervous tic which causes him to make strange gurgling noises, and for no visible reason the man will suddenly lace and unlace his right shoe rapidly a dozen times. Here is his story. The sergeant got his staff rating while on temporary duty and promptly bought a new uniform in a PX. He took this to the tailor shop in the Pentagon and asked that new chevrons be sewed on the shirt, and that the trousers be made 31 inches. They were ordinary sun tan chino and the man had no misgivings. The uniform was delivered, neatly wrapped, and the sergeant planned to wear it his first night back home. He got a hair cut and tonic, bathed himself well and made his toilet with meticulous care. He opened the package and put on the shirt. Then he noticed the trousers. They were finished with a two-inch cuff.

☆

RECENTLY an AIR FORCE correspondent suggested this war might produce some symbol to replace the 40 and 8 box cars which hauled doughboys across France in the other conflict. Quicker than you could say Jack (NMI) Robinson a fighter pilot in North Africa pounced on the idea like a duck on a June bug. His dissenting opinion: "It is still the 40 and 8," wrote Lieut. Shuford M. Alexander. "I am only one of many pilots who have ridden it across North Africa, a little over 1,000 miles to be exact. We spent five days and five nights in one—and to live up to its name the Army had just hauled eight horses in it. The smell wasn't so bad, once you got used to it, and in three days we outsmelled the car. The only difference between these and the ones in the last war is that they are 25 years older. For my money the 40 and 8 is even a better memory of this war than the other one. I don't think the hundreds of men who have ridden in one will let you get away with a substitute. There is none. No matter where you look, there is none."

☆

LIEUT. Gen. George C. Kenney, commander of the 5th Air Force for 22 months, has been appointed to head the new Far Eastern Air Force, into which the

5th and 13th Air Forces have been combined. Headquarters of the new command is in Australia. Maj. Gen. Ennis C. Whitehead, who served under General Kenney as deputy commander, is now commanding general of the 5th Air Force. Maj. Gen. St. Clair Streett became commanding general of the 13th, succeeding Maj. Gen. Hubert R. Harmon, who returned to the United States as commanding general of the AAF Personnel Distribution Command.

PARACHUTES—LOST AND FOUND

LOST:

No. 42-191317, seat type, return to Operations Officer, AAF Pilot School (Basic), Majors Field, Greenville, Tex.

No. 42-221483, seat type, communicate with Parachute Department, 251st Base Unit, Section C-2, Laughlin Field, Del Rio, Tex.

No. 41-13517, seat type, return to Operations Officer, Lowry Field, Denver, Colo.

Nos. 42-1041347, 42-1041360; furnish information on these to Sub-Depot Supply Officer, 47th Base Sub-Depot, Army Air Base, Jackson, Miss.

No. 42-2734, seat type, S-1, return to Headquarters, Office of the Supply Officer, 23rd Tow Target Squadron, APO 832.

No. 40-3133, 42-446002, return to 2131st AAF Base Unit, Section A, Office of the Commanding Officer, Gunter Field, Montgomery, Ala.

No. 42-45926, type S-2, return address: Bell Aircraft Corporation, attention of Lieut. Col. W. M. Altenburg, Marietta, Ga.

No. 42-370649, notify Base Adjutant, Ephrata Army Air Base, Ephrata, Wash.

No. 42-432284, seat type, notify 1st Lieut. Howard S. Twitchell, AAF Pilot School (Basic), Majors Field, Greenville, Tex.

FOUND:

No. 42-272874, seat type, shipped by mistake from A. W. Whitaker Co., Portland, Ore., to base Operations Office, Post Field, Fort Sill, Okla. This parachute bears the name of Carmello J. Milioto.

SECRETARY of War Stimson recently issued a letter to Aircraft Warning Service volunteers disclosing that the warning centers are to be closed and that the work, on a reduced scale, will be absorbed into installations used for the training of fighter pilots. Reduction of the service does not mean that the WD believes all danger of bombing is passed, he said, but the calculated risk in reducing defenses is justified by the offensive power released. Secretary Stimson praised the volunteers for their service and reminded them that the WD looks to them to maintain silence with respect to the many matters of national security which had come under their observation. The secretary said the war has much farther to go and he expressed hope that the volunteers will not relax their war efforts. He urged them to transfer to one of the many important jobs which remain to be done before victory.

AN 18-ounce olive drab serge field jacket, patterned after the British army battle dress, is being issued to American soldiers in the European theatre. The new garment is designed primarily for combat, but may also be worn for dress, taking the place of the enlisted men's olive drab coat. It has two outside breast pockets with flaps, and two inside breast pockets. It is designed with fly front and sleeves have an adjustable shirt-type closure. Waist is adjustable by side buckles and tabs.

☆

WHEREVER the GI goes, he takes with him something that is particularly American. At a base of the ATC's India-China Wing, the soldiers noticed that the native people did not have clothes enough to protect them from the chill nights. First they bought clothing for the native bearers who serve with the GIs. But that didn't satisfy the soldiers' inborn trait of sympathy for the poor. Staff Sgt. Joseph W. Wirth staged a fund raising campaign among the personnel of the base. Enough money was collected to buy 7,000 yards of cloth. Local Indian authorities said this cloth, distributed to the natives of nearby villages, would make 2,000 dhoties and sarees.

☆

THERE is now a \$10 U. S. Savings Bond, Series E (called GI bond), authorized to be sold exclusively to military personnel at an issue price of \$7.50. The bonds may be purchased only by a \$7.50 pay deduction under Plan 12 of the Class B allotment system. Installment deductions are not authorized and, until further notice, the sale of the bonds is not authorized for cash, nor through the Personal Transfer system. They will not be sold to civilians.

☆

"ONE afternoon I met two nice boys from your airbase, but I didn't get their names," a 19-year-old Mitchell, S. D., girl wrote to the field newspaper at a South Dakota base. "One was called Nathan, because that is what the other boy called him," the miss continued. "One had dark, curly hair and the other had light brown hair, I believe. One was from Missouri and the other was from Kentucky or Tennessee. If somebody will read this letter out loud, maybe they will remember." (We have read it aloud twice, and still can't place that Nathan. The other guy was unmistakably Sack.)

☆

Now in its third printing, Air Forces Airs, a collection of songs for the AAF, had sold 54,572 copies of the pocket edition and over 5,000 copies of the piano edition as of June 1. By now, the song books should be reaching post exchanges in the overseas theatres. The books are sold under Post Exchange Price Agreement No. F-340, and all royalties go to the Army Air Forces Aid Society.—THE EDITOR.

From bases constructed largely by those who have suffered most under the militant heel of the Japanese—Chinese farmers and laborers—B-29 Superfortresses of the 20th Bomber Command are striking now at the heart of the Jap war machine. On July 7, our B-29s attacked naval installations at

Sasebo and industrial targets at Yawata, both on the enemy's home island of Kyushu. Yawata's steel plants also were struck on June 15. More than 350,000 Chinese, hundreds of whom are shown in the photo below, helped pave the way for these attacks by completing the necessary airfields in three months.



THIS IS SUICIDE CIRCLE



Keep clear of propellers!

AIR FORCE

THE OFFICIAL SERVICE JOURNAL

OF THE U. S. ARMY AIR FORCES



Pre-dawn in Britain

SEPTEMBER, 1944

MEDITERRANEAN MILLINERY MOTIFS

There's much to be said in the tilt of a lid.



The Brow Beater



The GI Joe



The Fifty-mission



Garrison Cavalier



The Cocksure



The Canteen Killer



The Grease Pot



The Iron Knob



The TS Tilt



The Ernie Pyle



The Morale Builder



The Mel Ott



The Stanley Steamer



Gone With The Wind



The Browed Off

CROSS COUNTRY

Our staff correspondent in Great Britain, Maj. Arthur Gordon, has just returned with this little item which he swears is true. Not long ago, it seems, Lieut. Col. Ben Lyon, the former motion picture actor who is now in the AAF, walked into the office used by AIR FORCE in London with a recording of a robot bomb in flight. Although Gordon, who had heard too much of the real thing, evidenced little interest, the record was placed on a phonograph. The narrator prefaced the program with the dramatic announcement: "Here comes the robot bomb!" Then, from the machine, came the peculiar drone of an approaching buzz bomb. As the record played on, the drone developed into a roar. "That sounds like a real one," said Gordon. "Of course it does," responded Lyon. "Do you think we fake these programs?" The roar grew louder. "Shut that damned machine off!" shouted Gordon, whereupon the phonograph was stopped. A moment of silence followed. "See," Colonel Lyon remarked, "an excellent recording!" He was cut short by a terrific explosion. A robot bomb had struck some 500 yards away.

Now for a quick glance through this issue. You will find a few changes in appearance. For example, on many pages you will find two column instead of the usual three-column type makeup, and a different type face has been adopted throughout. Both revisions afford more words per page and, we think, improve appearance.

To keep you up-to-date on organizational changes in the AAF, we are publishing on Pages 32 and 33 of this issue a revised edition of the organization charts which have been published from time to time in AIR FORCE. This chart shows the AAF organization and key personnel through August 10. As usual, reprints of the chart are available on written request to the Service Division, AIR FORCE Editorial Office, 101 Park Avenue, New York 17, N. Y. So don't tear out the chart. Write for one so the next reader can have a complete magazine when you have finished reading this copy.

Two new departments are introduced in this issue. "Intercom," Page 13, presents a question of the month and the answers of men recently returned from combat. This month's question is "What one tip would you give to men going overseas?" On page 17 "September in the AAF" reports important events in AAF history which occurred in the current month up to December 7, 1941.

The front cover illustrates a familiar sight at heavy bomber bases in Britain—a ball turret gunner in the glare of an electric light installed in the turret for his convenience as he adjusts his guns in the early morning hours before a mission over the Continent. The gunner is Staff Sgt. Beuford D. Brush. (Continued on Page 63)

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September 1944

AIR FORCE

THE OFFICIAL SERVICE JOURNAL

OF THE U. S. ARMY AIR FORCES



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Guns and fortifications in German-held France crumbled into rubble under dive bombing attacks by fighters of the 8th and 9th Air Forces.

By Maj. Arthur Gordon

AIR FORCE Staff

THE story goes that a GI from Georgia in a foxhole near St. Lo raised his head from the shuddering ground and screamed in his buddy's ear: "Yuh know, ah'm beginn' to think that damyankee Sherman was a right easy-goin', friendly sorta fella aftuh all!"

A few hundred yards ahead of this particular dogface, 1,500 heavy bombers of the 8th Air Force, flying at medium altitude, were unloading more than 3,000 tons of GP and fragmentation bombs on an area five miles long and two wide. Thousands of other doughboys watched bomb-carrying fighters comb the area, saw hundreds of mediums add their bombweight to this cauldron of steel and flame. The date was July 25. The terrific aerial smash was the one that enabled the Americans to break out of the Normandy Peninsula and drive headlong toward Paris.

The resulting devastation, as described by observers who covered the area afterwards, was appalling. The neat orchards and hedgerows and farmhouses looked as if they had been beaten with a giant flail. Dead cows and dead Germans lay sprawled in the craters. The craters themselves were not too large to interfere with tank movements, but roads were pitted, railroads were twisted into fantastic shapes, telephone poles were sheared off like matchsticks.

It seemed impossible that human beings could survive such a barrage, but some did. Those who expected the Germans to be completely "anaesthetized" were too optimistic. The Jerries suffered far more than they did at Cassino, where they had deep cellars in which to hide, but plenty of them survived. The important question was whether they had enough fight left in them to stem the advance that followed. Results proved that they did not.

The weather was cloudy, as usual, but not so bad as that of the day before when the same armada had been forced to return to base without dropping more than a third of its bombs. On both days some bombs fell short. These errors could have been the result either of malfunctions or of poor visibility caused by the dust and smoke of the bombs. The casualties among Allied personnel were regrettable, but they were not unforeseen. The margin for error had been made

purposely small. No one doubted for a moment that among the assault troops the lives saved by the air blow far exceeded those lost by it.

The basic reason for this use of heavy bombers as tactical support was simply the desire on the part of Allied commanders to bring maximum pressure to bear on strong German defenses. There was no intention to divert the Ports and Libs more often than was necessary from their primary mission; the destruction of strategic targets. But it was significant that when they were diverted, as on July 18, July 25 and July 30, important ground gains followed.

What the high command thought of the value of all-out bombing of field defenses in open country was best indicated by their continued use of it. The Canadian breakthrough southeast of Caen on August 8, an attack which began at night, was paced by about 1,000 RAF heavies some of which brought their bombs back, because again dust and smoke made dead-accurate bombing impossible. The air support was continued the next day when 600 American heavies hurled down 20,000 fragmentation bombs. This was considerably fewer heavies than the number employed at St. Lo two weeks earlier. The reason probably was the air chiefs' conclusion that after bombing by a certain number of combat wings, the target was so obscured as to make additional bombing unprofitable and dangerous. On that same day, the remainder of 8th Air Force B-17s and B-24s attacked other targets, including launching sites for robot bombs. The Canadian drive, plowing through a defense belt at least ten miles wide, threatened to unhinge the whole German position.

In most of these cases where the heavies were employed, the Allies were facing German defenses in depth, with Jerry solidly dug in and awaiting attack. When the enemy was on the move, however, either forward or backward, the main burden of air support reverted to the mediums and fighters of the tactical air forces.

One of the most valuable contributions made by Allied air power in the entire campaign was the assistance it rendered in breaking up the German counterattack aimed at

How tactical air power was employed for the Allied break-through in France

Avranches, a thrust designed to pinch off the American spearheads driving south into Brittany. This was a full-scale effort by four German divisions, and the work of the fighter-bombers—especially RAF rocket-firing Typhoons—in blasting enemy armor played a large part in saving the Allied armies from what would have been an awkward position had the panzer thrust succeeded.

This protective role, however, was a rare one. When General Bradley said that air-ground cooperation in Normandy was "away beyond anything we believed possible," he probably had in mind day-to-day performance—a day, for example, like July 28, when 70 tanks and 884 other vehicles were reported destroyed by Normandy-based planes alone. The effect on German communications was catastrophic.

There were innumerable reports of direct appeals from Allied tank commanders for air support to bomb a stubborn gun emplacement or knock out a defiant Tiger tank. As a rule, the requests were answered promptly, and although pinpoint accuracy was not always obtained, sooner or later the obstruction was cleared. In one case of complete reciprocity, a P-47 pilot reported to Allied artillery that the

by subsequent interrogation of captured enemy ground forces.

There was little time to plan the operation—about six hours, to be exact; six hours in which to organize an air effort calling for about a thousand sorties against an area three miles wide and seven miles long; six hours in which to get the field orders down to the groups; six hours in which to let the ground forces know exactly what was going to happen. It took some tall hustling on the part of headquarters and all the way down the line, but they did it.

II-hour was 1400. The plan called for ten squadrons of RAF fighter-bombers from the 2nd Tactical Air Force to bomb and strafe the target area for 20 minutes from II minus 50 to II minus 60. Then twelve 9th Air Force fighter-bomber groups were to take over for an hour, from II minus 60 to II. Then eight groups of 9th Air Force Marauders bombing from medium altitude, were to pinpoint gun positions from II to II plus 60. Finally three groups of A-20s were to give the Germans a last-minute shellacking. Weather prediction was 1000-2000 feet overcast, which might call for pathfinder technique. Actually the weather was somewhat better than this, and visual as well as pathfinder methods were used.

The troops were withdrawn 1200 yards. The air attack began dead on schedule and proceeded like clockwork. The fighter-bombers—25 of which were lost out of about 550 attacking—claimed good results from strafing, glide-, and dive-bombing of trains, flak-guns, machine gun positions, troops and motor transport. The bombers, only one of which failed to return, reported excellent to unobserved results. The ground forces were of the opinion that no great material damage had been done, but that the enemy had been scattered and disorganized and that the advance had been made considerably easier.

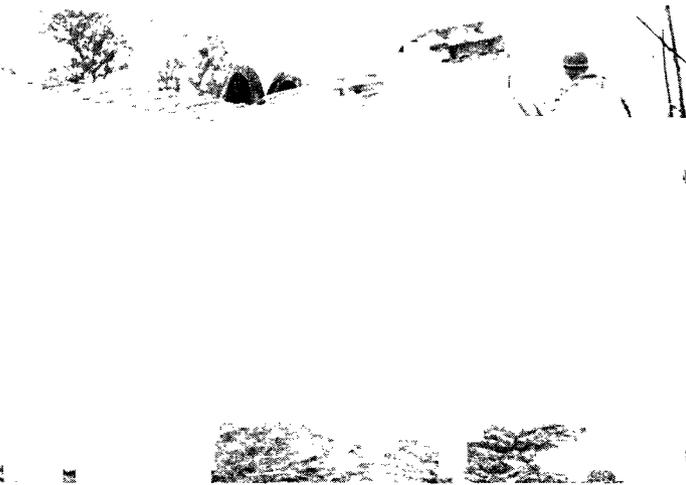
Prisoners of war who were interrogated later remarked that the ground strafing was much more demoralizing than the bombardment from medium altitude, mainly for psychological reasons. They commented that, from our point of view, the interval between the fighter-bombing and the Marauder attack was too long, for it gave their officers a chance to reform their men.

The lesson of the day seemed to be that unless the ground troops moved in quickly after the bombardment, much of its effect was wasted. It also indicated that material damage against an area so large was likely to be relatively low, unless some form of saturation bombing were carried out. The importance of intelligent use of colored smoke and ground markers was also stressed; otherwise the danger of hitting our own troops was considerable.

The question was raised whether or not it would be more effective to have the mediums try to silence strongpoints first, letting the fighter-bombers comb the area just before the ground assault. The losses in planes and diversion of effort from other targets were weighed against the results achieved. June 20 was a typical day, not spectacularly successful but certainly not wasted. And on every day that went by, the airmen learned more.

While tactical support held the center of the stage, the strategic blows continued. Fighter factories that the Germans had laboriously repaired by combining crippled plants were hammered again. The blitz on oil production continued, aided by the RAF's night blows. Most of the fighter opposition was encountered in southern Germany, where Jerry seemed to be concentrating the bulk of his remaining fighters in an effort to meet attacks either from England or Italy. Striking from Italy on July 18, heavies of the 15th Air Force and their escort attacked Friedrichshaven and met

(Continued on Page 41)



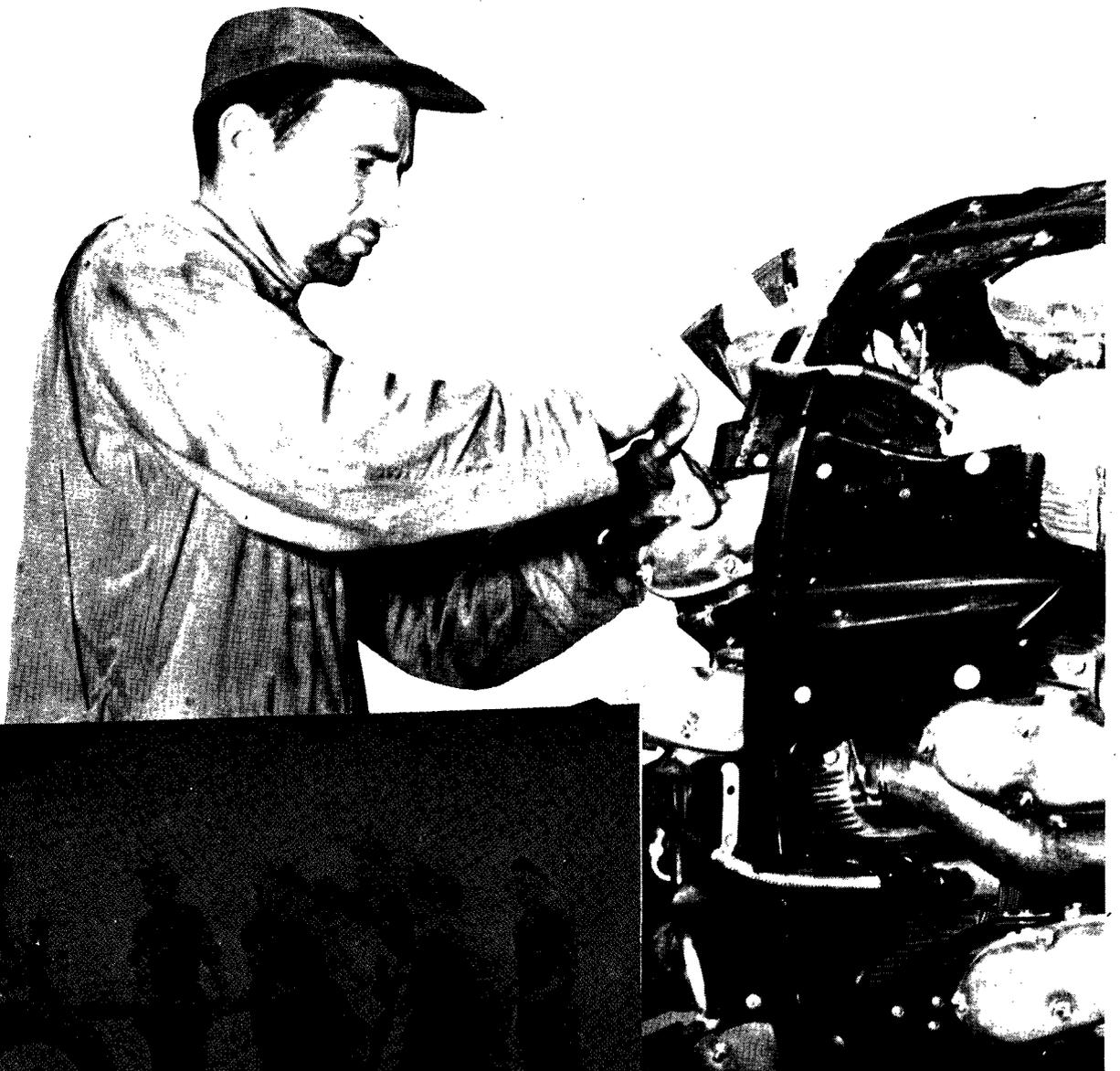
Nazi armored columns in Normandy took a beating from the air.

Germans seemed to be using a certain house as a headquarters. The artillery commander obliged by putting a couple of shells into the building. The Thunderbolt, swooping down, picked off the Jerries as they fled from doors and windows.

From the start, the tactical air forces showed a willingness to experiment boldly and profit by experience. A fairly typical day was June 20—D plus 14. At that stage of the game the Germans, fighting hard, were being pushed back toward Cherbourg. They had reached a fairly strong defensive position west and southwest of the city and, although somewhat disorganized, were in a position to inflict heavy losses on the attacking forces.

It was decided by the high command not to use the heavies but to let the tactical air forces make an all-out effort to harass and demoralize the Germans before the VII Corps moved forward. Although little if any opposition from the Luftwaffe was expected, the airmen knew that the operation might prove expensive; low-level attack against disciplined ground troops usually is. Still, one reason for the attack was to balance losses against objectives achieved and to be guided accordingly in the future. An advantage of this particular operation was that Cherbourg was doomed, the terrain was certain to be captured eventually, and results could be judged by first-hand inspection on the ground and

THE MEN



Here for the first time is the story of how
the AAF put the Superfortress into combat.

of the B-29s

WHEN the time came for our first B-29 outfit to move overseas we were falling short of our own training standards, but by any other standards we had the best trained heavy bombardment organization ever to leave the States.

This merely means that the standards we had set for the B-29 program were virtually out of reach of both men and machines. It is doubtful that we would have accomplished our mission if we had not raised our sights that high.

Our directive from the Commanding General was to commit the B-29 to combat without delay. To carry out his orders, we supervised and expedited all production, flight-tested the experimental planes, flew acceptance tests on all new production aircraft, effected modifications while prescribing changes in equipment for later models, determined the flight characteristics and limitations of our aircraft, established tactics best suited for combat, trained air and ground crews and prepared all squadrons for combat service overseas.

Eleven months after the first combat B-29 rolled off the production line, we had bombed the Japanese homeland.

Much has been said and written about the planes of that first outfit—the 58th Very Heavy Bombardment Wing—but I look back on the preparatory phase of the B-29 program primarily as a struggle of men against unique engineering, production, training and tactical problems.

When D-day came for the 20th Bomber Command in China, and our B-29s took off to bomb the Jap steel center of Yawata, the bombers carried veterans of many air campaigns, including men who had first challenged the enemy after Pearl Harbor as members of the 19th and 11th Bombardment Groups. Men who had helped engineer the B-29 through production also were there, some flying as regular combat crewmen. At the bases were hundreds of ground men who had pioneered their jobs and become specialists at them. In the background were hundreds of thousands of Chinese coolies who had carved out our airfields by hand. Back home there were more thousands of aircraft workers

The bigger the airplane, the bigger the job of maintenance. In the photo at left, T Sgt. Frank Chancilla installs a rocker box cover on a B-29 engine in India. At the same base, mechanics (inset) engage in some heavy work at the nose of a Superfortress.

By Brig. Gen. Kenneth B. Wolfe
Commanding General
Materiel Command



Brig. Gen. Kenneth B. Wolfe has been actively concerned with the development, production and operation of the B-29 since the Superfortress was in the blueprint stage in 1939. In February, 1943, he was directed by General Arnold to assume charge of the special B-29 project; in June was placed in command of the 58th Bombardment Wing, and became commanding general of the 20th Bomber Command when it was activated in November. After directing initial operations of the B-29s from India and China, General Wolfe returned to the United States in July to become commanding general of the Materiel Command.

who had given us our planes. How these men—working together—made that first B-29 mission possible is the manpower story behind this three-billion-dollar gamble on long-range heavy bombardment aircraft.

We started from scratch. We began with what was still, by military necessity, an incompletely designed, experimental airplane—more complicated than any ever before used in aerial warfare. When the 58th Bombardment Wing was activated on June 1, 1943, we had no personnel, no planes, no precedents.

As our first step, we moved in with the Boeing company at its Wichita, Kan., plant and we brought along some of the top engineers of the Materiel Command. Our test pilots were experienced command pilots; our crew members were high-ranking experts who had helped develop the equipment we were to fly. Our production men had been working with the B-29 since the aircraft was on blueprints in 1939. Our training instructors were veterans of more than a year of combat operations.

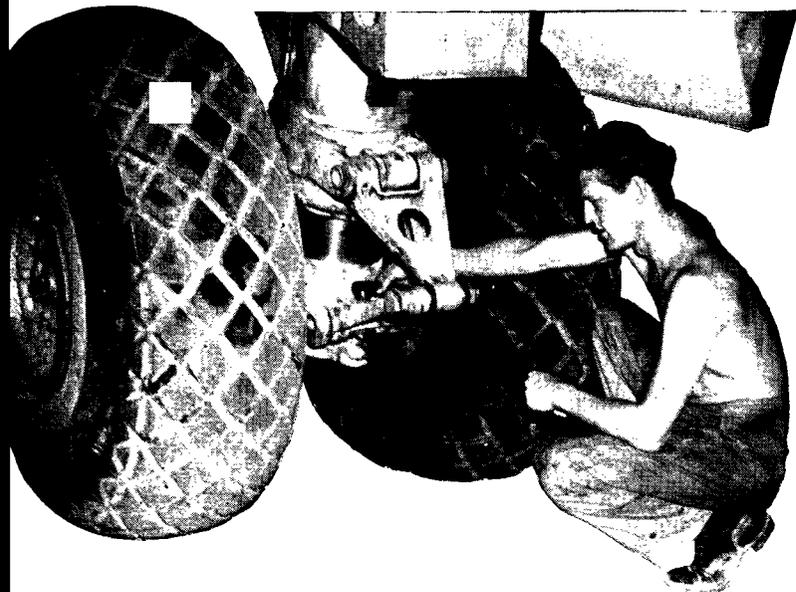
Officially, we received our first experimental XB-29 from Boeing on May 28, 1943. Two weeks later, the first production-type plane was flown successfully. The first of the combat B-29s rolled off the line in July.

While we were flying continuously to test all of the capabilities and idiosyncrasies of the new bomber, we organized the

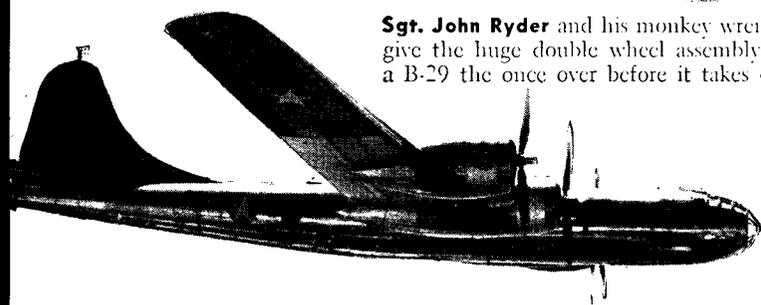
staff of the 58th Wing, which later was to become the 20th Bomber Command. Brig. Gen. Laverne Saunders, former CO of the 11th Bombardment Group and air adviser to Admiral Halsey during the Solomons operations; Col. Richard H. Carmichael, who had formerly commanded the 19th Bombardment Group in the Southwest Pacific; Col. Leonard F. Harman, B-29 project officer from the Materiel Command, and others of equal caliber were selected as staff members.

Already we had started ground crew training in the Boeing factories, with our mechanics working side by side with the men and women who were building the B-29s. Our men worked on the flight lines of Boeing at Wichita and Bell at Marietta, Ga., where we were flying accelerated service tests. At the same time, sub-assemblies were being shipped to train new factory workers in B-29 construction at the Bell plant.

New crews were checking out in the B-29s while they



Sgt. John Ryder and his monkey wrench give the huge double wheel assembly of a B-29 the once over before it takes off.



were being flight-tested. As rapidly as these tests uncovered "bugs," engineers took the problems to Wright Field's laboratories and worked them out. Their expeditious handling of our design and mechanical problems continuously contributed to improve the performance and reliability of our new plane. We were rolling because we had to roll. We were accomplishing a week's research, testing, modification and training every 24 hours.

Near the Bell plant, on an unpretentious Southern estate, we set up the first headquarters of the 58th Wing. The area was officially the Cobb County Army Air Field and it was the logical choice for our headquarters at that time since modifications and most of the Army's B-29 flight-testing were scheduled for Marietta. From this headquarters, on June 21, General Order No. 1 was issued announcing my assumption of command of the "58th Bombardment Operational Training Wing (Heavy)."

In September, to be near tactical units then undergoing training, we moved to Smoky Hill Army Air Field at Salina, Kan.—a post so forlorn that our GIs jokingly asked for theatre ribbons for serving out of the States. We had only a few B-29s for flight training but we had to instruct our crews in long-range, high-altitude formation and instrument flying. We decided to answer our immediate problems with other bombardment aircraft.

Fifty B-26s were obtained to familiarize pilots and copilots with tricycle-gear landing and glide characteristics of a high-wing-loaded airplane. Later we secured B-17s because of the similarity of its mechanical parts to those of the B-29 and because reasonably long-range, high-altitude missions could be flown with these planes.

We set up four operational bases in Kansas to house new personnel on arrival. A bombardment group from Panama and another from Alaska formed the nucleus of these lower

echelon staffs. The Panama outfit later became the first unit in the AAF to have a B-29 assigned to it. Graduates from airplane mechanics' schools, the Lowry Field armament school, Truax Field radio school, the Boeing flight engineer school, and from navigator and bombardier schools began to flow in for indoctrination in their new assignments. Occasionally they saw a B-29, but most of them spent many months with synthetic training devices, in high-altitude pressure chambers, on firing ranges and in other types of planes before they set foot in a Superfortress. To familiarize as many new ground crews as possible with the mechanical



Pfc. Jimmy Carmichael and Cpl. Joe Czeremysika, armorers of the 20th Bomber Command, overhaul .50 caliber machine guns in the shade of a Superfortress at a newly constructed airbase in India.

Hundreds of thousands of workers using primitive methods, constructed the huge B-29 runways now in use throughout China. Construction scene shown at right above is at the Kwang Lai airfield.

The three mechanics in the photograph at right have been distracted momentarily while at work on the engine cowling of a B-29. The photo graphically illustrates the size of a Superfortress engine.

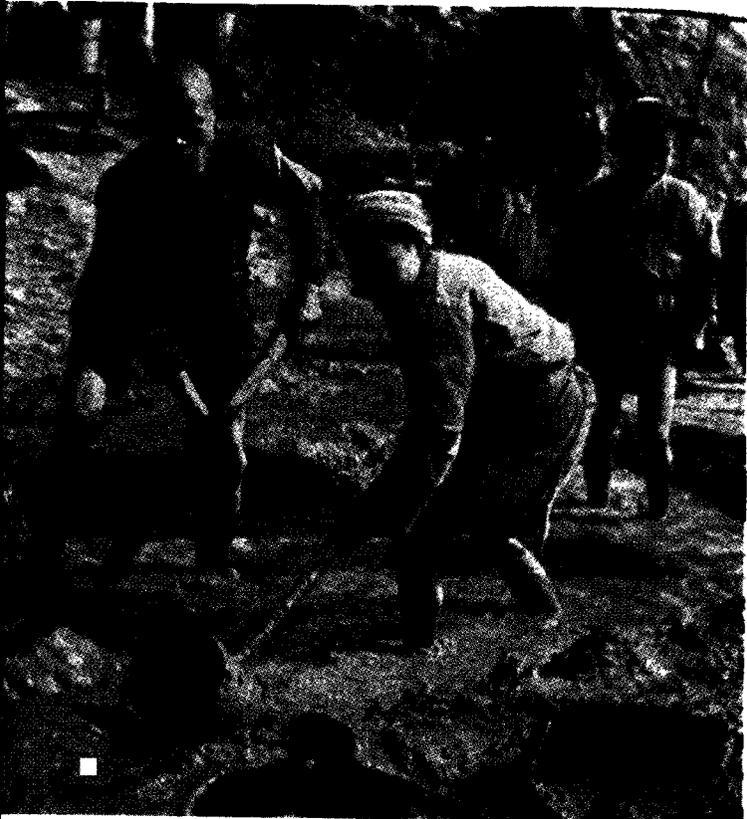
intricacies of the B-29, and at the same time keep the few we had in flyable condition, we assigned our ground crews to round-the-clock operation—three eight-hour shifts.

At Salina we benefited from the experience of the 2nd Air Force in training of heavy bombardment groups. Although our problems were different, training methods essentially were similar. Selection of personnel specifically qualified for B-29 work necessitated constant review of training schools and individual requirements, particularly since about fifty percent of the personnel supplied at this time proved to be physically disqualified for high-altitude combat crew duty. Fortunately, many of the rejected men were found suitable for ground crew work.

While trying to speed up production of the B-29's new

2200-horsepower engines, which was falling behind schedule, and trying to stimulate the slow operation of modifying B-29s with unskilled personnel, we also had to organize our tactical units and solve the logistics problems of moving all units overseas and providing for their maintenance in the theatre of operations.

Meanwhile, the first tables of organization and equipment for B-29 squadrons were being drawn up under Col. Claude E. Duncan, and A-4 was obtaining supplies from Air Service Command and scheduling them for shipment to ports of embarkation.



Aggressive cooperation of ASC headquarters in supervising the training of B-29 maintenance and supply personnel and in expediting the flow of spare parts to our operational bases saved our own staff many headaches. Planes seldom were grounded for lack of spare parts during our training program.

After full study of possible maintenance and supply plans, we prepared to set up a maintenance squadron at every field to be used by B-29s. Such squadrons would be able to keep the planes in operation at forward as well as rear bases. The training of these advance squadrons was a priority project because we had to ship the men and their equipment by boat at least two months before our air units left the States. The final decision required the movement of ground units in January and air units in March. How to house these men and how to set up our bases in India and China, and how to operate and maintain our planes once we arrived there were added worries. We were continually sending various staff members from our organization to the CBI to lay the groundwork for our movement to the theatre. And at this time the fact that we were to operate from bases in India and China was still highly secret information.

While this work was progressing, we were attending to one of our most vital assignments: the drafting of our recommendation to General Arnold on how we proposed to use the B-29 tactically. Thus, long before we had any tactical squadrons trained or equipped, we had worked out with the Air Staff the plan of attack which our aerial task force was committed to accomplish.

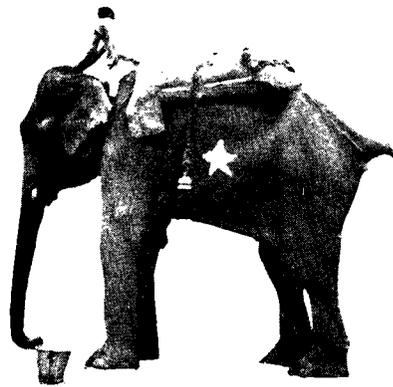
Progress of the training program upon which the success of our missions hinged was discouraging at this stage. We didn't have enough planes for complete training of flight crews, and our crew specialists and ground personnel had to be given extra training to measure up to the high standards we had set, despite their completion of specialized courses in AAF schools.

After hundreds of hours of semi-operational flying, we had determined that most efficient use of the plane could be attained with a crew of eleven men. The pilot and plane commander and the co-pilot were assigned the conventional responsibility of flying airplane, except for operation of the power plants. This task was assigned to the flight engineer officer who would adjust the carburetor mixture, regulate manifold pressure, transfer fuel and, in general, control the power output of the engines at all times, subject of course to instructions from the pilot. His training had been thorough—sixteen weeks in aircraft mechanics' school, twelve weeks in officer training and maintenance engineering, twelve weeks in B-29 mechanics and electrical specialization

and ten weeks of flight engineer training.

At first, our new flight engineers were eyed suspiciously by pilots as surplus personnel usurping some of their functions. However, as crew-team training progressed, the value of keeping one man's complete attention on power and fuel system problems was proved, and the flight engineers were accepted in good standing with the combat team long before our planes left the States.

Navigators and bom-



Indian bases were built with native labor and transportation. Army insignia lends GI touch to the elephant.

bardiers were graduated from regular schools but they needed additional training on some of the specialized equipment in the B-29. Radio operators usually were well trained but they, too, needed additional time on the specific sets they had to operate in the Superfortresses.

Training of gunners presented a difficult problem because we had so few planes with remote fire control installations. Although no one in the AAF was experienced with such equipment, Eglin Field had conducted tests indicating that three times as many hits could be expected by use of the system in comparison with conventional flexible guns and power turrets, with which our gunners already were familiar. Training on synthetic devices and on a mock-up system comprised the major portion of our gunnery instruction. Some aerial gunnery practice, however, was squeezed into the program after squadrons received enough planes to catch up on flight training early in 1944.

Because there was no background whatever in the AAF for training personnel on any type of B-29 equipment, our policy was to insist that every man who was to have any responsibility in operation or maintenance of the plane had to know its structure and equipment from wing tip to tail fin, including all of its capabilities and limitations under combat conditions.

Colonel Harman, who had grown up with the plane from the drafting board, summed up the AAF attitude this way: "We think a hell of a lot of knowledge about the B-29 is necessary before any man can develop all of the capabilities that have been built into the airplane by the hundreds of engineers and scientists who created it as a military weapon."

When we entrust eleven men with a million-dollar weapon, we have a right to expect them to use it to the maximum of its effectiveness. Every man had to be an expert.

Now and then, we established new training aids and methods to attain our high standards. In addition to his many engineering contributions, Col. Howard H. Couch, chief of the technical staff

who later disappeared on a routine flight over the India-China "Hump," introduced a pocket-size picturized training manual that enabled our men to learn in about fifty minutes the same information that previously had required some two hours with standard training manuals. Every short cut presented was given a trial—and was adopted if it contributed to more rapid and more effective training of our men.

Crew-team training, emphasized by the AAF in all other bombardment schools, was even more essential in the B-29 program because of the plane's size and its engineering design. A high degree of teamwork was demanded not only between individuals of each crew, but also among all B-29 combat units. Our policy insisted that units should be interchangeable. There was no room in our tactics for first and second teams among bombardiers, navigators or other crew members.

Late in December an outsider might have judged our training schedule with severity. The average crew had flown only eighteen B-29 hours, some of it in formation over 20,000 feet. Only one Superfortress had flown a long-range mission. Only 67 men had been checked off as first pilots of B-29s. Planes were flying an average of only two hours out of 24. We weren't proud of our record at the time, but it

was the low ebb. We had begun to realize that to keep our appointment over Japan we would have to complete some phases of our training after we had moved to our overseas bases. Yet we felt, with justification, that we had made great strides in our training program.

Our men had undergone intensive training in B-26s and B-17s. Every plane commander had participated in two separate wing training missions—something never before accomplished by any heavy bombardment organization to leave the country.

From altitudes above 20,000 feet we had "bombed" out of existence the industrial heart of many a Midwestern city. Our B-29 missions had been intercepted by P-47s and P-51s simulating attacks from every conceivable angle to give us experience in the best defensive formations and the most effective evasive tactics.

Our wing, group and squadron staffs probably had worked the hardest during these missions, for they were doing the planning that customarily falls on the desks of an air force headquarters. Since the Air Staff had decided to make our organization a separate air force when we moved overseas, it was essential that our staff should be equally as competent in their duties as our combat crews.

From experience we had learned that greater emphasis on mission briefing and interrogation would contribute to better target identification and improved bombing efficiency. Some particularly desirable officers, long earmarked for our organization, were requested from the 8th Bomber Command's Central Interpretation Unit and added to our A-2 staff to strengthen further this program. Our wing A-2 conducted a thorough survey of intelligence procedures in the 8th, 9th and 12th Air Forces before organizing our own A-2 section from the top men graduating from the AAF's intelligence schools.

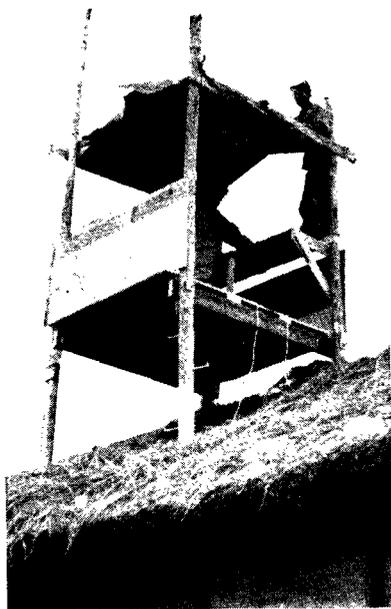
Particularly important to 20th Bomber Command operational flying was a thorough indoctrination in high-altitude pressurized flying. Our flight surgeons attended the aero-medical schools at Randolph Field, AAF/TAC and Wright

Field, where they underwent explosive decompressions in special altitude test chambers. The 10th Altitude Training Unit was moved to one of our fields to indoctrinate all flight personnel in proper use of electrically heated clothing, pressurized oxygen masks and emergency procedures to be taken in the event cabin pressure suddenly escaped.

Training in emergency first aid was stressed among air crew members to safeguard lives of men who might be wounded six to eight hours away from base. To demonstrate conclusively that plasma could be given a wounded man under extreme conditions, Maj. D. M. Green successfully administered plasma in a B-17F flying at 36,000 feet. Flight surgeons also carried on extensive research with new rations and food warmers. They modified flying clothing with zipper openings to facilitate first aid in flight. They worked out litter-hanging systems in the bomb bay and developed a nine-pound aluminum litter that could be slid through the tunnel between the front and middle sections of the B-29.

Further augmenting our staff of specialized personnel were two civilians, Dr. Hamilton Jeffers, who in Kiska had already accomplished valuable work with the operations analysis section of the 11th Air Force, and Dan B. Dyer, an expert

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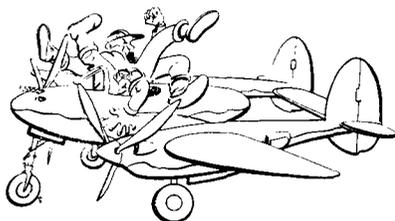


This crude, hastily-built stand served as control tower at B-29 base in China.

SHOOTING THE BREEZE



USSR. On one of the first fighter-strafting shuttle missions between Italy and the Soviet Union, Lieut. Richard E. Willsie had both engines of his P-38 shot up and he belted in on a Romanian meadow. Flight Officer Richard T. Andrews went down to rescue him. He landed his P-38 on the meadow, Willsie jumped in and they flew to their Soviet base in the single cockpit. The next day the pilots were dragged out for photographs but it took them a long time to get into the same cockpit again. After several attempts, Andrews fumed: "How the hell did we do it? Yesterday we just jumped in and fit the first time."



Egyptian Sudan. Tech. Sgt. Wilbur Stone of Fort Meade, Md., on temporary duty with the North African Wing of the Air Transport Command, had his billfold stolen in Khartoum. He reported the loss to police, then boarded a plane for India. The wallet was found and placed aboard a later plane, addressed to Stone. The plane crashed and burned, killing the passengers and crew, but the wallet was thrown clear of the wreckage. It was returned to Khartoum and held by authorities until they had completed an investigation of the crash. Stone, meanwhile, had returned to the States. Again the wallet was addressed to him and placed aboard a plane which also crashed and burned—but again the wallet was recovered. Nine months after it was stolen in Khartoum, the wallet was delivered to Sergeant Stone in Maryland.

Britain. P-51 pilots walking to their planes for an escort mission over southern Germany, were given a promise by pretty, blond-haired Ada Wattenmaker, Red Cross Clubmobile girl from Charleroi, Pa. "A kiss for every pilot who shoots down a German today," she said. After the P-51s returned, 13 pilots lined up outside Ada's wagon. Only one asked for coffee and doughnuts.

Inside Germany. From a Nazi prison camp 2nd Lieut. Richard Perle, a B-17 navigator, wrote a special request to his parents on Long Island, N. Y. The parents promptly mailed a \$20 check to Col. Eugene A. Romig, commanding officer of an 8th Air Force bomber base in England. Colonel Romig presented the check for twenty bucks to Sgt. Dale Schindele of Manly, Iowa. Schindele is the guy who packed the parachute with which Perle bailed out over Germany.

Central Pacific. Three squadron clerks of the 7th Air Force strolled along a jungle trail near the top of Mount Topatchau—Saipan's highest peak. Tech. Sgt. Ellis Shelhamer, Tech. Sgt. Albert F. Parsons and Cpl. Clifford Gilham were looking for salvage. Near the top of the peak they noticed a fellow traveler, but he turned out to be a Jap and they shot him. Suddenly a Yank sniper patrol on the ridge above, mistaking the three Americans for the enemy, opened fire with machine guns, automatic rifles, carbines and hand grenades. The clerks were in a tight spot. In the heat of this confusion a Japanese machine gun crew opened up on the Yank sniper patrol. Protected by this Jap fire, the clerks hastily withdrew from the action.

Italy. In Caserta our troops found an abandoned brewery and decided to whip up a batch of beer. They got permission, but couldn't find any hops. They wrote the proper people and the hops were given a high priority and shipped to Italy by boat. After long, thirsty waiting the boat finally arrived. The boys were on hand for the unloading, yelling for their hops. "And, just



what are hops?" the unloading crew asked. When the smoke cleared it was learned that the hops had been mistaken for mule feed and sent to a fort nearby where there were mules. The boys rushed over and found that the mules had eaten the hops. That did it. No future plans were drawn for beer-making in that part of Italy.

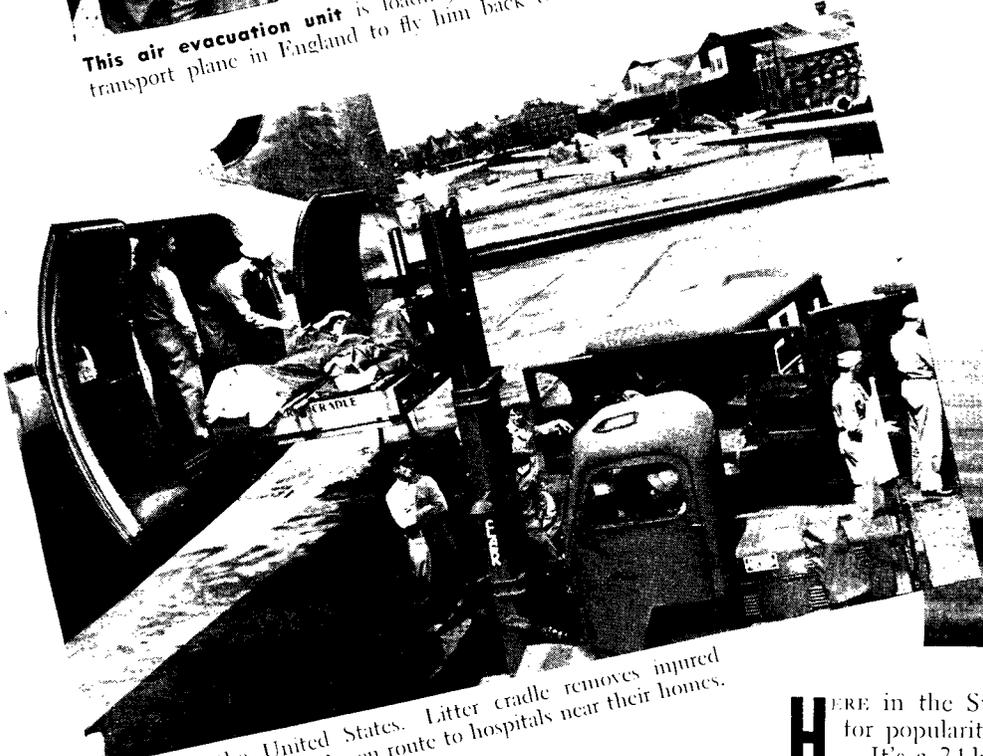
Britain. When a B-24 reached Britain in flames after a mission over Europe the order was given to hit the silk. Lieut. Robert L. Sanders, the bombardier, found that his chute had been damaged by the blaze. Lieut. Robert Callahan, the navigator, was about to make the jump, and Sanders straddled his back for the bail out. As the two lieutenants floated down, Sanders crawled around to face Callahan so they could hold on to each other. Despite their combined weight of 320 pounds, the chute opened with only a slight jolt and they landed in a British field. Callahan had a fractured ankle, Sanders, an ankle sprain and bruises.



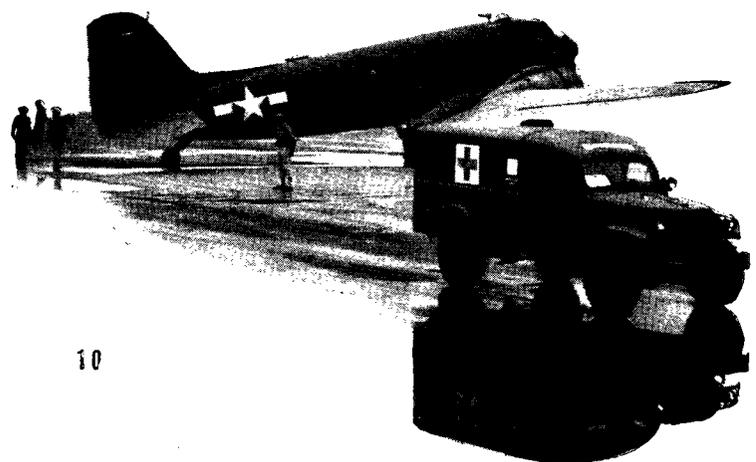
Central Pacific. Two sergeants on a newly captured base in the Marshalls have a happy domestic life in a shack built from materials found in Jap caches and washed in by the tide. Here 1st Sgt. Walter Cash and Tech. Sgt. Robert Craft have a washstand of Jap tin and a helmet for a washbowl. Their shower bath, made from a jumble of lumber and gears, works with a water-wheel of rope and beer cans. On one side of the shack is a windmill-driven laundry machine, and beside it a wind-powered sea shell polisher. Atop a coconut tree, a water-filled canvas bag swings in the cooling breeze—their refrigerator. Cash and Craft spend their back porch evenings on a salvaged car cushion, listening to American radio programs on their short wave set. ☆



This air evacuation unit is loading an injured soldier aboard a transport plane in England to fly him back to a general hospital.



Arrival in the United States. Litter cradle removes injured patients who soon will be en route to hospitals near their homes.



HERE in the States the AAF is running an airline that for popularity can defend itself against all comers. It's a 24-hour GI airline for the wounded, and that means air evacuation. Every day more than 100 patients just arrived from overseas are evacuated by air from U. S. ports to hospitals in the interior. Each patient is flown to a hospital as near as possible to his home town, whether it be in Georgia, Kansas or Montana. This is the last lap in the AAF's world-wide air evacuation service. This is the flight a guy waits for. "No one can know the gladness of soldiers going home until they see men come aboard our planes," says Lieut. Doris Nason, flight nurse on one of this airline's C-47s. "Privates or generals—they are all alike when they are going home. An infantry private sits between a quartermaster captain and an air force colonel, but they all get the idea. They talk about where they are going, not where they have been, and before long it's like a picnic.

The last lap in air evacuation takes combat casualties to hospitals near their homes throughout the United States.

"I have watched men become tense and nervous when we get into the air. For a long time, they stare out the windows, then gradually they relax and settle back realizing that this is it—they are in the States and going home!

"Pretty soon the snapshots will come out of the billfolds. A nurse gets to know about when they will appear. A sergeant will tell a colonel about a baby son he has never seen—already two years old. And the colonel, not to be outdone, will exhibit a picture of his daughter and announce that she will start school next year." These are the things a nurse comes to know about the men she takes home.

Air evacuation within the United States completes the job begun in combat areas. It provides the safest, fastest

and most comfortable means of moving wounded men and, while a large part of the general combat evacuation job must be done by boat and rail, air transportation is preferred by most of the men.

Men flown from overseas are landed at nine Air Debarkation Hospitals recently designated when domestic evacuation was begun on a larger scale. These hospitals, along the United States border and coasts, are located at Presque Isle Army Air Field, Presque Isle, Maine; Dow Field, Bangor, Maine; Grenier Field, Manchester, N. H.; Bradley Field, Windsor Locks, Conn.; Great Falls Army Air Field, Great Falls, Mont.; Westover Field, Chicopee Falls, Mass.; Hamilton Field, San Rafael, Calif.; Mitchel Field, L. I., N. Y., and the AAF Regional Station Hospital, Coral Gables, Fla.

Debarkation officers, assigned to each of these hospitals, handle the distribution of air evacuees. Under the plan, each man brought back to the United States is allowed to specify in which part of the country he wishes to be as-

signed for hospital treatment or convalescent care. To accomplish this, the 48 States have been grouped into 22 geographic areas and, while a man can have no assurance that he will be taken to a government hospital in his home town, he will certainly be sent to a hospital relatively close to his home, providing it can give the treatment he requires.

For example, a man requiring bone surgery will be sent to the hospital nearest his home which is qualified to perform this treatment. Where it becomes a matter of getting a man close to home, or providing the finest care for his particular case, he will be sent to the appropriate hospital.

In this event he will be close enough for his family to visit him, and for him to visit his home on leaves. Even if he is 3,000 miles from home, that is more comforting than the 3,000 to 10,000 miles which separated him from his family in the combat theatre.

Whether you arrive in the States by way of a debarkation hospital in California or Connecticut, the procedure for sending you to your home area is the same. If a walking patient, you are taken immediately to the admitting office and put through a screening process. If a litter patient, you are taken to a hospital ward and interviewed

there. The screening, done by board of doctors, determines the type of medical care you need, reveals whether you are able to continue the journey and gives you the opportunity to designate where you wish to be sent.

This information is reduced to a code of letters and numbers for each man. The numbers are then sent to the AAF Medical Regulating Officer in Washington, D. C., where they are given the highest priority. The regulating officer, Lieut. Col. Robert H. Looney, in the office of the Air Surgeon, decodes each number to make the assignments to hospitals. A typical code number will reveal these things about an evacuee:

Whether enlisted personnel or officer; male or female; the general nature of wounds or sickness; whether a litter or walking patient and the geographic area preferred. It does not reveal whether the person is white or black.

Assignment to hospitals in the interior is done through a regulating office in order to coordinate the requests from all nine debarkation hospitals. The regulating officer has daily information on the number of beds available in some sixty government hospitals so he can reserve a place for each man before he is moved from the debarkation point.

After these assignments have been made, the regulating officer returns the list to the embarkation officer, together



These enlisted technicians of an evacuation unit of the 9th Air Force were the first to land in France and bring back casualties.



Flight nurse checks her passenger list carefully as ambulatory patients board C-47 at Michel Field. This C-47 carried 24 evacuees.



Evacuation plane has just brought in this soldier who is being rushed to Chicago where specialists will attempt to save his eyesight.



Morale is high when destination is a hospital near home. Wounded soldier shares candy with Army nurse injured overseas.

with orders for the shipment by air. Everything necessary for the movement is included in these orders. Each walking patient is assigned a seat number in a C-47 and litter patients are allotted space. The regulating officer then requests the required number of planes to make the evacuation and they are ordered to report to the hospital making the shipment.

Arrangement to transport men to the planes is made by the debarkation officer, under a foolproof system which enables ambulances and station wagons to take as many as 200 men from various wards and barracks and move them to their assigned planes for shipment to a dozen or more different hospitals.

Each plane usually carries both litter and walking patients, since persons assigned to the same hospital are transported together.

Before a flight leaves a debarkation hospital, the nurse on each plane calls her destination hospital to announce the estimated time of arrival. When the planes take off the nurses know that their patients are expected and that ambulances and station wagons will meet them.

All government hospitals in the United States are located within an average distance of five miles from an airport. Some are as close as one mile, and others are forty miles, but in no instance is it necessary to transfer air evacuation patients to railroads to complete their journey.

In the assignment of men to hospitals in the United States, AAF personnel generally are taken care of at AAF hospitals, while ground and service forces personnel are sent to general hospitals. AAF personnel may be sent to general hospitals for specialized treatment, but they are returned to air force facilities for convalescence and redistribution. Only AAF patients who live in the immediate vicinity of debarkation hospitals remain in them for definitive treatment.

Evacuation by plane is considered an air mission, not a medical operation. It is the job of the Air Transport Command. Credit for a mission's success is divided among the pilots, the ground crews and the medical personnel who care for the patients in flight. The medical crew for domestic evacuation is composed of a flight nurse and a surgical technician (staff sergeant), both trained in the AAF School of Air Evacuation at Bowman Field, Ky. The enlisted men are volunteers for the service, and the nurses are selected from those on duty at AAF hospitals. All are put through rigid basic training, drilling and bivouacs, in addition to courses in air evacuation.

(CONTINUED ON PAGE 21)

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.

THE QUESTION: What one tip would you give to men going overseas?

Staff Sgt. Peter Van Slyck, armorer, England: "Don't pay attention to rumors. You'll get rumors that your missions will be changed, that your bombers will do unlimited missions, that you're going on base defense until the war's over. Our supply officer got some sun tan uniforms and the rumor arose that we were going to China. Those rumors shake your morale. You don't know what to believe and what not to believe. Rumors are as bad as careless talk. Don't believe any of them and don't be a rumor monger. Just do your job and forget them. Don't believe anything until you see it—and then it ought to be countersigned by authority."



Staff Sgt. William Clough, gunner, Italy: "Watch your voice communications. Be calm and speak clearly. Don't shout and scream and get excited. When one man hollers, another man hollers louder to tell him to be quiet and then you have nothing but confusion. On a flight over Italy, an ME 410 came in and the tail gunner saw him. But he yelled so loud, we thought something was wrong with him. Everybody started screaming to find out what was wrong with the gunner. When I saw the ME I couldn't cut in to give his position. If that had been an FW or a 109 we would have been in bad shape. Go easy on the intercom and live longer."



Staff Sgt. Ernest Carson, crew chief, Africa, India: "Hang on to your tools. When you're in a combat theatre, you can't duplicate every missing tool. If necessary, sleep with them. When I went to chow, I used to carry a two-foot screw driver in my pocket because it was the only one I had and I couldn't afford to lose it. Put a guard on your tool kits and post somebody to watch the guard. Too many planes have been grounded because the right tools weren't around to fix them. We wasted a lot of time making tools when we could have been fixing planes."



Capt. Robert Brown, bomber pilot, England: "Learn to fly all the formation you can and make the co pilot fly as well as you. Learn to fly formation for long hours because you will have to in combat. Learn to save gas. If you have 45 inches one minute and 15 inches the next, that's bad. One pilot will fly a seven hour mission and burn 200 gallons more than another pilot flying the same mission. It is your responsibility to see that your co-pilot knows formation flying. A fair pilot and a fair co-pilot are much better than a good pilot and a poor co-pilot."



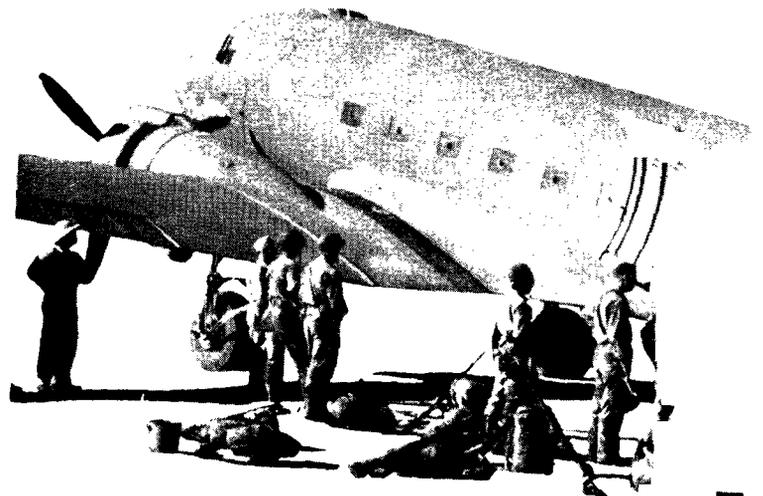
Capt. James Starnas, bombardier, Southwest Pacific: "Read the intelligence reports. That's the most important thing in combat. We spent two hours a day reading reports of previous raids. They tell you everything about your theatre. That goes for every crew member. You'll find information about targets and if you hit an area once you are going to hit it again. The reports give you dope on interception, AA disposition, terrain and topography. If you're shot down, you'll know what to expect. Escape routes taken by other men are there. The success or failure of your missions depends on reading the intelligence reports. That's how to learn the score."



Lieut. Gordon Burlingame, fighter pilot, England: "Know instrument flying. You have to know how to handle your ship smoothly on instruments. On an escort mission to Frankfurt we went into an overcast at 11,000 feet and we were still in it at 25,000. If you don't know instruments in a case like that, you're finished. Don't rely on any one instrument—it may be shot out. Use every available means and keep checking one instrument against the other. You can't horse around. I've seen men spin out of overcasts and crash because they didn't know the full-panel instrument system. Those instruments are on your panel for a damn good reason. Learn to use them."



WORKHORSE



The C-47 has been our only means of supply in many theatres and has kicked up its heels in combat, too.

OF THE AAF

By Maj. Charles D. Frazer

AIR FORCE Staff



WHEN the transport plane had gained altitude above Morrison Field, the pilot dug into his pocket for a long white envelope. It contained his orders and until he broke the seal he had no idea of his destination. All he knew was that he and 35 former airline pilots with instrument ratings had been given a super-secret mission calling for a two-year absence from the States.

The orders read that his outfit was to fly to the Far East, by way of South America, to serve in the American-India-China Aid Project. The planes were commercial DC-3s converted to military purposes. This was early 1942, when the U. S. and her Allies were being clobbered on every front and planes were where you found them.

Several days later, this group left Natal. The first DC-3 to take off groaned under its four-man crew, five RAF passengers, 1,623 gallons of gas, and personal and mechanical equipment for a two-year stay.

Running up his engines at the foot of the runway, the pilot knew that never before had a DC-3 carried a gross of 35,500 pounds on an operational flight; never had one attempted the 1,970-mile hop across the South Atlantic. He was in the air, laboring, at 4,500 feet and just cleared a 400-foot hill three miles beyond the field. And he flew 100 miles before he could get his creaking plane up to 7,000.

The 36 planes and crews arrived in the Far East just as the Japs were pushing into Burma. They promptly began evacuating thousands of wounded and still other thousands of frenzied men, women and children who mobbed the planes at every landing, pushing and jamming to get aboard. Fantastic loads were brought out. One pilot, on a trip from Myitkyna, carried 72 wounded soldiers. Probably the record haul of passengers was 74 in a single flight.

This was more than heroic stuff. The mass flight across the South Atlantic—still regarded as a remarkable feat—and the subsequent evacuation work proved that the DC-3 could handle loads far greater than had been anticipated and that it could operate successfully over long, open sea

routes. At the time, with the war just begun, this idea was almost revolutionary.

Since then, the Army C-47—military version of the DC-3—has sweated out millions of miles over open seas and uncharted mountains in all kinds of weather. Old Patso has struggled in every theatre with unbelievable loads of margarine, oatmeal, canned goods, gasoline, ammunition, torpedoes and everything else in the supply depots. Pilots have taken off with 32,000 pounds gross or more from short, bumpy fields that a Piper Cub wouldn't look at back home and have put them down on landing strips fit only for a baby Australian wallaby. Some of these ships have, in grunting toil, flown more than half the distance to the moon.

But the C-47 has been much more than a cargo plane. It has taken part in every major invasion and assault—carrying paratroopers, airborne infantry, jeeps, bulldozers, field guns and even mules. It has brought back to hospitals thousands of battle casualties. It has been in dogfights with enemy planes and come out of them in one piece. It has even performed a type of dive-bombing.

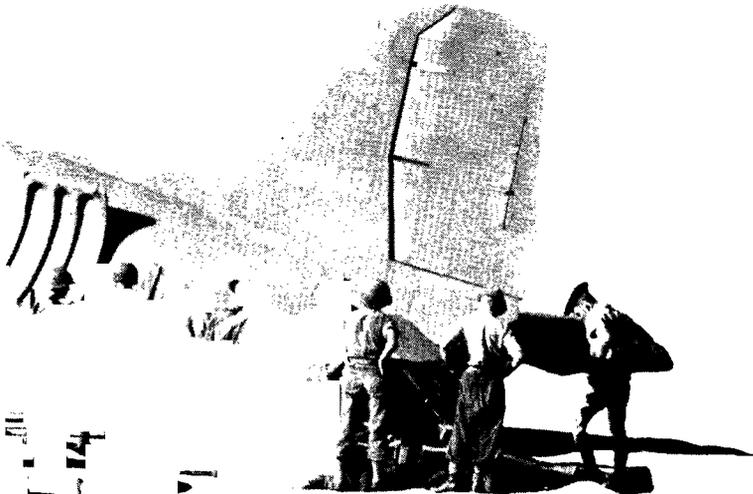
Development of this Army cargo plane began, really, in 1933, with the introduction of the original DC-1. It was an experimental plane built by Douglas at the request of Transcontinental and Western Air as a twin-engine replacement for the out-moded three-engined Fords and Fokkers. Only one DC-1 was built, for the plane gave such a speedy and economical performance that TWA ordered several ships of that type with modifications.

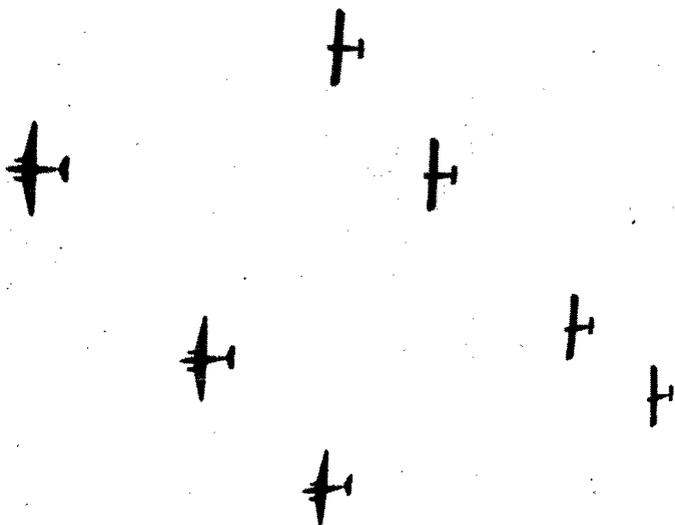
These were the DC-2s. They went into operation in the spring of 1934. From our present viewpoint they took commercial aviation out of the barnstorming stage and, for the first time, provided real comfort for passengers. Their speed nearly doubled that of previous commercial aircraft. Nearly every domestic airline soon had a few DC-2s flying its routes and many foreign countries ordered them. KLM, the Dutch airline running to Batavia, entered a DC-2 in a London-to-Australia air race. All other entrants were specially-built speed planes. The DC-2, carrying a full load of passengers and making every scheduled stop on the airline, still managed to place second in that race, whipping into Melbourne right on the rudder of the winning ship.

Out of that DC-2 grew the first all-metal cargo plane ever used by the Army—the C-33. This was the forerunner of numerous other Army personnel transports such as the C-39, which have grown out of the DC line.

In 1935 the Douglas Aircraft Company introduced the DC-3, which, while it had many modifications and was considerably larger, was nevertheless merely the big brother of the DC-2 in general design.

This plane became even more popular with commercial companies, who established with it scores of both speed and safety records. The Air Corps experimented with several adaptations of the plane and one of our early medium bombers—the B-18—was a distant relative of the DC-3.

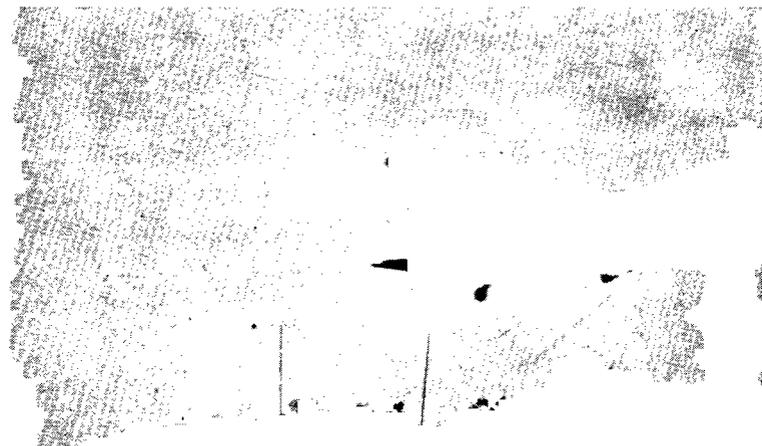




France. C-47s, such as these troop carriers (above) played a big role on D-day. The transport below was the first to land in France.



Burma. This C-47 of the Air Commandos is performing one of the most delicate of air operations—snatching a glider off the ground.



Shortly after the war began, scores of commercial DC-3s were hustled into the Army, Navy and Marine air arms until a high-level production of military versions could be obtained. This was quickly done and the C-53 soon began making its appearance on the AAF's extending routes. The 53 was identical to the commercial airliner, except for a substitution of bucket seats for the more luxurious reclining jobs; it is solely a personnel carrier.

Conversion of the DC-3 to a true cargo plane, however, involved many changes. First, it called for a reinforced bottom and floor and a wide loading door capable of admitting heavy machinery and weapons. Also, numerous changes in production methods were necessary if these planes were to be turned out in volume. Hand riveting was replaced by automatic riveting wherever possible. Fiber replaced aluminum in many parts of the aircraft interior. Forging was used on certain parts instead of gas welding, and flash welding was introduced extensively. All this was accomplished with no loss of strength and frequently with greater ease of interchange or replacement of parts.

By September, 1943, more than 2,000 C-47s had been built at Douglas' Long Beach, Calif., plant. By February of this year, more than 2,500 C-47s were being flown by Air Transport Command alone, to say nothing of another couple of thousand to troop carrier and other units or in use by the Navy and Marines, with the designation R4D-1.

As the war progressed, the suspicion began to grow that the C-47 could do anything.

The interior of the ship was so rigged that litters could be quickly installed, transforming it into what is in every sense a hospital plane. The Materiel Command at Wright Field put on floats to make it a rescue plane as well.

Soon it was found that the C-47 was a fine glider tow-plane because of its robust construction, and it became the first plane ever to tow a glider across the Atlantic.

So far, no armament has ever been installed in a C-47 but it does have vents in the windows out of which guns have been poked on many an occasion with good effect.

Today, the AAF has faster and bigger cargo planes—notably the C-54, or DC-4—but the enemy has nothing to compare with the C-47. The JU-52, Germany's best, has neither the range nor the speed nor the load capacity of the 47. From a pilot's standpoint, the 47 is perhaps not so easy to handle as the newer 54 but it is steady and reliable, its conventional type landing gear has stood up remarkably well under the worst conditions which could possibly be found, and as one veteran puts it, "The ship feels like an old pair of shoes." And while some have cracked up and some have been shot down, nobody ever heard of one wearing out.

As an example of the C-47's war exploits, take Asia. There, since the beginning of active operations, C-47s have struggled manfully over what is known as the meanest, toughest and most hazardous air route in the world—the 700-mile flight across the Himalayas from Assam Province in Northeast India to Chungking. They have helped literally to keep China alive, flying supplies in daily across a limitless stretch of 20,000 foot peaks and uncharted passes, all the while being within reach of Jap fighter planes.

More supplies go over this route than ever were transported by way of the old Burma road. More planes fly the route daily than leave LaGuardia Field in New York, and in planes and personnel the operation exceeds any three airlines in the United States.

C-47 pilots in this area have met every type of weather and flying difficulty in the world. One pilot, for example, trying to get around a typhoon in a heavily loaded ship, found himself in a strange pass at about 16,000 feet when an updraft suddenly whirled him to 28,000. He knew he

could only keep the ship steady and ride on up and, somehow or other, the C-47 took the strain in stride.

Pilots in Asia, unlike any others, welcome bad weather and storm fronts for then they know that at least the Japs can't find them. In the early days it was SOP to fly just beneath a cloud layer so that when fighters appeared, the transports could merely duck up into the soup for cover.

Recently, in Burma, C-47s launched one of the most spectacular military operations of the whole war. When the Air Commandos were landed 150 miles back of the Jap lines in North Central Burma, C-47s towed the gliders, carried reinforcing troops and maintained supplies during the entire operation. Low losses of personnel were attributed to the accuracy of the C-47 pilots, who put the gliders right over their fields for a drop into high grass.

During this campaign an "engineer-bombardier" was born. Lieut. John Sandichs, a transport pilot, while returning from a flight to Burma, spotted a Jap outpost on top of a hill. For a gag, he called out, "On target. Bombs away." His engineer, Richard Belcher, astonished him by replying "Bombs away." Looking back, Sandichs saw a mortar bomb leave the window of the C-47. The hit couldn't have been better and the post went up in debris and flame.

Striking the Japs from another side are the troop carrier and transport outfits of the Southwest Pacific. Ever since we began to strike back at the Japanese in New Guinea and the Solomon Islands, the C-47 has played an active, not to say indispensable, part in every major military operation.

The scale of the work may be indicated by the fact that in 1943 the Troop Carrier Command of the 5th Air Force, under Brig. Gen. Paul H. Prentiss, flew supplies and troops a total of more than 18,000,000 ton-miles. They carried 140,000 tons of cargo and personnel in areas where enemy action was frequent and lost only five aircraft due to enemy action. They are credited with evacuating 1,038 sick or wounded men from advanced bases to hospitals in advanced areas, 3,891 from advanced to base hospitals, and 1,985 over 600 miles of water to hospitals in Australia.

During the famous paratroop operation in the Markham Valley, flocks of C-47s flew American paratroopers in behind a smoke screen and carried out the lowest mass jump ever attempted with an extremely small rate of loss. While carrying supplies to that area, nine C-47s in one day hauled 500,000 pounds of cargo to an advanced base, averaging 55,000 pounds per plane for the day.

After Lae had been taken, the Allies moved further up the coast of New Guinea, capturing Hollandia and Wakde, where the 47s continued intensely active. Within 48 hours after our invaders had hit the beach at Wakde, engineers had the Wakde strip in shape and the first planes to land were the big twin-engined transports with reinforcing troops for the mainland offensive.

It was in New Guinea that Lieut. Mayhew W. Fishburn of a troop carrier squadron had the luckless experience to find himself in a dogfight with a Jap. He took off from an army airbase at dawn with a cargo of tar barrels for a front line airstrip. Just at that time, five Zeros chose to give the base a low-level strafing. One Jap pilot, seeing a fat 47 up there like a sitting duck, broke formation to get it. Fishburn pulled over in a screeching bank and the Jap's bullets hit the tail surface but didn't damage the controls. Fishburn, with some 30,000 pounds of airplane on his hands, ducked and dodged, rolled and banked like a fighter and broke every CAA regulation in the book. The Jap made repeated attacks while Fishburn wildly maneuvered—straightening up, pulling away sharply, banking almost vertically, and cutting back the throttles to make the Jap overrun.

On his second pass, the Jap caught the 47 amidships and

(Continued on Page 26)



SEPTEMBER IN THE AAF

BEFORE DECEMBER 7, 1944

1904 SEPT. 30: First Gordon Bennett balloon race is won by Lieut. F. F. Lamm.

1908 SEPT. 1: First test flight of the Army's flying machine is made by Orville Wright.

Official three-man world flight endurance record is set by Lieut. T. DeW. Milling. Time: 1:54:42.

First Aero Squadron is organized. Strength: 16 officers, 77 enlisted men, 8 planes.

First Aero Squadron arrives in France.

Balloon Section, AEF, created.

Air armada of 1481 planes parties to St. Mihiel drive.

1918 SEPT. 10: Unofficial world altitude record set and of 28,000 feet is set by Capt. H. G. Sweeney.

1920 SEPT. 11: Three airships fly fantastically under radio direction.

1920 SEPT. 20: Air Service strength this date is 596 flying officers, 275 non-flying, 7846 enlisted men.

Bombardment test flights result in sinking of battleship Alabama by 2000 lb. bomb.

Official world airplane altitude record of 34,508 feet is set by Lieut. J. A. Macready.

First transcontinental crossing within 24 hours is made by Lieut. J. H. Doolittle.

1922 SEPT. 10-21: First transcontinental airmail flight is made by the non-rigid C-7.

1925 SEPT. 8: Commercial naval vessels New Jersey and Virginia delivered to Army, including first.

1925 SEPT. 13-DEC. 14: First long-distance mail transportation by airplane. A mail plane, Capt. H. G. Sweeney and Lt. F. L. Smith.

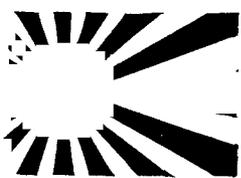
1925 SEPT. 15: The U.S. first designed and built airship to be constructed in America is completed.

1928 SEPT. 16: Collier Trophy is awarded Air Corps for development of pressurized cabin altitudinal plane.

1930 SEPT. 21: Doolittle and Smith make first flight acrossed the 19th transcontinental flight of record of 10,000 flying hours with 400,000 passengers.

1930 SEPT. 22: Maj. Gen. G. H. Arnold is appointed chief of the Air Corps.

1941 SEPT. 3: 10th B-17 to Japan Hawaii to the Philippines in first movement of heavy bombers by air across western Pacific.



this is your

ENEMY

Jap AA Tricks

Pickaback Plane

Truth, Jap Style

Jap Flak Traps and Tricks. In addition to their usual antiaircraft installations, the Japanese have been using many ingenious devices for action against our low-flying aircraft. In several instances, lures have been set up to bring our planes within the effective range of specially installed concentrations of AA weapons.

Recent photographic reconnaissance showed two dummy four-engine airplanes, which looked very much like our B-24s, located just off the runway on an island in the Southwest Pacific. Almost white, they appeared to be made of coral or else painted on the ground.

These dummies were placed within the arc of fire of the most concentrated antiaircraft artillery in the area. Guns within a radius of 2,000 feet totaled 24 automatic cannon and four, possibly seven, heavy antiaircraft weapons. The obvious purpose of the fake planes was to entice our flyers to come down and take a look, thereby coming directly in range of the AA concentration.

Wrecked and beached barges have also been used by the Japs as antiaircraft traps. One report on this activity said, "A run was made on a probably wrecked barge at treetop level. When directly over the target, the attacking aircraft was seen to smoke and plunge straight into the sea without a pull-up. During the run, eight .50 caliber machine guns appeared to fire from a nearby group of houses. Four additional guns were spotted in the vicinity. The guns were set up so that when the aircraft crossed the shoreline, the fire converged at a point beyond the two positions."

Another type of Jap antiaircraft trap or decoy is the "floating" explosive, brilliantly colored or lighted to attract attention and investigation by airplanes. A plane which approaches within the effective radius of the explosive actuates a firing mechanism in the raft or box and thereby "shoots itself down."

A similar device has been reported in use by the Japs against planes flying at minimum altitude over land. These "land mines" may be fired by sonic devices or manually by an observer.

The Japs also have used "anti-strafting cables" suspended between trees or hills to protect probable avenues of approach against attacks at minimum altitude.

Technically, these devices are not impressive. When denied the advantage of surprise and countered by proper evasive offensive measures, they are inefficient weapons. They do prove again that the Jap depends heavily upon trickery and surprise.

New Jap Guns. The principal Jap aerial weapons at the beginning of the war were the 7.7 mm, the low-velocity 20 mm, and a few 12.7 mm guns. Now they are substituting the 20 mm and the 12.7 for the 7.7 and developing more powerful 20 mm guns.

The higher velocity 20 mm anti-tank gun, which has been generally abandoned for anti-tank use, has appeared as a free mount in bombers, despite its comparatively slow rate of fire. In order to meet the demand for guns of larger caliber, single-shot 37 mm tank guns have been mounted in Jap fighter planes. There have been reports also of 13 mm and 25 mm guns being mounted in some aircraft.

Enemy's View of the Enemy. In an interview over the Tokyo radio, Japanese war correspondents back from the combat zones reported, "By and large, the enemy is afraid of dying. He hopes for rescue. Even when he is raiding our base at Rabaul, he is harnessed in a parachute and expects to be saved even if his plane is downed. Japanese pilots never use a parachute when attacking the enemy. If his beloved plane goes he goes with it. The enemy does not hesitate to become a prisoner. There is that spiritual difference between the enemy and our pilots.

"The enemy pays a great deal of attention to losses in personnel and takes a serious view of it. (You're damned right.—Ed.) Sometimes the enemy dispatches a rescue ship to pick up possible survivors from the sea, and sometimes such rescue ships have been sent out even before the raid was made. Because the enemy seems to value personnel so much, we have even been advised from our forward bases that instead of announcing the number of carriers and fighters scored on the enemy, we should publish the number of pilots we deprived."

Truth. Japanese radio report: "Japanese base, China front. In a midnight raid last night on the Hanchung airfield, the Japanese Air Force set ablaze at least eight enemy fighters and damaged two others, beside setting ablaze military installations."

The official 14th Air Force report of the same operation: "Hanchung was attacked by twelve enemy bombers which caused numerous holes in the runway. There was no report of any friendly planes lost."

The Japanese press: "Intercepting a combined enemy formation of twelve bombers and fighters which attempted to raid a railroad bridge on the Yellow River, Japanese fighters shot down three P-40s and one B-24. Only slight damage was suffered by Japanese ground installations while no damage was caused to the bridge."

The official 14th Air Force report: "Six B-25s with seventeen escorts successfully attacked the storage area south of the Yellow River bridge and bombed and strafed the railroad bridge. Two direct hits on the Northern New Bridge blew out an abutment. Enemy aircraft destroyed, four, two probably destroyed. Friendly aircraft damaged, one, minor."

Betty. In an effort to match our medium bombers, the Japs decided that they needed a bombing aircraft with high speed and long range. So they manufactured the Betty. Compared with our B-25 and B-26, the Betty has an extra thousand miles of range and at least equal speed.

But there is the usual catch. To get this range and speed, the Japs sacrificed armor and armament, just as they did with their Zero. By the extensive use of magnesium, they have in the Betty an unusually lightweight airplane. Magnesium, however, is a highly inflammable metal which is apt to burst into flames as soon as it is hit.

So far, the Japs haven't done much to give the Betty and her crew any additional protection. An examination of several wrecked planes shows that a little armor plate has been provided to protect the tail gunner, and heavy rubber mats have been added on the fuel tanks. But these measures were temporary, obviously taken in the field and not made a part of the standard equipment.

Betty's usual armament includes one 20 mm tail cannon, one 7.7 mm nose gun, another in the dorsal turret and one 7.7 mm gun on each side. In newer types, the side blisters have been removed, leaving open ports. This gives the side guns an increased arc of fire. It is possible that the dorsal turret now carries a 20 mm cannon.

Betty's armament is not completely inadequate. Even the earliest models had nose and tail turrets which could be rotated 360 degrees by hand. This permits the gunners to cover any attack angle, both front and rear. In this regard, Betty's armament was slightly ahead, but the Japs could not—or would not—keep in step with our improvements and they soon were left far behind.

Generally, the design and craftsmanship of the Betty is excellent. An interesting characteristic is that Betty's bomb bay doors are removed at the field before the take-off.

This bomber clearly indicates that the Japs still know how to make a good fighting airplane—but it also shows that they have not yet applied the lesson of the importance of armor and armament.

Pickaback. An unusual German "bi-plane" was seen by the crew of a Mosquito on patrol over France. On closer observation, the "bi-plane" turned out to be a small aircraft attached to the top of a larger twin-engine type. At the same time that the pickaback plane was noticed an Allied convoy was seen in the channel nearby.

The Mosquito crew members reported that they could see between the two aircraft which appeared to be connected at the trailing edges of the main plane. The pickaback plane was flying at an estimated speed of between 200 and 250 mph when the smaller ship suddenly lifted from its larger component, banked steeply and flew away at right angles. The larger plane turned over on its back and dived straight into the sea without displaying any tendency to spin or glide. It hit the water about three miles east of the convoy and caused a terrific explosion.

No evasive action had been taken by the composite aircraft previously, and it was proceeding on a straight course for the convoy when sighted. The controlling pilot apparently saw the Mosquito and jettisoned the larger craft. It was not possible to determine whether the propellers of the expendable plane were working.

It is believed that the composite plane flies on three engines under the complete direction of the pilot of the top plane. Reports indicate that usually the top plane is an ME-109 and the lower ship a JU-88. In making an attack, the ME pilot releases his aircraft from the JU and the lower plane continues at a shallow angle of descent under the control of an automatic pilot.

A new nose section which has replaced the regular nose of the Junkers contains an explosive charge in the manner of the flying bomb. No doubt the pickaback planes will prove highly vulnerable to fighter interception due to reduced speed and make comparatively easy antiaircraft targets.

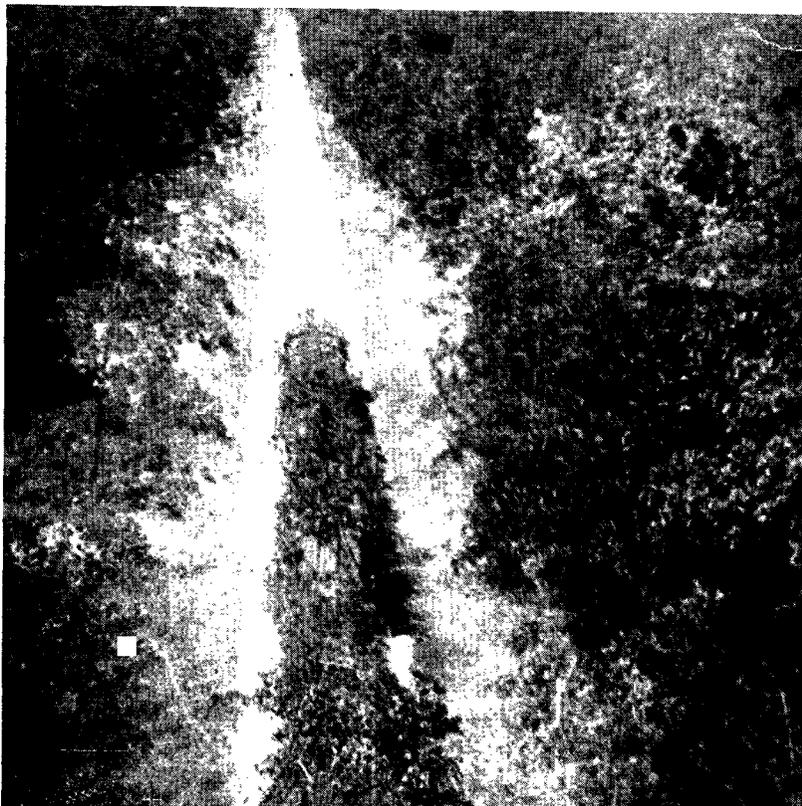
Putting on the Bite. A Jap soldier on Attu disclosed how the characteristic buck teeth of the Nips can be put to use for the Sun Emperor. The Jap's body was found beside a U. S. Signal Corps telephone line. He had gnawed away six inches of the insulation, shorting the circuit. ☆

SEPTEMBER, 1944



Using simplified launching sites that were easier to camouflage and to repair, the Germans in mid-August kept hurling their robot bombs such as this one on southern England with London as the principal target. Some of the buzz bombs were reported to be carrying incendiaries in their warheads while others were equipped with cable-cutters. But the majority still carried a load of HE equivalent to a German general-purpose 1,000-kilogram bomb, or one of our own 2,000-pounders. Fuzed for instantaneous explosion, the thin-skinned robot wrought most of its destruction through its terrific blast. There was no fragmentation to speak of, and seldom any demolition caused by earth shock. Jerry had an ugly habit of timing his salvos for the lunch or afternoon rush hours. Most of the casualties continued to be from flying glass.

This is the manner in which the Japs have attempted to camouflage trains by day in Burma. Our strafing pilots have not been fooled by this concealment. They fly down the railroad tracks instead of across them.



BREAKING

THE WALL OF CENSORSHIP

As unrest spreads among the enemy on home and battlefronts and sabotage by the underground increases in Axis-occupied countries, the AAF is actively engaged in agitating the growing turmoil through psychological warfare operations.

By dropping leaflets and newspapers on enemy territory, AAF bombers bring the truth concerning war aims and developments to soldiers and civilians from whom the facts have been concealed by Axis censorship. Resentment at being duped by their leaders results, or doubt and confusion, at least, are created. Through this "white" bombing medium, citizens of occupied lands learn that liberation is at hand, and their resistance becomes bolder. When the home area of an oppressed people must be bombed by the Allies, the strategic necessity for the action is explained by leaflets such as the one reproduced above. The sketch and the script (captioned at left) told Chinese residents of Formosa that the island was being attacked in order to expel the Jap "monsters." Photos on this page show three stages in AAF leaflet distribution.

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↑ "Bombs" are packed with propaganda matter at AAF base overseas.



↑ Ready to be hoisted into B-17 are five 300 pound leaflet bombs.

↓ Leaflets are scattered to winds when bombs split open in air.



GI AIRLINE

(Continued from Page 13)

tion. When a unit has completed its training it is shipped to whatever part of the world it is needed. Those serving in the United States are stationed at Memphis, Tenn., Wilmington, Del., and Romulus, Mich.

Planes used in evacuation are not to be called "airplane ambulances." We have cargo planes which are used to evacuate the wounded. It is the primary job of these planes to carry troops and war supplies, yet the Commanding General of the AAF will provide them for evacuation wherever they are needed.

Air evacuation policy provides plane transportation for all types of wounded persons, except those suffering severe chest wounds which might be complicated by collapsed lungs. All nerve cases may be transported except closed-ward mental patients.

Domestic flights are made at safe altitudes, below 9,000 feet, although fixed and portable oxygen systems are carried as standard equipment. So is blood plasma which may be given in flight. Nurses credit their pilots with extreme consideration for the patients, reporting bad weather in time for them to brace the litter patients and have the sitters buckle their straps. Air evacuation has made an exceptional record of safety. As for comfort, let Flight Nurse Nason explain from her experiences.

"We get some boys who have never flown before," she reports, "and I guess this trip means more to them than any of the others who have come all the way by air. They tell me about coming home by boat, and they can hardly realize that within a few hours they will be home by air.

"The boys from the South get excited at the very thought of getting down there where it is hot. I don't know why, but they all talk about how much they like it hot. Midwesterners, getting close to home, can ride for hours, just watching the ground. They watch those long section lines which you don't find anywhere else. To Midwestern boys they are the first sight of home."

Lieutenant Nason says she is particularly proud of her record for driving away air sickness, at the same time rapping on wood, the handle of a litter above her head.

"I watch my boys to see if any of them get a white ring around their mouths," she explains. "That means they are about to get air sick. If a boy gets to feeling too bad I let him smell some ammonia and, well—sometimes I sit down and hold his head in my lap.

"I didn't learn that in training, but I get good results." ☺

TO THE RESCUE

Using the Gibson Girl Aloft

During a mission in which severe flak had been encountered, a B-17 pilot decided that a ditching was inevitable, but he could not send out a distress signal because all aircraft transmitters were out. The radio operator therefore attached the trailing antenna to the Gibson Girl and cranked out an SOS. Bearings were taken on this call, but since the signal was automatic, rescue agencies assumed it was being sent from a dinghy. As the plane flew on, another fix was taken and it was assumed that this came from a second dinghy. The Fortress ditched soon afterward, but the rescue planes were searching the positions of the fixes. Eventually, flares shot from the dinghy attracted a plane and the crew was rescued.

The radio operator displayed ingenuity in using his Gibson Girl with the trailing antenna. Had he realized that coastal M.F. and D.F. stations would assume the signal came from a dinghy, he could have clarified the situation with Q signals, keyed manually. This is not a criticism of the radio operator; he acted more wisely than most of us would in such an emergency. Yet, we can profit by a study of the situation.

Lesson Number 1 has been indicated: If you are in distress and transmitters are out, use the Gibson Girl with your trailing antenna and you will put out a strong signal. (Only short range is possible on fixed antenna with SCR 578.)

Lesson Number 2: Using the hand key on the Gibson Girl, send a few "Q" signals to indicate that you are still airborne and then switch back to automatic. QAL, QUG or QMH are suggested.

Lesson Number 3 is for the man who monitors the distress frequency. If he gets an SOS from a Gibson Girl with the message tacked on, "I am flying at 3,000 feet," he should take for granted that a Gibson Girl may be used while the crew is airborne. If you are getting a fix which appears to be moving steadily, indicate this when you give your report.

Ditching the A-25

If you fly an A-25 you probably have played around enough at high altitudes to know its stalling characteristics with full flaps. Ditching instructions, however, tell you to use some flaps with most planes. If you have guessed that your A-25 is an exception you are absolutely right. The NACA Laboratories at Langley Field, testing with model planes, have found that the A-25 can be ditched satisfactorily with no flaps. However, with flaps down, the plane

noses down and pancakes onto its back. NACA strongly recommends that you ditch the A-25, if ditch you must, with flaps all the way up.

Getting Them Back

The first problem in emergency rescue is to locate the survivors. The second and frequently more perplexing problem is to bring them back alive. In the English Channel the RAF rescue launches have been very effective, due largely to efficient coordination between rescue planes and the boats but due also to the large number of rescue units available to search a relatively small area. In the South Pacific Navy PBVs have done a remarkable job, but there are places where a PBV cannot land—in a turbulent sea or in an uncleared jungle. Nor can a rescue boat steer too close to enemy positions. One of the major means of solving this problem in the AAF is the development of the airborne lifeboat for rescue at sea.

The British have been using the airborne lifeboat with considerable success where aircrews are forced down near enemy territory. American engineers received valuable assistance from British designs and operational reports, so that ours will be the latest thing in airborne lifeboats. Production is under way and boats should be available to the theatres in a few months. (For a description of airborne lifeboats and their development, see "Technique" in August Air Force.)

Notice to Doodadlers

Ditching reports occasionally tell of an airman whose Mae West did not inflate because the valve was open and all the gas produced by the CO₂ cartridge escaped. This danger must be checked by the wearer of the vest, and the final check should be made when ditching becomes necessary.

Many people are "doodadlers"; they like to play with something, especially when they are nervous. The valve on the life vest is easily accessible to idle fingers, and it can be unscrewed by a doodadler without his realizing that he has doodadled with his life.

When a vest is not entirely deflated it will expand at high altitudes. Sometimes airmen unscrew the valve to deflate the vest and forget to screw it tight again.

It is almost impossible to fill a Mae West by mouth while trying to swim in flying togs; several men have drowned in the attempt.

So add this to your ditching procedure and practice it when you drill: check the valve on your Mae West as soon as the ditching order is given.

Prepared in collaboration with Emergency Rescue Branch, Headquarters, AAF.

By Air Commodore C. S. Wallingford

*Former Commander of the RNZAF in the Pacific Area,
now in charge of RNZAF Operational Training Units.*

ALTHOUGH the average bag of the Royal New Zealand Air Force in the South Pacific is about twelve enemy aircraft destroyed to every one lost, we still emphatically believe that squadron credit is more important than personal credit, and frequently the enemy planes which we destroy are incidental to the mission performed. Particularly is this true when our fighters are acting as cover for U. S. bomber formations in strikes against the enemy's installations.

It is not advisable to go into detail about the nature of RNZAF operational procedures anymore than it would be to discuss those of the AAF. Not only would such statements be unwise militarily but they might well be incorrect for our operational details are constantly changing just as yours are changing. However, one element constantly stressed, remains static with us. That is air discipline. Briefly, air discipline to us means sticking to the job assigned at briefing and following operation procedures.

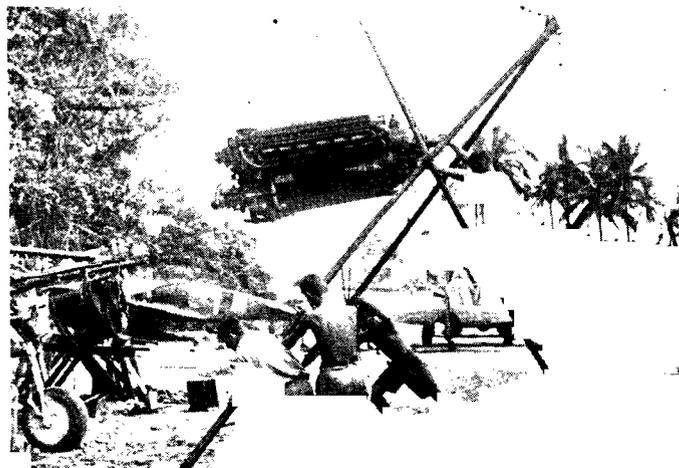
Even in fighter action our accent is on teamwork; the individual is curbed in his personal ambitions. It is impressed upon him that cooperation with the squadron comes first. The fleeting opportunities to strike at the enemy must be restrained because if the flyer leaves his job, he is weakening his whole squadron as well as presenting an opening for the enemy to strike at the bomber formation he is supposed to be covering.

Escort duty is not a particularly welcome duty. By the very nature of his work, a fighter pilot is looking for trouble and nothing suits him more than going out on an offensive sweep. But the bombers must be covered, and this job must be done in the most competent manner possible.

Perhaps it is for that reason that we believe in building up the squadron rather than glorifying one or two individuals. Our best squadron leaders have knocked down few planes and received even less publicity. It is not unusual to find that every man in the squadron has more planes to his credit than the flight leader. This is easily understood for it is the flight leader's job to lead his squadron into combat. Most of the time he will make the openings and thus furnish an easy opportunity for a less experienced man to make the kill. The nearest analogy to our use of the squadron leader is your quarterback in football who calls all the plays but seldom carries the ball.

Generally in the RNZAF a man gets a decoration not so much for the number of Zeros he has brought down but the manner in which he does it. A great deal of harm can be done if a chap gets a Zero but in so doing weakens the whole formation and perhaps gives the enemy a chance to get some shots at a bomber. If a man can get an enemy aircraft and at the same time provide cover, he then is really

RNZAF ground crew in New Hebrides changes fighter engine.



RNZ

doing his job. For that reason there are occasions when a flyer who has shot down only one plane will receive a citation before another man who has five or six to his credit.

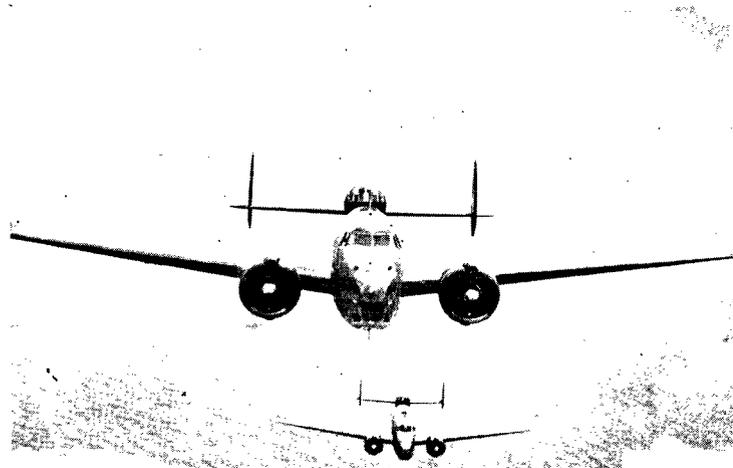
And, by the same token, it does not matter that a flight commander will go through all manner of action and not get any enemy planes. Instead, he gets the credit for the number of planes shot down by his squadron and, most important, for the manner in which his squadron carries out its mission.

ALTHOUGH a great many of our pilots are enlisted men, our squadron leaders are generally older and more experienced officers. We have not found it necessary for all of our pilots to be officers. We have gone through an evolution somewhat similar to the cavalry. At first when warfare on horseback was carried out, all of the men were knights. Then it was shown that a man did not necessarily have to be a knight in order to fight well, and eventually it worked out that most of the horsemen were regular soldiers being led into combat by officers, who could guide, direct and lead them.

Approximately fifty percent of our pilots are officers. In time most of our pilots and aircrew members qualify for commissions, and every opportunity is given them to achieve this status. When their wings are awarded during the last phases of training, some of the men are given commissions. No arbitrary number is set but it is determined by the grades the cadet makes as well as by his actions in proving himself qualified to assume the responsibilities that go with being an officer.

The remainder of the men become sergeant pilots. The sergeant pilot remains in grade approximately six months and then is promoted to flight sergeant. In another six months, he becomes a warrant officer. The next promotion,

Hudsons of the RNZAF fly over the Solomons on a mission.



The success and popularity of our RNZAF companions in the South Pacific can be measured in terms of the job they are doing against the common enemy.

rails, especially some of the flyers who become extremely overconfident after four or five successes.

Another principle that we hold to is the importance of the physical fitness of the men. We maintain our aircraft to the best of our ability and we do the same with our flyers. Following the same general principles as the AAF, the Navy and the Marines in this theatre, we rotate our squadrons to give the men a chance to leave the tropics and go to a cool climate, even if for only a limited time. We have a great physical and an even greater psychological advantage over your men. Our flyers can go home on leave, since New Zealand is not too far from the theatre of operations. This also accounts for the fact that our tour of duty is longer than yours.

However, the rest leave is but a small part of the time the squadron spends away from actual fighting operations. The majority of that time is devoted to operational training in new tactics which we have learned and in which we are aided by your experience and men.

In very few other instances do we differ from your AAF and, were it not for the different markings on the wings and fuselages of our planes, we would be practically indistinguishable. Not only do we all operate in the closest coordination and friendship, but we are flying your planes in our operations. For standardization we have kept down the types of planes flown. Principally, we fly P-40s, your Navy's Corsairs and Dauntlesses in fighter and dive-bombing operations.

For transport service we fly the C-47, which, by great coincidence, we also call the C-47. We maintain a transport squadron which corresponds to your Air Transport Command for inter-island traffic to and from New Zealand.

Our bombers were formerly Hudsons. This plane has been superseded by the Ventura, your B-24, although the modified plane that we employ is the Navy type P-1. The Hudsons have been principally used for overseas reconnaissance, convoy escort and antisubmarine patrol.

There is no denying that reconnaissance and searcher are very tiring and difficult, with none of the usual glamor and little excitement. It is hard for the men to realize that the negative information they generally bring back is definite information and as important as positive information. To keep them in operational trim and to provide them with a change, we generally give each bomber crew a minimum of one strike. Now, as we get more and more bomber squadrons and are using a much improved plane, this policy is paying off. We are flying an increasing number of strikes of the type best suited for our smaller bombers.

A great many kind things have been said of the RNZAF by the Americans with whom we fly. This is not the place for flowery statements. All we can say is that we are fully cognizant of the aid which you sent when our island appeared to be the Jap's next invasion point. We consider it an honor to fight alongside your forces to drive the enemy from every island he has touched and destroy him. ☆

to the rank of pilot officer, is the equivalent of your second lieutenant. However, a flyer does not necessarily have to go through all these steps. At any time during any of these grades, he can be directly appointed to the rank of pilot officer upon recommendation of his senior officers.

None of this should in any way reflect upon the flying ability and skill of the sergeant pilots. In a majority of instances, they make excellent section leaders (a section is usually a four-plane formation within the squadron) and often they have officers following them. But it has been demonstrated that a man may be a wizard in the air and yet not have the aptitude, the desire or the experience and qualifications to take on the responsibilities demanded of an officer on the ground.

Naturally, we are trying to improve our tactics and technique and plenty of leeway is given in the manner in which missions are flown. For that reason, we have as staff officer a highly qualified and experienced pilot, who studies carefully combat reports from a standpoint of operations and tactics. At group headquarters (our group corresponds to your wing) he breaks down these reports and, when the occasion demands, makes candid and often sharp criticism. In one instance, we had a highly successful mission with regard to the number of enemy planes downed. Our flyers were sitting back applauding themselves when they were brought out of their happy aura by a piercing analysis of the mistakes made. Through the staff officer's criticism, they soon realized that had the enemy been a bit smarter, the results might have been overwhelmingly in his favor.

It isn't that we belong to the spare-the-rod-and-spoil-the-child school of thought. Our men get credit when they deserve it, just as they receive candid criticism and censor when necessary. Nothing can substitute for experience, but criticism goes a long way toward keeping the men on the

Panoramic view of an RNZAF installation in the South Pacific.



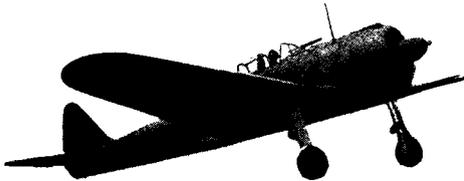
Call it



If you wondered about our hillbilly code names for Jap aircraft — here's why.

WHEN a combat report states that "TONY was taking HELEN home," it is the result of a carefully designed program for tagging Japanese aircraft with such names as those used in this description of a Jap fighter escorting a bomber back to base. The system used by the AAF in assigning code names to Japanese airplanes has assisted greatly in speeding up the collation and usefulness of our growing technical intelligence on enemy aircraft types.

The development of these colorful code names began in the Southwest Pacific in the early days of the war. At that time, all Japanese airplanes were identified as Zeros if they were fighters or as "Mitsubishis," if bombers. There was no formula for differentiating among types, because there was no method of designating them. The result was confusion—



in signals, in correspondence, in files, in order of battle, and even in the exploitation of intelligence. Information was pouring in on Jap planes but there were no pegs on which to hang it, and there were no handles by which it could be exchanged conveniently.

The problem of clearing up the nomenclature mess in the Southwest Pacific was labelled "urgent" and given to the theatre's Air Technical Intelligence Unit for immediate action. The section at that time consisted of one commissioned and two noncommissioned officers, who had been struggling with the difficulty even before they left the States.

Discovery of Japan's official names for its aircraft helped but little. For one thing, the official monickers generally were not verified until well after scattered and sporadic descriptions had already furnished us relatively complete identification. Principally, however, the official names were as unwieldy as anything we had yet devised. What we know as the ZEKE, for example, is known to the Japanese as Type Zero Mark I Carrier-borne Fighter Model I, or as Type 0 Carrier-borne Fighter Model II, manufactured by either Mitsubishi or Nakajima.

As cumbersome as such designations were, some AAF agencies were using them, where known, for lack of anything better.

Other agencies were attempting to describe the Japanese

types by using the name of the manufacturer. This only added to the confusion, as it had been proved that more than one manufacturer frequently produced the same type of airplane.

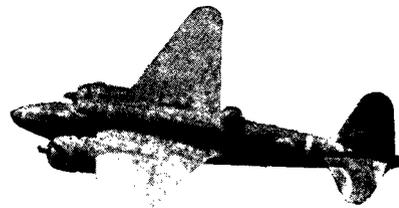
The term "Zero"—or other numbers—was, of course, inadequate. "Zero" meant simply that the airplane had been first accepted by the Japanese Army or Navy in 1940. Many types were known to have been accepted in that year—all of which were then being lumped together without distinction under the same classification.

Southwest Pacific's ATIU decided that under the circumstances the only practicable solution would be to start anew and institute a comprehensive system of its own for naming all Japanese airplanes. This was put into effect in July, 1942.

All known airplanes were given short, snappy, personal names. Fighters and observation planes were made masculine; all bombers feminine.

The system was adopted. The officer in charge of ATIU was from Tennessee, so all Jap fighters emerged at first with distinctly hillbilly code names: NATE, RUFF, JAKE, PETE, ZEKE and so on. Wherever possible, an attempt was made to tie in the code name with some feature of the type; for example, ZEKE was so named because it was the best known of the "Zero" types.

The code name method was quickly adopted by all air units in the Southwest Pacific, and it worked so well that ground and naval forces took it up, too. The confusion was gone; classification of enemy planes became simple and orderly.



No security classification was given to the code names. On the contrary, they were publicized among the Volunteer Air Observer Corps. The new titles were remembered easily and aided considerably in identification.

Evidences of new types poured in so rapidly that the supply of hillbilly names was soon exhausted. When that occurred, some of the men in the Allied Air Forces asked immediately that Jap fighters be named after them, and bombers after their wives or sweethearts. There also were requests that new Japanese planes be named after some of our outstanding airmen.

Such requests were heeded in a number of cases, although primary consideration was given to a name that could be connected in some way or other with the type itself. ATTU members explained, that the double-tailed NELL could be recalled easily as the twin-finned belle, that DINAH had a nice "inah." TONY was so named because one of the first reports regarding it was thought, mistakenly, to have described this in-line engine fighter to be of Italian make.

By the end of October, 1942, more than 65 known operational and non-operational types had been distinguished and named—as contrasted with the dozen or so known haphazardly before the code system was instituted.

During the development of the system, the China-Burma-India theatre cooperated closely and sympathetically with the Southwest Pacific in the selection of code names and with technical intelligence generally. On the whole, however, inter-theatre communications lacked uniformity in designation. There was still no official terminology.

Late in 1942, the Allied Air Forces in the Southwest Pacific, supported by the CBI theatre, requested official adoption of the code names and of the code name system by Washington and London. Washington approved late in December, 1942, and London followed sometime later.

Original code names for newly discovered types are still allotted by Allied Air Forces in SWPA, but are first coordinated with Washington, London and India. An exception is TOJO, the formidable new Jap fighter. It was first spotted in China and dubbed TOJO there. A request was made that the name be allowed to stick and all coordinating parties agreed.

By 1943, the designating technique in SWPA had passed beyond the stage of naming new types after individuals. One reason for this was the rapidity with which many of the Japanese planes became non-operational. BEN and FRANK, for example, which had been named for intelligence officers in the 5th Air Force, faded quickly out of the picture. Very few of the presently operational Japanese types were named for individuals. Names are now chosen, on the basis of the original policy, for distinctiveness and for some relationship with the plane's origin or characteristics.

One recent exception, however, is LIZ. When positive evidence was received that the Japanese were using a land-based, four-engine bomber, an intelligence officer from AAF Headquarters in Washington was visiting the Southwest Pacific. In Washington he had been a supporter of Southwest Pacific ATTU, which made him a very highly regarded officer in these parts. As a mark of respect to him, the new bomber was named LIZ after his daughter.

The present list totals about a hundred names, representing hillbillies, sweethearts, wives, daughters and airmen. Whatever their origin, the names have speeded up the combat exploitation of our knowledge of the enemy.

Under a new joint arrangement between the Army, Navy and British, the sole authority for the assignment of new Jap code names is the Technical Air Intelligence Center, Anacostia, Washington, D. C. ☆



CODE NAME	DESIGNATION AND TYPE
TONY	T 3; single-engine, single-seat fighter
TOJO	T 2, Mark 1 & 2; single-engine, single-seat fighter
NICK	T 2; twin-engine, two-seat fighter
OSCAR	T 1, Mark 1 & 2; single-engine, single-seat fighter
ZEKE	T 0, Mark 1 & 2; single-engine, single-seat fighter
HAMP	T 0; single-engine, single-seat fighter
RUFÉ	T 0; single-engine, reconnaissance, float plane
PETE	T 0; single-engine, reconnaissance, float plane
JAKE	T 0; single-engine, reconnaissance, float plane
DINAH	T 100, MARK 1 & 3; twin-engine, reconnaissance
JUDY	T 2; twin-engine, reconnaissance, night fighter
IRVING	T 2; twin-engine, reconnaissance, night fighter
VAL	T 99; single-engine, dive bomber
KATE	T 97; single-engine, torpedo bomber
BETTY	T 1; twin-engine, medium bomber, torpedo bomber, reconnaissance
HELEN	T 0; twin-engine, medium bomber
LILY	T 99; Mark 1 & 2; twin-engine, light bomber
SALLY	T 97; Mark 1, 2 & 3; twin-engine, medium bomber
NELL	T 96, Mark 2; twin-engine, medium bomber, torpedo bomber
EMILY	T 2; four-engine, patrol bomber

WORKHORSE OF THE AAF

(Continued from Page 17)

there was a flash in the radio department from a direct hit. The radioman, however, was able to keep in touch with the tower. By this time, the 47's violent maneuvers had shaken the cargo loose and tar barrels were bouncing merrily around the cabin. Another pass sent a shell fragment through the cabin. Altogether, the Jap made six passes—all unsuccessful—and finally had to give up when his fellow fighter planes began to depart. Fishburn lost no time sitting down on the nearest runway, yet he and his crew delivered the barrels that same day.

It was in the Southwest Pacific too, that a startled C-47 found itself doing a dive bombing job.

A combat plane had crashed in the jungle and medical corps men had been dropped by parachute to help the crew, all of whom were badly injured. While these men had been dropped only 300 yards from the scene of the accident, it took them more than half a day to cut through the underbrush. Arriving at the wreck, they signaled from the ground that the flyers were in such bad shape that plasma and surgical supplies were needed urgently.

The C-47 pilot returned to base, obtained the necessary items and flew back. It was plain that if the bundle were dropped by chute it might land some distance from the men and either be lost or cause delay while being retrieved. He saw a small open space where the crashed plane had cut through six-foot-high grass. Circling once, the pilot flew back toward the wreck, throttled both engines, opened the flaps and let down the landing wheels to create all possible drag, and then put his 47 into a dive from 1,000 feet. He pulled out at 20 feet and the bundle landed within arm's length of the medical corps men.

The C-47 won its European theatre ribbon the very first day of the invasion of North Africa. In the longest mass troop carrier flight ever made, 44 Skytrains flew 1,500 miles from Britain with British paratroops and, without the failure of either an engine or an airplane during the entire trip, dropped the men on an airfield 35 miles southwest of Tunis.

From that minute on, 47s were in the thick of it in Africa, Sicily and Italy, moving supplies quickly to places where the tide of battle depended on them. On one occasion in Tunisia, C-47s picked up some miniature bulldozers and steam rollers and landed them in a cow pasture right at the front. Then minutes afterward aviation engineers had gone to work on a runway, and 24 hours later bombers were operating from the new base.

It was in Africa, more than anywhere else, that the C-47 proved itself a good mudder. Frequently pilots had to take off with heavy loads from what were virtually quagmires.

There is the story of the pilot who took off in mud so deep that he had his brakes locked and didn't discover his error until he had left the ground.

An army contract pilot was dispatched with twice the normal load of cargo and on his return reported that his plane was "a bit sluggish on take-off." Still another, flying a ship loaded only with airplane tires, discovered when in the air that the plane acted badly and seemed heavy. He couldn't figure it out until, arriving at a forward base, he found that every tire had been stuffed with canned goods.

The invasions of Sicily and Italy were both carried out with big troop carrier operations. During the Sicilian campaign, one transport had the unique and unnerving experience of having to fly down the main street of a city to avoid ack-ack. The plane hit the guy wire of a telephone pole and nearly crashed. With the wire wrapped around one of the engines, the plane staggered along, however, always on the verge of stalling out, until the pilot found his drop zone and dropped his troops. He then pulled over a hill, only to smash into several high tension cables. Men at his base said the ship returned "looking like a cat that had been playing with a ball of yarn."

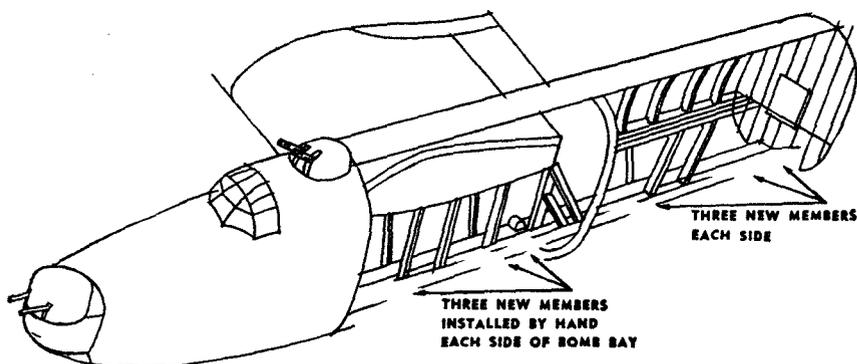
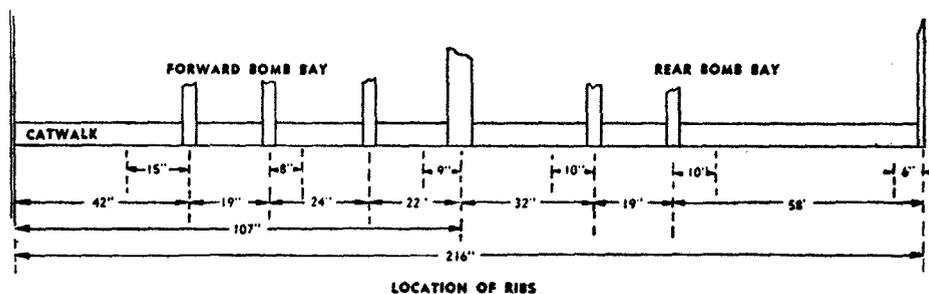
While the C-47 outfits suffered many casualties during these intense campaigns, there were times when they escaped with miraculously little damage. When, on September 13th, 14th and 15th, the 5th Army was embattled on the mainland of Italy, thousands of paratroopers were dropped from C-47s which cut across from Sicily at Messina and followed the coastline. This was accomplished without a crew or troop casualty, and a week later these same C-47s were busy putting troops down on the Salerno beaches and evacuating the wounded.

The part played by Army transport planes in the invasion of Normandy is too well known to be gone into here. The 9th Troop Carrier Command flew two entire airborne divisions to the scene of battle on D-day, and then kept them and other units supplied with food, medical supplies and countless other items. Many of these planes were those known as the "urgent 400"—the extra planes which General Arnold requested the Douglas Company to produce over their full schedule specifically for invasion needs; and which were given a top manufacturing priority above all other production models, including even heavy bombers.

Everywhere, since its induction into the AAF, the C-47 has performed with a reliability hardly to be exceeded by any other plane. It has licked every kind of weather in the world and has carried loads which even the designers would have thought impossible three years ago. Little wonder, then, that in its bulging 201 File the C-47 has a fine letter of commendation from the Truman Committee and that some people say that without the jeep and the C-47 we couldn't run this war. ☆



India. Supplies must be dropped at a precise moment. C-47 supply team watches pilot for signal, then shoves cargo out side door.

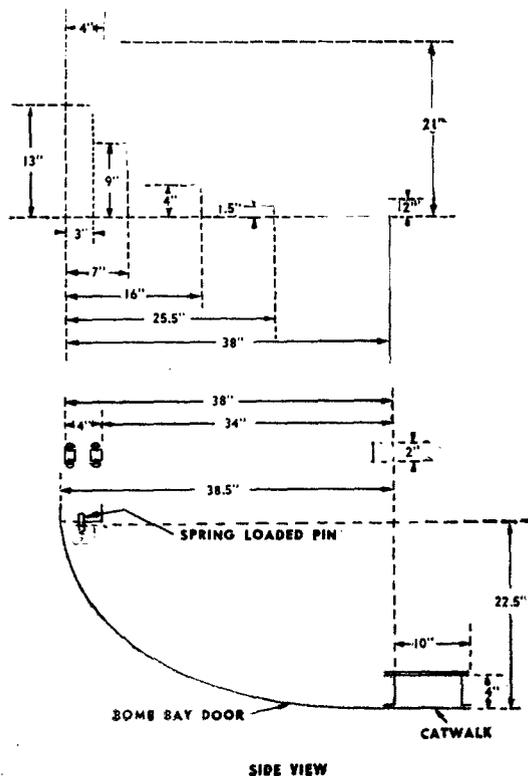


Emergency Reinforcement for Bomb Bay Doors

THE B-24 is known to be a difficult plane to land on the sea because the bomb bay doors receive a terrific slap rendered on contact with the water. Consequently, the crew may be in danger of being injured by interior breakage and the plane is apt to sink before Johnnie-come-lately can get out. To give Liberator crews a better chance of survival, a support system to double the strength of the doors has been designed under the direction of Col. Carl F. Greene, Materiel Command liaison officer with the NACA. Capt. William P. Carl, Jr., of that office developed the project.

Supports may be constructed of aluminum alloy or of white pine. The wood support is strong enough and will be easier to make—especially in the field. To build the pine supports you need twelve pieces of two-inch lumber, 39 inches long and 23 inches wide, or, if you have a two-inch plank you can cut several supports from it by making a pattern. The accompanying drawings give you all of the specifications for the support and their positions in the bomb bay. It is best to make them a quarter of an inch too long and then file them down to a tight fit when you get in the bomb bays. You need twelve supports in all—three for each side of the forward bomb bay and three for each side of the rear.

These reinforcement ribs are to be stored in the plane. When it becomes apparent that a ditching is necessary they can be fitted into place in a few minutes by any member of the crew. They rest on the curved bomb bay doors, fitting



between the catwalk and the first horizontal support along the longitudinal channel. A spring with a loaded pin built into the top of the support will help to keep it in place but is not necessary if the support fits tightly.

Although no shearing factors have been tested, static tests indicate that this support system will make a B-24 much more seaworthy. There is only one real test—an actual emergency. When we get a report of a ditching where these braces have been used, we will tell you of the results. Meanwhile, we do not advise anyone to ditch his B-24 just to see if it will float.

Plastic Adhesives and Aircraft Construction

Revolutionary changes in structural design of airplanes already are beyond the blueprint stage now that metals, plastics and wood can be "welded" together with thermosetting plastic adhesives. With a little pressure and a little heat, aircraft engineers soon may be expected to build aircraft with nothing more than "glue" as a structural assembly medium.

This new glue replaces rivets and spot welds, simplifies present production techniques, saves time and cost, eliminates internal spider-web bracing of spars, ribs, bulk-heads and stringers from airplane construction. New metal adhesives are Cycle-Weld (Chrysler and Goodyear), Metlbond (Consolidated Vultee), and others by Du Pont, Cordo Chemical, Resinous Products and B. B. Chemical Co.

Advantages of these cements include decrease of structural weight, greater strength and stiffer construction resulting from use of a continuous bond instead of spaced rivets or welds at joints, a smoother skin surface through elimination of rivets and weld overlaps, that yields advantageous low drag characteristics and higher speeds.

Increased use of plastics and wood also is made possible by the new adhesive through perfection of the sandwich type of construction. A thin sheet of metal bonded to wood or plastic provides the strength of metal while capitalizing on the rigidity of thick sections of light weight material, thereby eliminating need for solid metal or intricate stiffening mediums such as stringers, ribs, doublers and the like.

Approximately 5,500 rivets were eliminated when the new bonding method was applied to a P-40 horizontal stabilizer, and the new assembly was capable of withstanding greater loads by providing more rigidity in tests. The Z-stringers of the B-26 wing are bonded to the shear webs of the spar in production airplanes. This use of the "cement" bonding, in addition to eliminating rivets, provides a continuous bond that strengthens the joint and reduces production time on this vital structural assembly. The new bonding methods permit metal fittings to be fastened to wood on the CG-13 glider without the use of heavy bolts and bushings. The newest of our very heavy bombers have many parts glued together by adhesives. Rubber is bonded to metal on the skis of the CG-4. Secondary and non-structural parts on many planes, such as doors, fairings, escape hatches, floor sections and droppable fuel tanks, utilize the new bonding methods.

In January, 1941, the Materiel Command's engineering division first launched an investigation into the possibilities of bonding metal to metal, to wood and to plastic. Two months later, an intensive program was initiated to expedite development of structural adhesives under development. Key men in the AAF sponsorship were Brig. Gen. F. O. Carroll and Col. P. H. Kemmer, chiefs of the engineering division and the aircraft laboratory, respectively.

The leading industrial firm cooperating with the Wright Field engineers in the development of a structural plastic adhesive was the Dodge division of the Chrysler Corp.

Cycle-Weld was the first adhesive to pass all structural test requirements and was used in all of the original test assemblies.

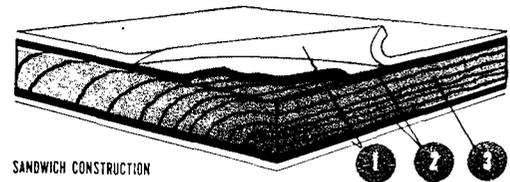
By January, 1942, eight non-structural items, bonded with the new adhesive, emerged from tests and were authorized for production models of B-26 airplanes. In June, a P-40 stabilizer representing the first primary aircraft structural part assembled by a plastic adhesive proved satisfactory in both static and dynamic test. This confirmed the fact that a plastic cement could be gainfully employed as a metal assembly medium for aircraft structures. Immediately development of redesigned structures was undertaken to determine production rate possibilities. A Cycle-Welded B-26 trim tab was approved for flight in August and several were installed on aircraft for service tests. A couple of these tabs are still logging time. To date, numerous primary structural assemblies, using an adhesive, have been approved for production—P-40 flaps, P-47 wing bay ammunition door, CG-13 and CG-16 glider fittings and others.

Approved cements have exhibited shear strength so great that the metal tears before the adhesive parts. A single riveted lap shear joint can be made only approximately sixty percent efficient. By staggering rows of rivets, efficiency of a joint can be increased to about 85 percent. However, lighter weight Cycle-Weld joints can be made 190 percent efficient—the sheet metal will fail in tension before the joint.

Cemented joints have excellent fatigue or vibration strength characteristics. There are no holes, no non-homogeneous alloys of low elongation, such as those existing in riveted or spot welded parts, from which cracks can develop.

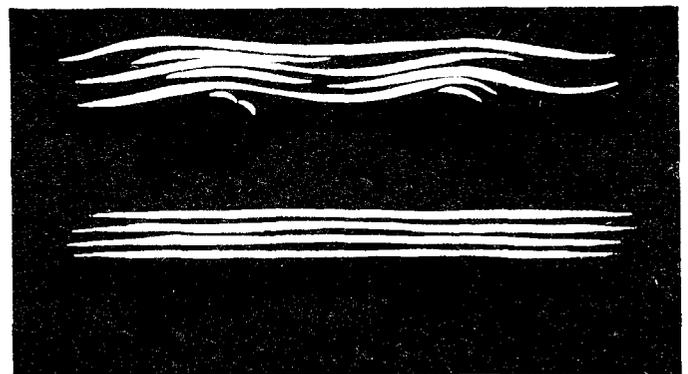
Impact strength of adhesive single lap shear joints in tests was approximately four times as great at room temperature as the impact strength of riveted joints on the basis of foot-pounds per square inch of lap area.

From comparison tests of typical cemented joints and



SANDWICH CONSTRUCTION

- 1 Metal or laminated structural plastic
- 2 Plastic adhesive
- 3 Balsa wood or light weight plastic core material



This drawing illustrates the value aerodynamically of eliminating rivet construction in aircraft by the use of plastic adhesives. Structure assembled with plastic also is stiffer, lighter and stronger.

riveted joints, results indicate that the cemented joint is more rigid and has a higher ultimate strength—approximately 200 percent—than a riveted joint.

Weight savings of about thirty percent can be realized with proper design of wood and plastics to metal joints. This is particularly important in fabricating cargo, bomber and fighter aircraft of wood and plastic.

Another advantage is that increased rigidity and better support of the skin covering tends to reduce slight variations in airfoil profile, thereby reducing drag. Surfaces bonded by adhesives are perfectly smooth.

Tests show that a single row of rivets, placed at five percent of the chord from the leading edge of a wing, produces an increase in profile drag of approximately thirteen percent of the minimum drag of the smooth airfoil at the low speed of 120 mph. Elimination of rivets is particularly important for planes with laminar flow types of airfoils.

Immersion in water for periods up to three months as well as in oil, aviation gas or Prestone for 48 hours, have no effect on the shear or tensile strength of the joints when tested immediately after removal. Aromatic fuels tend to soften the adhesive in time but do not affect the strength enough to limit its application, except for integral fuel tanks. Weathering and exposure to salt air apparently do not cause deterioration of the cement, but do corrode the metal under the bond. This corrosion can be prevented by use of paint.

With plastic adhesives a joint can be made and sealed in the same operation; this advantage is of great importance in fabrication of pressurized cabin assemblies.

Metal cementing processes now require application of heat and pressure at the joint. Nevertheless, great strides are being made to reduce the time, temperature and pressure requirements. Originally at least 500 to 1000 pounds per square inch of pressure was necessary to make a structural metal joint. Now joints of equal or greater efficiency can be fabricated at ten pounds per square inch. So far, conversion of the plastic adhesive to the infusible thermosetting state requires approximately 300 degrees F. for fifteen minutes.

The assembly of structural metal materials with glue is very new. We have proved in static and flight tests that such assemblies are dependable as structures and offer decided advantages to aircraft. At present, only a few production assemblies are utilizing metal adhesives in comparison to the number of riveted and spot-welded assemblies. However, manufacturer's requests for AAF approval to use cemented joints on future designs are increasing each day.—Capt. D. L. Grimes, Aircraft Laboratory, Materiel Command.

The Mildew Problem

Source of much trouble to the AAF in the tropical and semi-tropical regions is mildew. Because this mold or fungus is extremely destructive to equipment, particularly oxygen masks, all personnel should learn methods of combatting the nuisance.

Under a microscope, mildew is revealed as a branching network of colorless threads. To the naked eye it appears to be felted, powdery patches of one of a variety of colors—white, cream, green, brown, grey or black. Nearly everyone has seen mildew on food that has been allowed to stand unsealed for a considerable period or on substances that have been exposed to dampness.

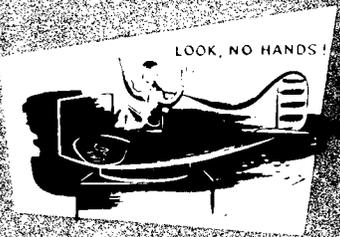
A small patch of fungus will produce millions of microscopic spores or seeds, so light that they blow away and become part of the dust in the air even at high altitudes. Not choosy about their food, the spores thrive on wood, cloth, leather, certain paints and even on finger prints.

Because mildew flourishes in warm, humid climates, where many of our bases are located, it must be fought continu-

TECH TALK

For more than a decade the AAF has been developing high altitude equipment for use on personnel equipment. The development of such devices as electric heaters for oxygen masks, automatic mask and regulator tubing, an oxygen indicator, a self-sealing oxygen cylinder with a capacity of 280 cubic inches, and a portable, liquid oxygen container for use as a supplemental source . . . Tested recently were several self-sealing, pressurized turret domes for super high altitude bombers.

The famous Link Trainer, long used for teaching blind flying, now has an automatic pilot installation. One can "fly" for hours without touching the controls, without leaving the ground . . . Builders of the automatic pilot have also developed new equipment for controlling their "mechanical brain" during an instrument landing approach. Used with other automatic devices the new equipment makes possible completely automatic landings . . .



Automatic flap controls are being tried out for airplane engine coolant systems . . . The dangers of exhaust flames and other fire hazards in aircraft operation in cold climates have led to the development of special fire extinguishers. In use are new chemicals which have better reaction against fire where temperatures are almost and below zero.

Droppable fuel tanks for wing attachment on one engine plane have been moved farther toward the wing tip to make room for externally hung bombs which, in turn, have been moved over to rocket tubes can be fitted under the fighter's wing. The problem is no longer how many fighters can lift, but when to put it all . . . Plans have been in progress to put pilots in prone positions in fighter planes. Lying down, aero-medical men say, the human body can stand more acceleration. Some new designs may incorporate prone-position cockpits.

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Dirt alone can support mildew growth. Grease and sweat from the face accumulate on oxygen masks to provide ideal food for the spores. The masks, therefore, must be cleaned frequently. Recommended is the practice of vigorously scrubbing a mask with plain water and brush. It then should be dried thoroughly, but not in the sun because the solar rays hurt rubber. Use of soap is not satisfactory, for mildew will grow on remaining soap particles.

The cloth straps on masks also are vulnerable to the fungus growth. Steps have been taken by the Aero-Medical laboratory at Wright Field to find a suitable method of mildew-proofing the webbing.

Even after they've been washed, the masks frequently retain the unpleasant odor of mildew. This condition can be corrected by swabbing the mask with a deodorant and fungicide consisting of a mixture of one gram thymol and 100 cubic centimeters of 70 percent ethyl alcohol. Every crevice must be penetrated and then the masks must again be allowed to dry.

The mixture replaces the musty, foul smell of mildew with a clean antiseptic odor, which may be rather strong immediately after application but which will cause no discomfort after exposure to air for thirty minutes. One swabbing will keep the mask fresh for at least five hours—a period long enough for most missions.

To prevent formation of mildew, the following rules should be observed:

- (1) Keep equipment in a dry place above the ground. Utilize platforms and wall hooks.
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- (3) Take full advantage of sunlight. It is your greatest ally in drying, except in the case of rubber equipment which never should be exposed to the sun.
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"Blackout," the temporary loss of perception which imperils all pilots during violent maneuvers, has been grounded for study by specialists at the Aero-Medical laboratory of the Engineering Division, AAF Materiel Command, Wright Field.

The ingenious device which enables researchers to simulate blackout on the ground is essentially a large, two-arm merry-go-round called a centrifuge. Solidly constructed of aluminum beams and steel tubing, the centrifuge has a man-carrying gondola or cab at the end of each arm.

For the experiment, the subject is always one of the vol-

unteers from a long waiting list which includes many test pilots. He sits in one of the cabs and the observer faces him from the pivot position. The other cab is counterweighted.

The centrifuge is then turned by a 250-horsepower electric motor and the test cabs, swung outward by centrifugal force, place the subject's body parallel to the plane of the circle made by the spinning centrifuge, with his head toward the center. This action duplicates precisely the zooming force of a pull-out from a dive. To simulate the reverse, or



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Fundamentally, the common blackout in flight is caused by the stoppage of blood circulation in the brain—a stoppage resulting from the centrifugal force exerted by an inside loop. The maneuver multiplies the force of gravity or "G". The weight of any body at rest is 1G. When a force several times that of normal gravity is applied, the body therefore weighs several times as much.

The inside loop adds "positive acceleration" or plus G to the normal gravity load of the body. This causes blood pressure in the brain to fall and, in the lower extremities, to rise. As a result the eyes first see "grey." Then, as load increases, total blackout occurs. The flyer does not always lose consciousness when blacking out, although he will do so if the force is high enough and lasts long enough.



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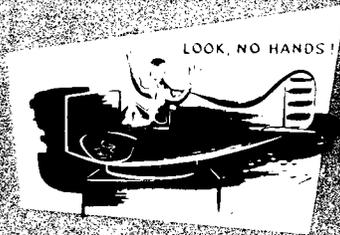
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most immediately. At higher levels of G, consciousness may be lost. When the higher force is removed, a definite interval for recovery is required—usually fifteen or more seconds.

Maximum tolerance for minus G is about three. A continued negative acceleration may lead to serious eye or brain injury. Recovery from the effects of even temporarily applied minus G force is slower and the evidence of effects may be delayed as much as several hours.

It was to study the effects of accelerated gravity that the first man-carrying centrifuge was built in Germany about 1934. The initial experiments in this country were conducted in 1936 by Col. Harry Armstrong, now an 8th Air Force flight surgeon, who used a machine less efficient than the present one.

In 1942 the present highly-efficient centrifuge at Wright Field was designed by Capt. Harry W. Jobs. Later, it was modified by Capt. William Cade. The control system was designed and built by the General Electric Company and first tests were run in March, 1943. Since that time, experiments have been continuously under the immediate direction of Capt. George L. Mason, Clarence A. Maaske and George A. Hallenbeck of the Materiel Command's Aero-Medical laboratory. Dr. E. J. Baldes of the Mayo Clinic adds considerably to the Materiel Command's centrifuge research as consultant on design and operation.

During a typical test, the centrifuge is operated automatically through the use of a pre-drawn test chart made to duplicate flight tests and simulated combat. Time necessary for arriving at a maximum test level of spinning speed, time at maximum speed and time for maximum to stop are diagrammed on the chart and it is then placed on a cylinder in the control room.

From that point the test is run by an electric eye which translates the chart diagram into control manipulation. This automatic feature of the centrifuge gives perfect mechanical control over the experiment—an advantage entirely absent at present in actual test flights, although results are often checked by actually flying a subject through similar G forces in a specially equipped A-24.

Should a subject desire to halt the experiment at any time, an instant braking arrangement is available. To prevent visual distraction, all tests are run in darkness.

A tremendous amount of physiological data valuable to all phases of medical science, has been amassed from the aggregate runs. Through special instruments such as an electrocardiograph, a brain wave recorder and a photoelectric eye for measuring blood volume in tissue and for recording pulse and respiration, much new knowledge of the human structure has been accumulated. All data is recorded electrically in the control room through an intricate system of wires from the test cab.

From centrifuge research, specialists at the Materiel Command's Aero Medical laboratory expect a gain in information which will be invaluable in indoctrinating flyers and which may lead to positive methods of overcoming G effects.

Already the technicians know that the tricks of veteran pilots—tensing muscles or yelling at the moment of pull out—have some effect on G symptoms. A tense pilot can resist blackout more easily than a relaxed one can. It also has been proved that the method of taping the body tightly and the German stunt of assuming a prone position, with feet higher than head, during dive bombing both have merit.

But first on the list of blackout preventive suggestions is the avoidance—except when necessary in combat, of course—of violent excessive flight maneuvers.

A pilot's health also is a factor. The flyer in top physical shape can stave off blackout better than the man who has let his condition slip.—*Lieut. J. F. Ryan, Materiel Command.*

technique

Tire Busters—Steel barbs for puncturing and ripping tires of enemy planes and supply vehicles have been developed by the Materiel Command and approved by the AAF Board. Two types are packed in containers which are released by bombers at an altitude of 700 feet above airfield and highways. A static line opens the container, spreading the barbs over an area of 200 yards. The "Christmas tree" type of barb has serrated, hooked projections which rip tires. The tubular type is a four-pronged article. It rests on three of the prongs and the fourth points upward at a 90 degree angle to penetrate "puncture-proof" tubes.

Gyro Attitude Indicator—The attitude of a plane throughout 360 degrees of roll and pitch is indicated by a new flight instrument, which overcomes the present gyro horizon's limitations of 70 degrees in pitch and 110 degrees in banks. This attitude gyro, adaptable to all types of aircraft, provides pilots with a visual indication of the ship's relative position to the earth at all times. They can execute loops and slow rolls with less than an hour of "under the hood" instruction. A 14-ounce electrically-operated gyroscope is the heart of the attitude indicator. A fixed reference pattern, around which the plane can be maneuvered in any attitude, is marked on a stabilized spherical surface with luminescent paint and is visible to the pilot through an opening in the front of the instrument case. The indicating sphere is divided into halves, the upper dark and the lower white. Latitude lines in contrasting colors are located on each hemisphere inscribed at ten degrees intervals and there also is a vertical reference line. By a small knob, a pilot can adjust the "target," a small circle which moves up and down to compensate for change in the trim of the airplane for level flight.

Bomb Service Truck—As a result of AAF Board recommendations and Air Service Command tests, the M-27 truck, capable of hoisting and transporting 4,000-pound bombs, will replace the M-6 which is limited to handling 2,000-pound bombs. The new vehicle is a standard 2½-ton cargo job, equipped with overhead monorail and powered hoist. During loading and unloading operations, bombs are moved to and from the truck on a dolly over narrow gauge track, provided in one curved and four straight sections.

Pneumatic Lifting Jacks—Used for raising belly-landed planes so that repairs can be made, pneumatic lifting bags are now standard equipment of most types of aircraft. The rectangular-shaped bags are collapsible and may be stowed away in nearly all planes. A small gasoline blower inflater goes with a complete set of three bags, each of which has a 12-ton lifting capacity. Only two bags are required to lift most planes. Four can raise a B-24 and eight can do the trick for a B-29. The bags are made from two-ply fabricated canvas, which is impregnated with synthetic rubber.

Life Raft Flashlight—Designed as equipment for emergency dinghies, the Type A-9 flashlight is energized by a hand-driven, alternating-current generator. A waterproof case protects the light from salt water spray and humidity.

ORGANIZATION CHART ARMY AIR FORCES

All headquarters shown are located in Washington, D. C., unless otherwise indicated.

Aug. 10, 1944.

ADVISORY COUNCIL
Col. F. M. Dean

COMMANDING
General H. H.

SECRETARY TO AIR STAFF
Col. T. A. Fitzpatrick

DEPUTY COMMANDING AND CHIEF OF /
Lt. Gen. Barney /
Col. M. A. Libby,

DEPUTY CHIEF OF AIR STAFF
Brig. Gen. Patrick W. Timberlake

DEPUTY CHIEF OF AIR STAFF
Brig. Gen. Ray L. Owens

ASSISTANT CHIEF OF AIR STAFF MATERIEL AND SERVICES Maj. Gen. O. P. Echols	ASSISTANT CHIEF OF AIR STAFF PERSONNEL Maj. Gen. J. H. Bevans	ASSISTANT CHIEF OF AIR STAFF INTELLIGENCE Brig. Gen. Thomas D. White
CONTROL OFFICE Col. C. H. Dyson	PLANS AND LIAISON Col. C. DuBosque	OPERATIONAL DEPUTY Col. J. F. Turner
AIRCRAFT RESOURCES CONTROL OFFICE Mr. T. P. Wright	MILITARY PERSONNEL DIVISION Col. E. S. Wetzel	COLLECTION DIVISION Lt. Col. J. W. McGuire, Acting
RESOURCES DIVISION Brig. Gen. F. M. Hopkins	CIVILIAN PERSONNEL DIVISION Col. G. E. Clark	ANALYSIS DIVISION Lt. Col. D. J. Schloten
MATERIEL DIVISION Col. J. F. Phillips	SPECIAL SERVICES DIVISION Col. Robert C. Jones	PHOTOGRAPHIC DIVISION Col. J. D. Kay
PROCUREMENT DIVISION Brig. Gen. A. E. Jones	AIR CHAPLAIN DIVISION Col. C. I. Carpenter	TECHNICAL AIR INTELLIGENCE (Japanese) Division Lt. Col. F. T. McCoy, Acting
MODIFICATION DIVISION Col. C. S. Irvine	AIR WAC DIVISION Lt. Col. Betty Bandel	ADMINISTRATIVE DEPUTY Col. R. H. Boberg
TRAFFIC DIVISION Col. C. F. Nielsen	GROUND SAFETY DIVISION Col. W. L. Tubbs	HISTORICAL DIVISION Lt. Col. C. W. Williams
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AIR PROVOST MARSHAL Col. H. G. Reynolds		
AIR QUARTERMASTER Col. H. R. W. Herwig		
COMMUNICATIONS EQUIPMENT OFFICER Col. G. C. Hale		

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AIR SERVICE COMMAND Patterson Field, Ohio Maj. Gen. D. H. Dunton	MATERIEL COMMAND Dayton, Ohio Brig. Gen. K. B. Wolfe				

FIFTH AIR FORCE Southwest Pacific Maj. Gen. Ennis C. Whitehead	SIXTH AIR FORCE Caribbean Area Brig. Gen. E. P. Sorensen	SEVENTH AIR FORCE Central Pacific Brig. Gen. R. W. Douglass Jr.	EIGHTH AIR FORCE Europe Lt. Gen. J. H. Doolittle	NINTH AIR FORCE Europe Maj. Gen. Hoyt Vandenberg	TENTH AIR FORCE India-Burma Maj. Gen. H. C. Davidson	TWENTIETH AIR FORCE Global Gen. H. H. Arnold
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COMBAT AIR FORCE

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SPECIAL CONSULTANT
E. L. Bowles

AAF
AFF
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MANAGEMENT
CONTROL
Brig. Gen.
B. E. Gates

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STATISTICAL CONTROL	Col. C. B. Thornton
MANPOWER	Lt. Col. A. R. Guyler
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AERONAUTICAL
CHART SERVICE
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AAF WEATHER WING
Asheville, N. C.
Col. W. O. Senter

ARMY AIRWAYS
COMMUNICATIONS
SYSTEM, AAF
Asheville, N. C.
Col. Ivan L. Farman

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AIR FORCE
North Pacific
Maj. Gen.
Davenport Johnson

TWELFTH
AIR FORCE
Europe
Maj. Gen.
John K. Cannon

THIRTEENTH
AIR FORCE
South Pacific
Maj. Gen.
St. Clair Streett

FOURTEENTH
AIR FORCE
China
Maj. Gen.
C. L. Chennault

FIFTEENTH
AIR FORCE
Europe
Maj. Gen.
Nathan F. Twining

311th
PHOTOGRAPHIC WING,
MAPPING AND CHARTING
Bolling Field, D. C.
Col. G. G. Northrup

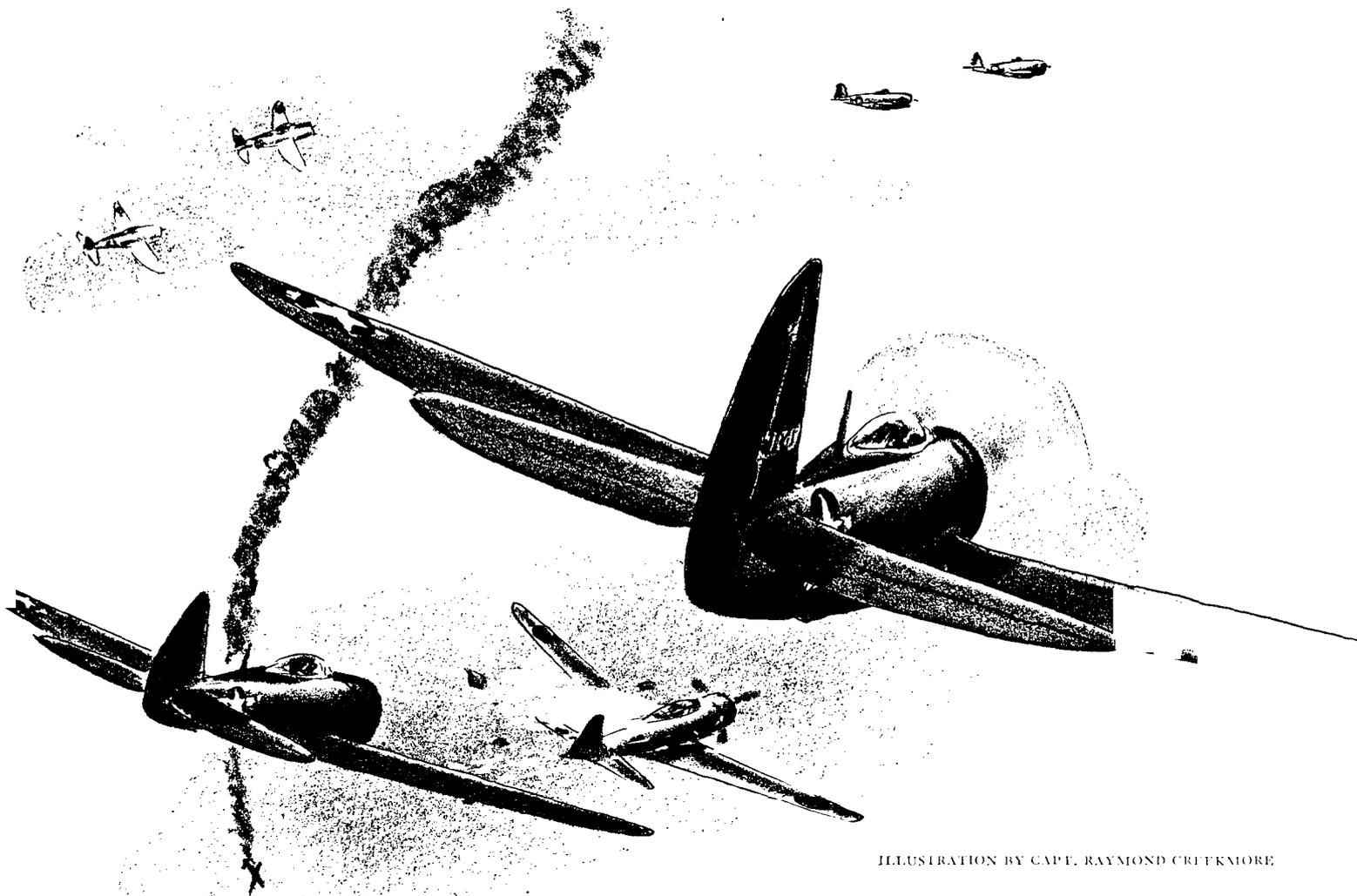


ILLUSTRATION BY CAPT. RAYMOND CRIFKAIORÉ

ONE combat veteran says of fighter tactics, "It's just like playing poker. The idea is never get below a pair."

The pair, of course, is leader and wingman. You hear a lot about the leaders, the boys who get the shots and the headlines, but too often the wingmen pass unnoticed.

Yet, the importance of flying the wing position is undisputed, and a good many combat-experienced pilots will tell you the wingman is the more important part of the fighter team.

This month AFR FORCE asked a group of veteran fighter pilots, who represent the major theatres of operation, for their comments on the job of the wingman. Here's what they had to say:

Maj. Robert Westbrook (P-38s), who had 14 enemy planes confirmed in the South Pacific, says: "With us, no one pilot goes up on a pedestal because he shoots down a bunch of Japs. We aren't supermen. When one of us hits the jackpot, it is partly luck in being in the right spot at the right time, but mainly it's the work the wingman does in protecting your tail. In one of our dogfights, my wingman picked a Jap off my tail who could have gotten me easily. Later, I was able to follow through and pick one off his tail. That's the way it's got to be."

Capt. William Packard (P-40s), who fought in the CBI theatre, adds, "Flying wing is a lot tougher than flying leader. You are entirely responsible for protecting the flight.

You have to predetermine what your leader is going to do under every circumstance and do it with him."

Maj. Walter Mahurin (P-47s), who got 21 enemy planes in the ETO, puts it this way: "The wingman should remember that he is the most important man in the squadron. I have been fortunate in always having been in a hitting position—leading a flight. But I still think that it is the wingman who counts. I couldn't shoot a thing if I were worrying about whether or not I had a wingman. Sure, I know it's a tough job to sit back and tell a man that it is clear behind him so that he can shoot the enemy. But look at it this way. Sooner or later, the man you've been following around is going to be through with his tour of duty. That will leave a vacancy. And it will be filled by the man who has been doing a perfect job flying wing. Then, he will have a chance to shoot and he probably will have profited by having followed a good shot. Then he will realize what an important job the wingman has."

Combat veterans argue that there are certain set rules to flying wing correctly, and that breaking those rules is an invitation to trouble. Obviously, the function of a wingman varies with the type of mission and often with the type of aircraft being flown but it all boils down to sticking with your leader. It's simple advice, yet men go down every day because they refuse to follow it.

"A wingman's first job," says Capt. Richard Linnell (P-38s, 39s and 40s), who piled up 144 missions in the

Here is what some of our veteran fighter pilots think of the wing position

Southwest Pacific, "is to stay in formation. You have to be able to anticipate your leader's next move, and be there when he makes it. If you learn to stick to your leader like flypaper, the rest is comparatively easy."

"Let me give you an example of that," says Capt. Joseph O'Conner, just back from the Southwest Pacific. "Four P-40s were on patrol over Wewak at 18,000 feet. They saw fifteen Zeros about 4,000 feet below them. The flight leader made a diving pass, fired and pulled up to maintain altitude—a maneuver that had previously been agreed upon. But his wingman continued to dive through, leaving the flight leader and himself completely unprotected. The element leader, seeing the mistake, continued his dive to cover the wingman, and was shot down. The element leader's wingman stayed in formation, followed and was jumped by five Zeros. He crashed into the ocean. When the flight leader found himself alone, he was forced to break off and return to base. His wingman took a terrific beating, but managed to get home and make a crash landing."

"Under ordinary circumstances, when you have altitude on the Japs, you have a good chance of getting a couple of

"In dive-bombing," he says, "a flight leader doesn't have much time to look around for enemy aircraft. He has trouble enough navigating and picking out the pin-point targets. It is up to the wingman to weave around and clear the skies for him. If anybody jumps the flight, it's the wingman's fault. He has to watch the air while the leader is looking on the ground. He is there to give his leader ease of mind and the confidence that no one will come down on his tail when he starts diving."

"On strafing missions, the work becomes a little more difficult. The wingman has to watch both the ground and the air. Again, it is the leader's prime function to pick out the target and not worry about anybody playing tag with his tail. But you also have to watch for any ground installations which may be in a position to shoot at your leader. I remember in Italy, I was going down the side of a road after some Mark

if you're a Wingman

them. This time not a single enemy plane was chalked up. Two of our men were killed and three airplanes were lost because a wingman didn't follow his orders and do his job properly."

Capt. Richard Dow (P-39s), who flew in the African campaign, offers this advice to wingmen: "Don't be afraid to ask questions. Some leaders have their own individual flying characteristics and you'll have to learn them. Find out how your leader wants things done—and do them that way. Some men will want you to fly close the minute you take off. If you don't, you'll catch hell. Others don't give a damn how you fly just after the take-off provided you get into formation properly. Ask your leader how he wants it done before you go up. Then when you come down find out if you did it right. You'll save everybody a lot of trouble that way."

"An important thing to keep in mind," says Capt. Michael Quirk (P-47s), veteran of 82 missions in the ETO, "is the trick of cutting off properly. When your leader turns, try to keep inside of his turn rather than going out wide. If he makes a ninety-degree turn, cut inside of him instead of barreling around and circling wide. You'll find that you can save a lot of gas that way—and on long fighter missions, those extra gallons will come in mighty handy."

"After awhile," adds Captain O'Conner, "it will become second nature to anticipate your leader's moves. You'll get a good briefing before the flight that will take care of all expected maneuvers. Before you go out, your leader will tell you just how he is going to break away from the target, or what he will do if attacked. Naturally, that will vary quite a lot according to the circumstances, but it isn't as difficult as it sounds. I don't know why, but a lot of guys try to make it tough for themselves."

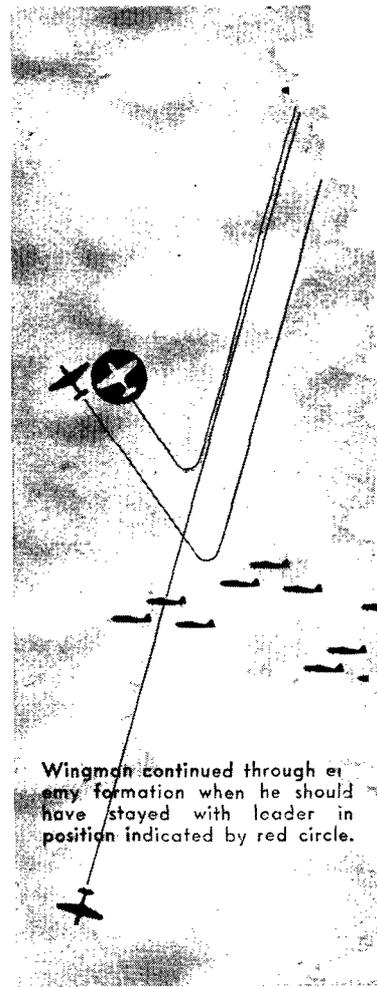
Lieut. Robert Duffield (P-40s), who flew 25 missions as a wingman before he became an element leader in Italy, describes the changes in a wingman's position on the different types of missions.

IVs. My wingman opened fire on a haystack at about one o'clock ground position and he got three 20 mm anti-aircraft guns that I never saw. I was lining up the tanks, but he was watching the ground in front of me. Good thing, too, or they would have got me, sure as hell.

"Doing escort work, your operations are simple. Just tie an imaginary rope around your leader's wing and don't let him get away from you. The enemy will try to break you up. One plane will come diving down, attempting to draw one of you away, while a couple of others sit up there waiting to jump on the unprotected planes. You just got to stay with your leader. If you get jumped, you may have to split up momentarily, but get back together right away. Otherwise, you both will be dead ducks."

A wingman's position may change slightly, depending upon the type of plane he flies. Captain Linnell says, "When you fly P-38s, you have to stay out quite a distance. Those two engines cut off a close side view. But you can't lag behind your leader, because the Lightning accelerates and decelerates very slowly. It takes too long to get up there when you have to. The idea is to be there in the first place."

"With P-40s, the best position is about three plane lengths to the right. Put your wings where your leader's tail assembly is. The Warhawk isn't the most maneuverable plane in the world and we found that you'll need plenty of room in which to move around."



Wingman continued through enemy formation when he should have stayed with leader in position indicated by red circle.

"In P-47s," adds Captain Quirk, "There isn't much rear visibility. You can't see a wingman who stays behind. Our wingmen usually flew about 100 yards to the side. There's a very easy way to judge that distance. All of our planes have letters on them about two feet high designating the different squadrons and groups. Your wingman ought to be just far enough to the side to be able to distinguish those letters."

Capt. Walter Gresham (P-51s), another veteran from the ETO says, "We have the same kind of problems as the Thunderbolts—our armor plate and gas tanks cut off the view to the rear. We are practically blind in the back so our wingmen fly line abreast. In that way, we can cover each other's tail."

Perhaps the job of a wingman can best be summed up in the words of Maj. Gen. Claire Chennault, commanding general of the 14th Air Force, who says, "In combat you are part of a team. Never forget that. Teamwork is the basis of all tactics and one of the principal reasons for our low losses. Our fighter tactics are based on the fact that two planes working together are more effective than three or four planes flying as individuals. My men have fought against odds of five and ten to one with those tactics and have won consistently with small losses. They have been proved in battle." ☆

Southwest Pacific Time-Tick Service

NAVIGATORS and others whose work in the South and Southwest Pacific requires precisely correct time-of-day can set their chronometers with confidence, for accurate time-tick service is now available in those areas through the facilities of the 5th Army Airways Communications System.

Originating at Arlington, Va., the time signal is relayed by San Francisco to Honolulu, from where it is re-broadcast by the local US Navy station. Picked up by the AACCS station in the same city, the time-tick is placed on the point-to-point circuit between there and Australia where, in turn, it is keyed to the five transmitters normally used to broadcast synoptic weather data.

Until recently, the signal could be obtained in the South and Southwest Pacific only through the Navy station re-broadcast. Because of atmospheric difficulties, however, the service was not dependable, and the problem was referred to the AACCS.

The signal disseminated by the AACCS is accurate within one-tenth of a second. This variation—negligible in its effect upon navigation computations and other mathematical reckonings—is the result of two factors. In its relay to Australia, the time-tick travels 10,000 miles at a rate of 186,312 miles per second, thus requiring about .005 of a second to complete the circuit. Add to this about .045 of a second for electrical relay lag and the error of one-tenth of a second is explainable.—Lieut. Col. R. G. Nichols, Regional Control Officer, 5th AACCS. ☆

what is your air force I.Q. ?

This month's Air Force Quiz must be approached downwind. Be as honest as you are when playing Canfield, and mark up the usual five points for each correct answer. A score above 85 is excellent; 70 to 80, good; 55 to 65, fair; below 55, you're in a tailspin.

Answers on Page 61

1. **B-29s that raided Japan on July 7 are attached to the**
 - a. 14th Air Force
 - b. 10th Air Force
 - c. 20th Air Force
 - d. 11th Air Force
2. **The .50 caliber machine gun is capable of firing how many rounds per minute?**
 - a. 400
 - b. 1,200
 - c. 800
 - d. 200
3. **The P-61 is a**
 - a. Single-engine, single-tail fighter
 - b. Twin-engine, single-tail fighter
 - c. Single-engine, twin-tail fighter
 - d. Twin-engine, twin-tail fighter
4. **Lashio is located in**
 - a. Southern India
 - b. Northern Burma
 - c. Coastal China
 - d. Eastern Thailand
5. **The gap in a spark plug is set according to**
 - a. The compression ratio of the engine
 - b. The type of magneto used
 - c. The horsepower of the engine
 - d. The volumetric efficiency of the engine
6. **The distance in statute miles from Chungking to Tokyo is approximately**
 - a. 2,000
 - b. 900
 - c. 3,500
 - d. 1,400
7. **Comairforward is the name applied to an air command in the Central Pacific.**
 - a. True
 - b. False
8. **Under the terms of the "GI Bill of Rights" you will receive how much in mustering out pay if you have served sixty days or more outside the continental limits of the United States?**
 - a. \$50
 - b. \$300
 - c. \$200
 - d. \$100
9. **When ditching a B-25, the dinghy generally is released by the**
 - a. Co-pilot
 - b. Tail gunner
 - c. Navigator
 - d. Radio operator
10. **The Japanese aircraft popularly referred to as the Nick is a**
 - a. Single-engine fighter
 - b. Twin-engine fighter
 - c. Twin-engine medium bomber
 - d. Four-engine bomber
11. **Goodfellow Field is located nearest**
 - a. Baton Rouge, La.
 - b. San Angelo, Texas
 - c. Madison, Wis.
 - d. Tacoma, Wash.
12. **The yearly base pay of a flight officer is**
 - a. \$2,100
 - b. \$1,800
 - c. \$1,500
 - d. \$2,500
13. **Halmahera is located**
 - a. Northeast of the Solomons
 - b. Between the Philippines and Indo-China
 - c. Off the northwestern tip of New Guinea
 - d. Between the Philippines and Guam
14. **What is a parademo?**
15. **You are eligible to wear an overseas stripe after how many months of service outside the continental limits of the United States?**
 - a. Nine
 - b. Three
 - c. Six
 - d. Twelve
16. **Which of these general officers is a graduate of the United States Naval Academy?**
 - a. Carl Spaatz
 - b. Ira C. Eaker
 - c. James H. Doolittle
 - d. Lewis H. Brereton
17. **Which of the following men would most likely be identified with G-5.**
 - a. A control tower operator
 - b. A mechanic
 - c. A weather observer
 - d. A clerk assigned to the Allied Military Government
18. **Membership in the Army Air Forces Aid Society is restricted to officers.**
 - a. True
 - b. False
19. **The capital of Thailand is**
 - a. Rangoon
 - b. Bangkok
 - c. Inphal
 - d. Singapore

20. **Identify aircraft below. One incorrect, both incorrect.**



ON THE ALERT!

TIMELY ADVICE FROM THE AIR INSPECTOR ★ Administration ★ Supply and Maintenance ★ Operations and Training

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

Mission of Air Inspection

Jottings from the notebook of an officer attending the revised Air Inspector's Course at AAFSAT, Orlando, Fla.:

"Inspectors must help keep the AAF on the beam—to Tokyo and Berlin. This means following through . . . well trained individuals . . . proper assignments . . . teamwork . . . equipment that gets there . . . equipment that works when it gets there.

"The AAF is made up of just ordinary Americans . . . We all make mistakes and we must all help guard against them . . . Self management within the AAF is Air Inspection.

"Everybody wants to cross the goal line standing up, but doesn't always know the rules. As inspectors, we can assist AAF personnel by helping them learn the rules as well as seeing that they are kept . . . Rules are necessary. Somebody has to check.

"We must see that the job is done—for our own commanders, for our people, and for ourselves. That is the mission of Air Inspection."

GI Shoes

The importance of all crew members being equipped with GI shoes for combat missions is stressed in inspection reports from overseas. If it becomes necessary to bail out, the GIs are more inclined to stay on than low-cuts, and, if the terrain is rough, the GIs are better for the hike to safety. They are insurance against thorns, sharp coral, insects, snakes, etc. In the case of Tailgunner Sgt. Raymond G. Givohna in the European theatre, his kickers stopped some flak, but that was "over and above the line of duty"—even for GI shoes.

CARTOONS BY PVT. SIDNEY CHAPLAN



Good Conduct Medal

Care in the awarding of the Good Conduct Medal is necessary to maintain the prestige associated with it. The medal is not an "automatic award." It may be awarded for exemplary behavior, efficiency and fidelity to each enlisted man of the Army of the United States who fulfills certain qualifications (see AR 600-6S, 4 May 1943). A recommendation for the award of the medal ordinarily will originate with the company (or similar unit) commander. In each case, due consideration should be given by commanders in awarding the medal. A charac-

ter and efficiency rating of less than "excellent," given an enlisted man or woman while on temporary duty or detached service, will not of itself bar the award (see AR 600-6S, Ch. 1, 26 May 1944), providing the ratings given the individual while on permanent assignment meet the requirements as set forth in AR 600-6S.

Oil Hose Connections

Faulty maintenance and installation of oil hose connections are major contributing factors to forced landings. Proper maintenance and installation plus frequent and thorough inspection of oil line hose connections, are "musts."

Dangerous Packages

Directives forbidding the mailing of explosives and firearms capable of being concealed on the person are contained in Sec. II, WD Cir. 243, 1943, and it is desired that the provisions of this circular be brought to the attention of all AAF personnel. (AAF Ltr 80 12, 26 May 1944, Subject: "Mailing of Prohibited Matter.")

The Driver Speaks

"Yes, sir, you can eat a meal on that engine," beamed Pfc. Daniel Hill as the inspector admired the spotless engine of a staff car driven by Hill at the Orlando (Fla.) Army Air Base.

The inspector glanced at the mileage—49,615.

"Has the motor required any major overhauls?"

"No, sir. And it doesn't use any oil. I started driving this car over a year ago when it had gone only 300 miles, and I've treated it like a baby. You see, sir, I don't want that car to quit on the road. I'm the guy who would have to get out and fix it if it did. And who knows? I might be driving General Arnold, and would I be embarrassed?"

Maintenance Inspections

Units maintaining airplanes should keep up to date the maintenance inspection forms and guides on all aircraft. Inspection entries should be made regardless of the fact that maintenance was not required, so there won't be any doubt as to whether the aircraft is in flying shape.

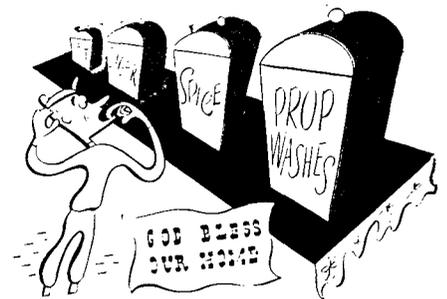
Safety First in Ammunition

In inspecting ammunition, the inspector's thought should always be, "Is it safe?" Two prime requisites must be considered when determining a safe practice: safety for personnel, safety for ammunition. The inspector should be constantly on the alert to forestall any practice which might cause injury or death to any worker, and should see that ammunition is handled, stored and shipped in such manner that no deterioration, dam-

age or distribution may result. (Sec. I, Chap. 2, TM 9-1904, Ammunition Inspection Guide, 2 March 1944)

Containers

The use of unmarked empty containers and the storage of materials in improperly marked containers has resulted in mixing fluids and chemicals which develop a corrosive action and cause failure of various systems in the airplane. More precaution should be exercised to insure that containers are properly marked as to contents and to discourage the use of empty containers whose former contents are unknown.



Warning to Maintenance Men

Sending men into the air in a plane with compliance pending on the TOs marked in red is like sending men to sea in a leaking boat. It has been directed that particular emphasis be placed on compliance with red cross and red diagonal TOs (AAF Ltr. 65-18, 29 May 1944), and that commanders impress upon engineering officers and inspectors their responsibility in raising to the maximum degree the standards of base maintenance.

Firing for New Men

When new men join units, are immediate checks made to see that they have completed the requirements for individual weapon firing? If they have not, are arrangements made for firing at the earliest practicable date?

Personal Letters

A good hint for the wife or girl friend is that gifts of stationery will be appreciated. Use of official stationery and envelopes for personal correspondence is taboo. (AAF Ltr 80 13, 26 May 1944, Subject: "Use of Official Envelopes for Personal Correspondence.")

Electrical Circuits

Incorrect wiring of electrical circuits by maintenance personnel is causing forced landings. The Technical Order on pertinent aircraft should be consulted for correct procedure when wiring electrical circuits. A ground test should be conducted to insure proper operation before flight.

TIMELY ADVICE FROM THE AIR INSPECTOR

Q. Are personnel encouraged to submit suggestions for improvements in the AAF?

A. Yes, in AAF Reg. 37-3, 20 May 1944. It is the policy of the AAF to encourage the submission of beneficial suggestions by civilians and military personnel on duty with the AAF. Recognition for suggestions by military personnel may consist of a recommendation for a Legion of Merit, consideration for promotion, or a letter of commendation placed in the individual's 201 file by the commanding officer. Cash awards will be paid to civilian employees when such suggestions are authorized or adopted.

Q. What types of war trophies may be brought back to the United States?

A. Military personnel returning to the United States from theatres of operations may be permitted to bring back small items of enemy equipment, except name plates removed from captured equipment, items which contain explosives and such other items useful in the service or needed for training purposes in the theatres of the United States, items of value as critical scrap material as determined in the theatre. No articles removed from enemy dead, except items of enemy military equipment,

can be sent or brought into the United States.

Q. Is a reduction in grade of a noncommissioned officer or private, first class, an authorized punishment by a court martial?

A. Yes. Authorized punishments for enlisted men, subject to any limitations applicable in a particular case, include reduction to the seventh grade from the sixth or any higher grade. (AR 615-5, Ch. 2, 10 May 1944)

Q. Is it still necessary for officers and enlisted men to have attached to their pay vouchers Standard Forms 1051 or 1051A (Flight Certificate and Schedule) when claiming flying pay?

A. No. Officers will execute the certificate as shown in Par. 2b (2) (b), AR 35-1360, 11 April 1944. In the case of enlisted men, certificates prepared by the responsible officer as shown in Par. 5h, AR 345-155, Ch. 10, 5 May 1944, will be entered on the pay rolls.

Q. May leaves or furloughs be obtained after arrival at a port of embarkation?

A. Only in cases of emergency. (Par. 6, WD Pamphlet 29-2, POR, 15 May 1944)

Q. Does flying pay continue for captured or interned AAF personnel?

A. Section 2, Act of 7 March 1942 (par 1c (2)), provides that any person in active service who is officially reported as missing, missing in action, interned in a neutral country, or captured by the enemy shall be entitled to receive or have credited to his account the same pay and allowances to which such person was entitled at the beginning of his absence. If any person receiving extra pay for flight duty is reported absent for one of the causes mentioned in the statute, he is entitled to receive or have credited to his account such additional pay during the period absent. (Par. 8a, AR 35-1320, 24 May 1944)

Q. Who may be awarded the glider badge?

A. Any officer, warrant officer or enlisted man who is assigned or attached as a member of a glider or airborne unit, and who fulfills the requirements outlined in Sec IV, WD Cir. 220, 1944. Individuals authorized to wear both the parachute badge and the glider badge may wear but one badge at a time. In such cases, the choice of which badge shall be worn is a matter of individual choice. ☆

READ THIS COPY • PASS IT ON • READ THIS COPY • PASS IT ON • READ THIS COPY • PASS IT ON

TECH TALK (CONTINUED FROM PAGE 29)

In their search for the best in wearing apparel for our aircrews, personal equipment experts have recently conducted tests to find a more comfortable parachute harness for our women with wings. Smaller sizing and different strap arrangement are included in some of the redesigning . . . The WASPs will also get smaller B-4 bags . . . And those AAFers who have stood in line at overseas PXs to get foreign-made South American or Australian-type cowboy boots may get their own in the future—GI. A boot of this design is under development by our clothing experts . . .

Lightning pilots who sit in front of their engines and therefore lose the benefit of engine heat have been complaining about the cold. Some have actually suffered minor cases of frost bite. An electrically heated glove and spat assembly has been adopted for P-38 pilots. The heat comes on automatically when the cabin temperature hits 40 degrees F. . . . Lightweight flak suits made of plastic cloth are being tested. They are more comfortable than the present heavy suits, but how effective they are remains to be seen . . .

Portable-by-air milk emulsifiers, known as "mechanical cows," have been under test at Wright Field. The machines are used to produce milk or cream containing natural elements, by the emulsion of powdered milk, butterfat and water. Already tried out by ATC's Alaskan Wing, the flyable milk cans may go to AAF installations wherever powdered milk is on the menu . . . Emergency portable-by-air cooking kits have been provided for aerial delivery to mobile repair units, crash camps, rescue stations and weather

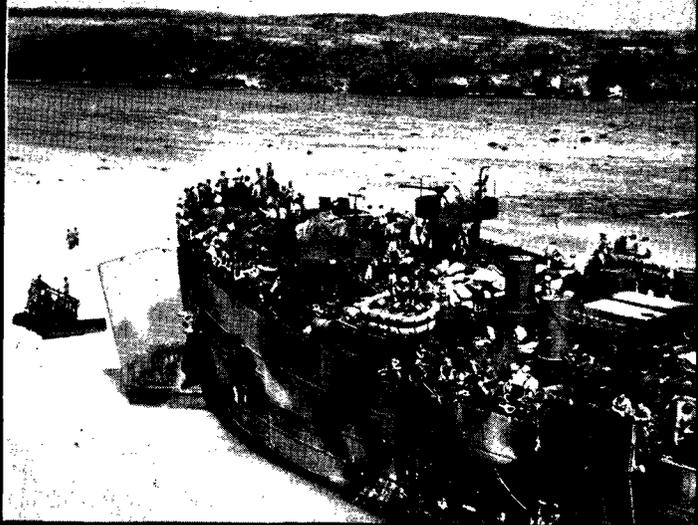
outposts. Small and compact, they include stove, fuel, oven, grill, pots and pans . . .

Extreme lack of litters for ground or air evacuation in the CBI theatre resulted in the development of a bamboo pole litter which can be made easily and quickly by the natives. It is designed to AAF specifications to fit metal litter supports stowed under the center metal floor plate in most cargo airplanes. Further modification permits installation in all types of evacuation planes . . .

A billboard manufacturer has applied his company's experience to making pasteboard, framework tow-targets which have the profiles of big German tanks. Pulled behind a jeep the targets are used for air-to-ground fire to help test new rocket gun fighters . . .

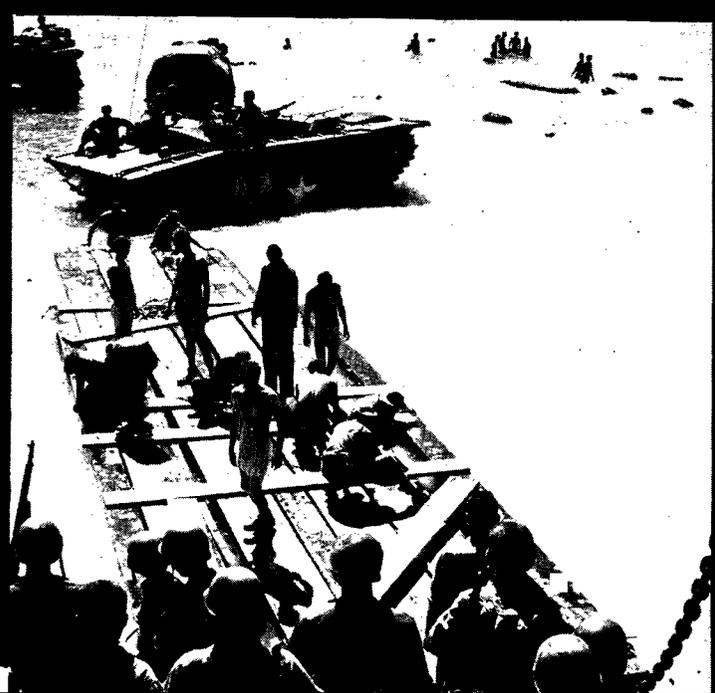
Some C-47 transports have had installed a roller conveyor system that simplifies dropping of cargo. The ships have an extra cargo door and the conveyors run to the opening on each side of the fuselage, which permits shoving cargo overboard at double previous speeds. The roller conveyor is similar to those used on ramp platforms for loading trucks . . .

Called the "Sky Hook" because it seems to hang in the sky, a new container for dropping supplies without a parachute has been under consideration. It is shaped like a large maple seed and gyrates to earth, landing without much impact . . . For cargo nets, human parachutes, life rafts and other vital accessories, the AAF already has used 139,380,230 yards of multiple-strand woven nylon cordage. ☆



SAIPAN LANDING

with 7th Air Force Engineers





On the Italian front recently a non-com on patrol inched forward, glanced once more at the aerial photograph in his hand, heaved a grenade, then charged forward to take possession of a machine-gun nest. He had neutralized it without ever having seen it. Later, highly delighted, he sat down and wrote a letter of thanks to the pilot of the photo-recon plane who took the picture that made such a surprise attack possible. The letter went up through ground force channels, received an enthusiastic indorsement from the theatre commander, and down through air force channels to the pilot himself.

Such a letter was more than deserved, but if the infantryman had known a little more about the intricacies of photo-reconnaissance he would not have failed to write another letter giving credit to one of the most important and under-publicized links in the whole chain—the photo-interpreter.

There is a tendency, even among those who should know better, to think of the PI as a rather studious individual, sitting far behind the front lines peering owlishly through stereoscopes at the pictures brought back by daredevil flyers who risk their lives in unarmed recon planes. This may be true in some cases, but not all. In the Mediterranean theatre there are some PIs as battle tested and hardened to shell fire as any Commando.

Take the case of Lieut. Charles Metcalf of Dallas who held down the uncomfortable job of interpreting aerial photographs for the ground troops on the Anzio beachhead. In the beachhead nothing could move on the roads by day without drawing enemy fire, but every morning, flying low across the water, an air courier sneaked in. On that courier were air photographs taken by pilots of a photo-reconnaissance wing only a few hours before. Preliminary interpretation of them had already been made, showing location of enemy batteries and major installations. Metcalf would check these, since no good PI really believes in any other PI's interpretation until he has confirmed it

himself, then pick up a field telephone, call the artillery observer whose set of air mosaics and maps matched his own, and give him certain coordinates. The artillery observer marked a duplicate air photograph and gave it to the pilot or observer of a Piper Cub who went aloft to spot the position and direct the subsequent fire. If the PI was right, in a matter of minutes the enemy battery might be destroyed, or at least forced to withdraw. And the PI had to be right since there was no ammunition to waste on the Anzio beachhead.

During the rest of the day Metcalf studied his pictures for the faint but unmistakable signs of changes in the enemy's minor defenses. If the pictures were good—and the PI blesses the recon-pilot who goes beyond the call of duty and risks his neck by shooting pictures from 20,000 feet or lower, instead of the standard 25,000—the information derived from them may have saved a good many lives before the next sunrise. After dark Metcalf moved forward to the sand-bagged dugouts in the front lines which are so reminiscent of World War I. There, while the shells screamed over (the American ones make a hissing noise; the German ones, as some wit remarked, sound "like God gargling") he reported his findings to regimental S-2s. They in turn passed the intelligence along, with photographs whenever possible, down to platoon or even patrol leaders. The result may well have accounted for episodes like the one described in the first paragraph.

With Metcalf when he waded in with the Anzio troops was Capt. Bernard Thomas of Fairmont, W. Va. Thomas stayed until March 24 when he was pulled out and or-

dered to England to give the benefit of his experience to the invasion armies. This tall captain, a veteran of Salerno, had a lively time in the beachhead from the start. The landing itself was unopposed, as indeed photo-intelligence had indicated it would be. But an hour or two later, when six FW-190s dove out of the sun, Thomas hurled himself into the nearest shelter, which turned out to be an ex-German latrine. He saved his life but lost all his friends temporarily—at least until he found some clean clothes.

Hard to sell at first on the value of air photographs, ground commanders who have used them in combat now scream for pictures so loudly that often it is impossible to satisfy their demands. One enthusiastic paratroop commander even put in an urgent request for pictures to show his men how certain terrain looked "at night forty minutes after the moon is down." When appalling weather grounded the regular photo-recon planes during the Volturno offensive, the whole Fifth Army, massed for the battle, waited for several days. Finally, unable to wait any longer, yet unwilling to advance without photo-recon, Maj. Gen. Lucian Truscott sent up a G-2 artillery-spotting Cub. It flew straight up the valley, snapping pictures as it went, and on the basis of those pictures the assault began.

These PIs assigned to army interpretation lose most of their air corps identity. They are attached to G-2, and for all practical purposes become ground troops, dodging bullets and living in fox-holes. They have to earn the respect of the infantrymen. They do earn that respect and Thomas reports that underneath



the doughboy's apparent hostility lurks a warm affection for the men who fly. The appearance over the beachhead of waves of bombers always gave a great boost to morale. The infantrymen used to look up and wince as the bombers ploughed through the flak, never once deviating from formation. More than once, when they saw a plane disintegrate in midair after a direct hit they were loud in praise of the airmen's courage. And one day, when a shot-up B-26 made a brilliant one-wheel landing in the beachhead, one could see the soldiers hunching their shoulders and gritting their teeth as they *willed* the pilot into a safe landing. When he made it, they jumped up on oil drums and cheered as if they'd been at a football game. So the interservice rivalry does not go very deep.

In planning an invasion, where ground reconnaissance is impossible, air photographs furnish an estimated ninety percent of the required information. And once an invasion has begun, the camera continues to prove far more reliable than maps which may be dated or inaccurate and which fail to show changes in enemy dispositions from day-to-day or hour-to-hour. One reason for the brilliant work of American artillery in the Italian campaign has been the intelligence supplied by PIs assigned to Army cooperation. As one captured German medical officer said bitterly, "where we use blood, you use ammunition."

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PACING THE ATTACK

(Continued from Page 3)

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There was considerable discussion in the American press as to the wisdom of pulling the big bombers off strategic targets, even occasionally, to give close support to ground troops. To an observer recently returned from the ETO, in fact, the agility displayed by some of the air experts at jumping to instantaneous conclusions was quite amazing. But the question was beginning to seem academic. The truth was that the Allied air forces could now dispose sufficient strength to meet all tactical requirements and maintain strategic bombing too.

This was the happy state of affairs that prevailed as the second anniversary of American participation in the European air war drew near. In August, 1942, twelve Fortresses had made the first stab at the Nazis, bombing the marshalling yards at Rouen. In August, 1944, after two years of bitter fighting and heartbreaking effort, the U. S. Air Forces and their British allies were dominating the skies and were pacing the ground assault upon crumbling Fortress Europe. ☆

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AAF WOMEN'S ACTIVITIES: FOR THE SMALL FRY



Keeping the Kids. Newest addition to the Orange Villa military housing project at Orlando, Fla., is a day nursery built by the AAF Tactical Center for children of working mothers.

Servicemen's wives engaged in defense jobs or volunteer work can now leave their youngsters in this modern fireproof Community House, secure in the knowledge they will be cared for by trained supervisors.

A variety of children's play facilities abounds in the Community House where boys and girls between two and six spend their recreation hours. Meals and rest periods are taken in two nearby housing units, each consisting of two separate three-room apartments.

Trained nurses, dieticians and kindergarten teachers under the supervision of the Orange County Board of Public Instruction are on duty from 9:30 to 1:30 daily. Fed-

eral funds provide equipment, maintenance and staff salaries, and the \$2.50 weekly charge per child covers cost of food.

AAFTAC officers' wives and enlisted wives' clubs furnish volunteer workers from their membership to assist in the nursery.

Toys for Bomb Victims. Six hundred toys made from scraps of leftover cloth by AAF wives in Asheville, N. C., have been shipped to children blinded and maimed by Axis bombings in Britain.

The idea began when Mrs. S. N. Lapsley, one of the AAF Women's Club members and who is a nationally known doll collector, saw possibilities of making use of bits of material left over from clothing renovations at war relief workrooms. Officers' wives enlisted the help of the city's Girl Reserves, wives of enlisted personnel on the post, and

children as young as six years old to assist them in the toy making project.

Reports say that British children have gone into raptures over cuddly white lambs with bells on their necks, dolls with braided hair and hand-painted faces, elephants, bean bags—produced by the youngest of the workers—and even a purple velvet zebra complete with internal music box which plays "Brahms Lullaby" when you pick him up. Toys are shipped overseas by Bundles for Britain to two hospitals for children in the UK and to other places where there is need for them.

For the Record: Hi, Pop! Women volunteers at Fort George Wright, Wash., don't miss any tricks where the AAF's junior division is concerned. Almost as soon as baby's first howl announces his debut into the AAF fraternity, women have wheeled a recording machine into the hospital's maternity ward. Junior's screeches—sounding like no other baby's cries, of course—are faithfully recorded on the "waxes" and shipped post haste to the proud father overseas.



"I'm four—but mother's working and daddy's on duty and couldn't come—" explains young Susie. Nevertheless the Hendricks Field, Fla., nursery saw that she had a party.



Couvert. Speaking of children, the Red Cross volunteers of Spokane Air Service Command have solved the ever-present problem of what to do with babies too young to feed and dress themselves while mothers roll bandages at the club. Lois Winston, one of the volunteers, acts as chief nurse, and has several nursemaids to assist her. "Cover" charge is 25 cents. ☆

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TRAINING AIDS

Weather Textbook

A new textbook has been compiled for weather instruction of aircrew trainees. Designated AAF Manual No. 6—"Weather for Aircrew Trainees," it supersedes TM 1-232—"Basic Weather for Aircrew Trainees," 22 April 1943.

Use of the new book is supplemented by lectures, daily meteorological observations, map reading, teletype operation and quizzes. The manual contains many functional illustrations and a set of questions follows most sections.

Basic weather, a knowledge of which is required of every aircrew member, is covered in the first ten sections of the book. The next three are concerned with the hazards of cloud formations and the concluding section is an introduction to climate on a global scale.

Training Films Released

Bombing, gunnery, ditching and loading techniques are the subjects of six training films released since publication of the most recent catalog:

Bombing Computers (TF 1-3333) explains the characteristics, similarities and differences of the E-6B and ABC computers, and demonstrates the proper operation of each in high-level precision bombing. Released 1-18-44. Running time—25 minutes.

Combat Bombing Procedures (TF 1-3334) details high-level precision bombing methods in terms of preliminary preparations, preflight inspections, take-off adjustments, flight adjustments and calculations and target-area action. Released 1-18-44. Running time—22 minutes.

Position Firing (TF 1-3366), also an animated-drawing strip, shows a fighter plane's curve of pursuit and the motion imparted to a bullet by forward movement of a bomber. Application of the rules of position firing is presented in diagrams. Lead requirements against all attacking planes also are graphically described. Released 3-10-44. Running time—14 minutes.

Ditching Without Hedging (TF 1-3634) explains the proper procedure for setting down land planes on water in emergencies. By use of aircraft models, animated diagrams and action shots, the film covers the subjects of sea recognition, wind velocity and proper trim, speed and approach with single-engine and multi-engine planes. Released 12-29-43. Running time—22 minutes.

Ditching: Before and After (AF-112) demonstrates the approved method of crash-

landing a C-46 on water and details the duties of a crew in such an emergency. The strip also explains how to launch and enter a Type A-3 five-man life raft, describes the location and use of the raft's special equipment and portrays proper regulation of life aboard a raft. Released 1-31-44. Running time—35 minutes.

Loading (TF 1-3348) depicts, through animated drawings, the effects of unbalanced cargo in a B-26, and demonstrates, by use of models, procedures in maintaining weight and balance control in the plane. Considered are basic weight of the plane, center of gravity, datum line, arm and moment, load adjuster slide rule, weight and balance check list and the pilot's diary. Released 1-28-44. Running time—18 minutes.

Pilotage Navigation Trainer

A device has been perfected for ground training of students in the principles of map reading and dead reckoning navigation.

Known as the Pilotage Navigation Trainer, it is used with a projection screen, in the center of which is a small silhouette of an airplane with nose pointed upward.

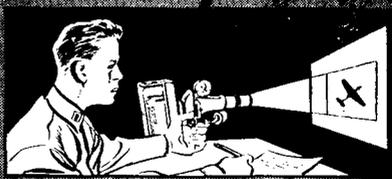
A positive plate in black and white, showing a portion of the earth's surface as viewed from an airplane, is flashed on the screen and moved to create the impression that the silhouetted plane is moving across the terrain. Indicators on the sides of the screen show the speed and heading of the plane.

Each student is supplied with a map of the area, of which the screened section is a part. By referring to the individual maps and the screen, the students are required to determine the exact geographical location of the plane. Thus valuable training in map reading is received.

Knowing the point of departure and the heading, speed and location of the plane, the students then are required to ascertain the wind speed and direction by employing principles of dead reckoning navigation.

The design for the Pilotage Navigation Trainer was originated at San Marcos, Texas, by Capt. Willard D. Tullock and John P. Paup and W/O Richard Koopman. ☆

Get the most out of film strips by following these simple rules:



Be familiar with the content of the training film before you show it to an audience. Know the subject matter covered and how the information is arranged for presentation in pictures and text.

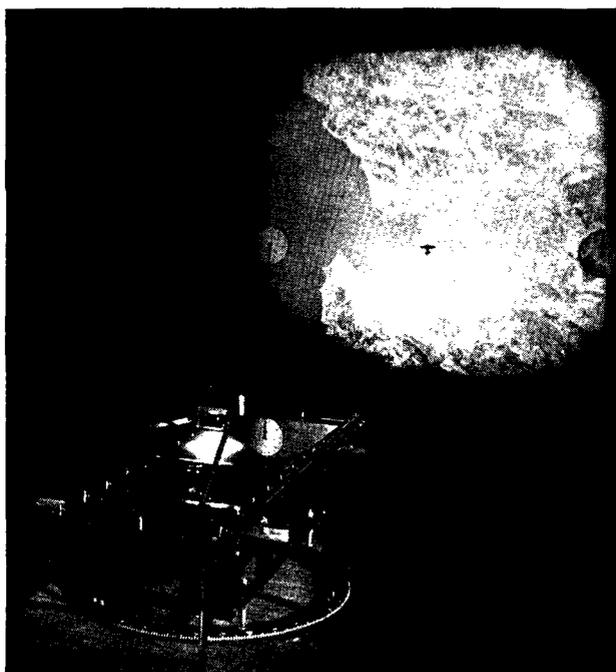


Prepare your audience for viewing the strip before screening it. Explain the purpose of the film and its relationship to the training program, and outline the salient points which must be digested.



No special lecture is required while the film is being shown. The strip is so arranged that its pictures and text unfold the information in logical order. Read the text aloud and call particular attention to all the important points.

As pilotage navigation trainer projects aerial view of terrain on screen, the silhouetted plane appears to be in flight.



WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, training devices and training publications may be obtained from the Chief, Training Aids Division, Army Air Forces, 1 Park Avenue, New York 16, N. Y., upon request through channels. AAF Regulation No. 50-19 explains fully the functions of the Training Aids Division.

B-29 (Continued from Page 5)

from the Air Staff in analysis of bombardment operations and evaluation of bomb-damage assessment.

Our men were enthusiastic in their training, eager to learn their tasks, itching to be on their way to combat. They liked their planes. They liked their organizations. Each and every one of our GIs and officers had contributed to the building of our first tactical B-29 unit. As training progressed, excitement about our combat assignment increased.

A conference was held in General Arnold's office on December 21. After outlining our progress to the General, who was to be in command of the 20th Air Force, I was started on my way when he said: "You had better get over there yourself. Think you can make it by Sunday?"

After my arrival in India, the entire staff back in Kansas was officially apprised of our theatre of operations and our mission for the first time. We would operate from rear bases in India, forward bases in China, and our targets would include the islands of Japan and some areas in Manchuria.

During the next few weeks, our maintenance squadrons and the depot group for our rear echelon bases were shipped out of the States. Supplies were 98 percent at the embarkation port by the middle of January, when a letter reached me from our A-4 advising: "You have coming to the theatre enough supplies to cover about 150 acres piled 100 feet high . . ." And this represented only our initial requirements.

Working with Maj. Gen. George E. Stratemeyer, commanding the AAF in the India-Burma sector, Maj. Gen. Howard C. Davidson, commanding the 10th Air Force, and Maj. Gen. Claire L. Chennault, commanding the 14th Air Force, we devoted our attention to constructing new air-bases in India and China, solving logistical problems, stocking up our depots and acclimating personnel.

To expedite delivery of needed supplies from India to China, a number of C-87s were assigned by ATC as cargo carriers for the B-29s. C-46s later supplemented this force. However, the supply requirements of the advance China bases were so great that, after their arrival in April, B-29s flew thousands of tons of gasoline, bombs and supplies over the "Hump" for their own use. These flights did not interfere with regular ATC commitments to the 14th Air Force because the B-29s flew directly from their India base to their China bases without landing on any of the crowded fields of the India-China wing of ATC.

In February a depot group, assigned to the B-29s for third and fourth echelon work at our rear bases, arrived in India. Maintenance squadrons docked during the following two months and prepared for the arrival of our air echelon at bases being rushed to completion by engineers and Indians.

Back at Salina, late in March, the last of our quota of planes was delivered to the crews. As rapidly as planes could be loaded with engines and spare parts, they began sifting

out of the country, each with a complete combat crew.

First plane to reach India was that of Colonel Harman, who settled the big plane down on the runway of our dry and dusty base on April 2. As others arrived on succeeding days, we again resumed our training program.

Keeping our planes in commission was a major problem. During the day they were peppered with hot, dry, dusty winds, and at night they were drenched by the humid atmosphere. Air crews joined ground crews in their constant maintenance and repair work for all were eager to put in more flying time before the big show started.

Whenever possible during the next two months, we would load up the Superfortresses with bombs and gasoline and fly non-stop to our bases in China, building up a reserve of supplies for our first missions. This flying—a distance of more than 1,000 miles at an altitude above 22,000 feet—provided crews with excellent operational flying experience in the theatre long before our first mission was scheduled.

Only once did Jap fighters attempt interception. Five of them made passes at a B-29 over the Hump but they inflicted no damage. When under fire, one of the enemy planes fell out of control and in flames into the clouds below. The B-29 was credited with a probable.

By the first of June, just one year after our B-29 unit was activated, we were ready to fly our first tactical mission. Bangkok, Thailand, the rail and shipping funnel for Jap military supplies to Burma, was selected as our target on the shakedown mission. This was the dress rehearsal, the critical mission that would give us the final information on the capabilities and limitations of our crews and planes.

Early on the morning of June 5, scores of B-29s roared down the runways, soared into the hot, humid air of a monsoon daybreak over India. Weather was bad, making formation flying virtually impossible. Navigators and pilots and flight engineers sweated out one of the toughest flights they had ever made. Over the target, they found 7/10 cloud cover. They dropped their bombs and fought off a small attacking force of nine Jap fighters between 20,000 and 25,000 feet, scoring one probable and two damaged. Flak was heavy but only one B-29 received a minor hit, in the tail.

The mission was an operational success. We were ready to launch our attacks on Japan.

On June 15, as summer twilight settled down, our B-29s lifted their wheels off the runways of our Chinese bases with bombs for Japan. Many of our crews personally were avenging the Jap attacks of December 7, but strategically we were doing even more—we were ending forever the immunity of the Jap homeland from destruction by our bombs.

Many hours later, our radio operator at the home base waved his arms and shouted, "Betty! Betty! Betty!"—the code word we all were waiting to hear.

Our B-29s were over the target. It was bombs away on Japan. ☆

Prodded along by native drivers, oxen teams haul freshly cut logs in two-wheeled wagons across a partially completed runway in India.



THE LAW CAN HELP YOU

By Brig. Gen. L. H. Hedrick

The Air Judge Advocate

The following article is the second of a series written for AIR FORCE by General Hedrick.

CHANCES are that somewhere in the great assortment of federal and state laws relating to servicemen and their dependents, there is an answer to your particular financial or legal problem, whether it be a current problem or one likely to arise after your discharge.

These statutes cover all manner of difficulties confronting or likely to confront service personnel and veterans—leases, installment purchases, court proceedings, interest, insurance, taxes, education, loans, employment, unemployment compensation and mustering-out pay.

The purpose of this article is to explain, briefly, what these statutes mean to you. Obviously, the field cannot be covered in so short a space, but we can indicate at least the extent of these efforts on behalf of service personnel, giving some details of the more important provisions.

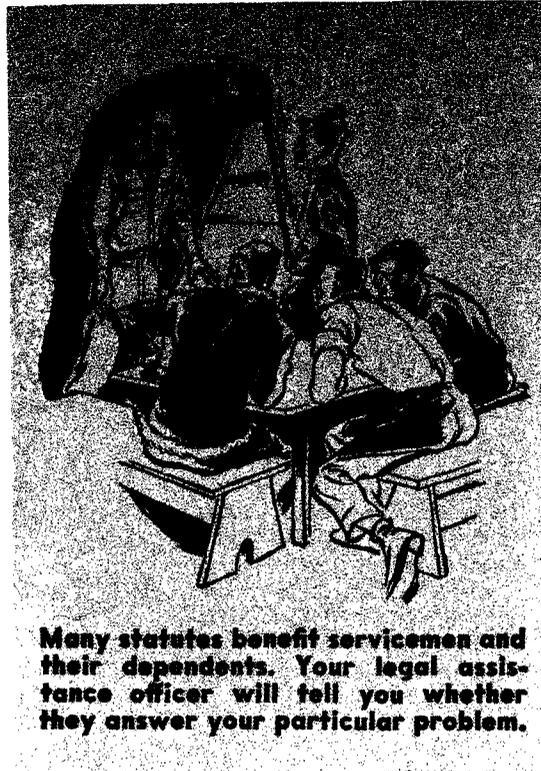
If, after reading this article, you think there might be help for you in these laws, you may get additional information by consulting the legal assistance officer at your station. He will be glad to study your case and advise you. On the other hand, if there isn't a legal assistance officer where you are stationed, you may write direct, stating your problem fully, to The Air Judge Advocate, Legal Assistance Division, Washington 25, D. C.

☆

Primarily, the Soldiers and Sailors Civil Relief Act is intended for the individual whose income has been reduced substantially by reason of his entering military service. If a soldier finds that because he is in service he no longer is able to meet obligations incurred when he was a civilian, this law is important to him. It should be understood that no obligations are actually written off. In many cases, it does permit postponement of obligations.

Court Proceedings. This legislation gives the courts, both federal and state, an unusual degree of latitude in relieving hard-pressed service men and women from the normal penalties for non-payment of debts or non-fulfilment of contractual obligations. Specifically, if a soldier is made defendant in a court action and is unable to appear in court, the court will appoint an attorney to represent him and protect his interests. If judgment is rendered against the soldier, he will have an opportunity to reopen the case and present his defense, if meritorious, within ninety days after his discharge from active service.

Courts throughout the country, both federal and state, are given the authority to postpone proceedings to which a sol-



Many statutes benefit servicemen and their dependents. Your legal assistance officer will tell you whether they answer your particular problem.

dier is a party and in which he is unable to participate by reason of being in military service. Execution of judgments, attachments and garnishments may likewise be postponed. The maximum period for such postponements is the period of military service plus three months.

Rent. If a serviceman's dependents occupy a house renting for \$50 a month or less, the landlord may not evict them without court authority. And even then, provided it is shown that military service is responsible for the tenant's inability to pay, the court may delay the eviction proceedings as long as three months. By giving written notice to the landlord, a soldier may terminate a lease he entered into prior to induction on a dwelling, business establishment or farm.

Installment Purchases. Court action is necessary before a merchant is permitted to repossess an article of personal property sold to a soldier prior to his induction, provided a deposit or installment payment has

been made. And if repossession is authorized, the court may require the seller to refund all the soldier has paid or to delay actual repossession until three months after the soldier is discharged.

Interest. A ceiling of six percent per year is placed upon the interest on obligations incurred prior to military service, provided again the soldier's ability to pay has been reduced considerably by entering the service.

Insurance. Provision is made for the government to guarantee premium payments on commercial life insurance up to \$10,000 held by a soldier prior to military service. It should be emphasized that this is only a guarantee. That is, upon application by the policy holder, the government will agree to pay the premium if the insured person is unable to pay it. If, under such an arrangement, the government pays the premiums, the policy holder will owe to the government the amount advanced for him. An application blank for this guarantee may be obtained by writing to the Veterans Administration, Washington, D. C. A separate application should be submitted for each policy.

Taxes. If a soldier, because of reduced income, finds himself unable to pay his state or federal income tax, he may postpone payment until six months after his discharge. This relief may be had upon application to the appropriate U. S. Collector of Internal Revenue or to the state tax collector.

The personal property of a soldier or his home, business or farm may not be sold to enforce collection of taxes on such property without court action, and the court has authority to stay the proceedings until six months after the delinquent taxpayer is discharged from the service.

As a further protection, it is provided that, for tax pur-

poses, a serviceman does not become a resident of a state other than his home state merely by being stationed there.

(A more detailed explanation of the tax laws as applied to military personnel will be given in a later article.—Ed.)

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A soldier is entitled to National Service Life Insurance of \$1,000 to \$10,000 without a physical examination if he applies for it within 120 days after entering the service. Thereafter, any person on active duty is eligible if his application is accompanied by evidence of good health. Monthly payments may be paid in cash or by allotment of pay. This insurance is against death only. It may be converted to ordinary life, 20-payment life or 30-payment life by application to the Veteran's Administration without medical examination after the policy has been in effect for a year. This insurance may be made payable only to a widow or widower, a child, a parent, brother or sister. The insured may change the beneficiary at any time. While policies are not issued during the war, an insurance certificate is mailed to the address designated by the applicant.

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The GI Bill of Rights, officially known as the Servicemen's Readjustment Act of 1944, is an effort to mitigate the difficulties that men and women will encounter in readjusting themselves to civil life after they are discharged. It provides for education, employment, unemployment compensation, and loans to help a returning soldier stock a farm, build a home or establish a business. Generally, the benefits of this act are limited to those who are discharged from active service under conditions other than dishonorable.

Education. A soldier whose education was interrupted when he entered the service is eligible after discharge to resume his education at the expense of the government. Refresher or retraining courses also will be available at government expense. These benefits are limited to those who have served as much as ninety days or who have been discharged earlier by reason of service-incurred physical disability. A veteran may resume his education at any time within two years after his discharge or within two years after the war ends, whichever is the later date. In some cases, veterans of this war will be entitled to four years of training at government expense. The veteran may choose his school, subject to approval by the Administrator of Veterans' Affairs.

The student will receive a government subsistence allowance of \$50 a month, \$75 if he has dependents. Up to \$500 a year, the government will bear the full amount of the tuition, plus the cost of books and supplies. The expense of board and lodging comes out of the subsistence allowance.

Extensive preparations are being made for the vocational rehabilitation of men and women who receive injuries which prevent them from returning to their normal occupations.

Guarantee of Loans. If a returning soldier obtains a loan to buy or build a home, to buy a farm or to establish a business, the government will guarantee fifty percent of the amount of it up to a maximum guarantee of \$2,000. The same provision is made for loans to pay off delinquent indebtedness, taxes or special assessments on residential property already owned by the discharged soldier or to repair or improve such property. This guarantee is limited to loans on which the interest rate is four percent a year or less.

Employment. Local U. S. employment offices will register veterans and help them get jobs. It will be the function of

a veterans' employment representative assigned to the U. S. Employment Service in each state to maintain current information on job opportunities by constant contact with employers, to encourage the employment of veterans and to assist in improving the working conditions of veterans.

Unemployment Compensation. A "readjustment allowance" will be payable to unemployed veterans who have as much as ninety days of active service or have been discharged earlier for physical disability. To be eligible, a veteran must be registered with and report regularly to a public employment office. He becomes ineligible if he gives up a suitable job or is discharged for misconduct, if he declines suitable work when it is offered to him, or if he fails to attend an available free training course.

If the veteran is totally unemployed, the allowance is \$20 a week, payable for a maximum of one year. However, if he earns wages of more than \$3 per week, the unemployment allowance is reduced by the amount of the wage.

The number of weeks for which the veteran is eligible for allowances is dependent upon his length of service. For ninety days' active service, he is entitled to 24 weeks of compensation, and for each additional month of active service he is eligible for four additional weeks of allowances. Thus, a man who served four months in the Army is qualified for 28 weeks of allowances, one who served five months is qualified for 32 weeks of allowances, and so on up to ten months of service for 52 weeks of allowances.

The readjustment allowance is payable not only to those who seek employment, but also to those who have businesses of their own which net them less than \$100 a month. If a veteran is his own employer, he must show that he devotes full time to his private business. His allowance will be \$100 a month minus his net earnings for the previous month.

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To assist the returning veteran further during the period between his discharge and the time he gets established in a civilian occupation, Congress has enacted a measure known as the Mustering-Out Payment Act of 1944. A serviceman or woman who has served sixty days or more and has been stationed outside the continental United States will receive \$300 at the time of discharge. Those who have not served overseas but have more than sixty days' active service will get \$200. Those who have served less than sixty days, overseas or not, will be paid \$100. These benefits are limited to those whose Army base pay at the time of discharge is \$2,400 a year or less. That means, generally speaking, captains and under.

☆

Many AAF officers will be entitled to bonuses of \$500 for each year of active duty. This is provided by the Aviation Cadet Act of 1936 as amended. Each claim must be decided on its own merits at the time of separation from the service. One who receives this bonus is disqualified for mustering-out pay.

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We have touched only the high points of the federal assistance laws for men and women in uniform. We have examined just enough to indicate the breadth of the subject. Add to all this the great volume of state legislation relating to military personnel and their dependents, and you have a whole new field of law.

To apply these statutes to your particular problem, you will need more detailed information. Take your problem to your legal assistance officer. ☆

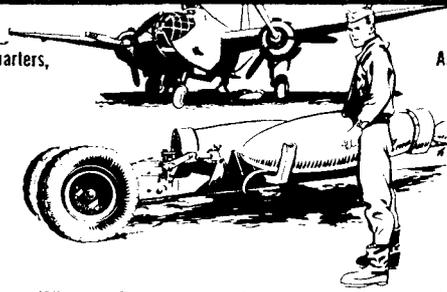


FLYING SAFETY

Suggestions from the Office of Flying Safety, Headquarters,

Army Air Forces, in the interest of accident reduction

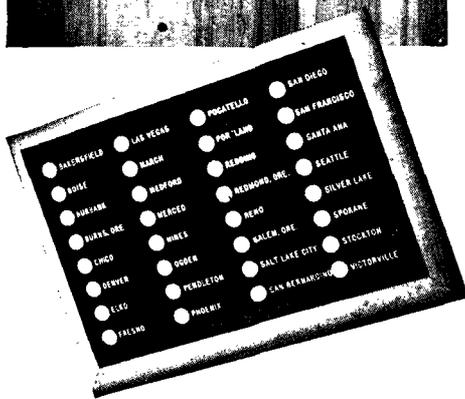
These items are of a consultative nature and are not to be construed as directives.



Flight Information Panel

Operations procedures at Mather Field, Calif., are simplified through use of a flight information panel. A pilot needs only to press a button and he is supplied with most of the essential information required for a flight.

A desk push-button panel includes the names of 52 fields most frequented by Mather pilots and transients. When the pilot presses the button representing his destination, a ground glass screen overhead flashes the numbers of regional and sectional



maps needed, magnetic course direct, mileage direct, mileage airways and the tower frequency at the intended landing field.

Weathermen control a system of switches behind the panel which indicates whether the flight must be made on instruments or contact. If the message is flashed on the screen in green the pilot knows weather is contact. A red message indicates instrument conditions.

The indicator panel is divided into 52 sections housing a red and green light. A stencil bearing the flight information is placed in front of each station. When the circuit is completed the information is projected on the ground glass in red or green, depending on how the weatherman has placed the two-position switch.

The device, developed by Mather Field's training aids laboratory, can be constructed to provide information for flights to as many fields as local operations require.

Parachute Training

Parachute landing injuries will be held to a minimum if the Training Command has anything to say about it. A new landing technique course has been launched for aircrew trainees and permanently assigned aircrews at selected stations in the command.

The course is taught during regular physical training periods. Thus aircrews receive valuable instruction without an already crowded schedule being increased and considerable interest is added to PT class.

Based on methods devised by the Materiel Command's parachute section, the Office of Flying Safety and the Infantry's Parachute School, the course includes landing techniques proved best by experience. Approximately 15 hours is devoted to the basic and refresher sections of the course.

Crash Protection

While making an emergency landing in a blazing P-47, the pilot received first and second degree burns of the face and hands. Before landing he had removed his gloves and goggles but replaced his mask to use the radio. Since the mask kept the flames from his face only the upper part was burned.

Medical safety officers point to this case as an example of protection available to pilots in burning planes. If the body is covered, the severity of burns will be lessened. Gloves, goggles, helmet and oxygen mask should be used as protective covering whether or not they are needed for their normal use.

Safer Taxiing

Careless taxiing with resultant accidents and excessive brake wear presents a major maintenance problem. To correct this, the 1st Fighter Command has prescribed a taxiing course to be completed by all P-47 pilots before their initial checkout. New pilots are taught proper methods of negotiating fast and slow turns, sudden stops

without lifting the tail and 180 degree turns without locking the inside wheel. Constant "steering" is stressed throughout the course.

Students involved in taxiing accidents are required to take a brake steering course in dual controlled planes before returning to flight duties.

Weather Indicator

Regional safety officers at the B-24 school, Chatham Field, Ga., reported a unique method for keeping operations and the control tower informed when the field is contact, on instruments or closed. Three colored lights—green for contact, amber for instruments and red for closed—are mounted in the operations office and in the tower. Weathermen control the switches for the lights which flash an immediate warning when conditions change.

Proper-Size Chocks

Forms 14 show that many minor, though expensive, accidents are caused by planes jumping chocks during engine checks and run-ups. The situation is especially bad where faulty brakes or careless operators are involved.

Regional safety officers point out that the hazard can be removed by using proper size chocks for the particular type of plane being checked. Handy small chocks may be used for light, low-powered planes, while much larger chocks are required for powerful fighters and multi-engined planes.

Performance Award

To encourage safer operations and better maintenance, the engineering section at Reno AAB, Nev., conducts a picnic and fishing outing for the hangar crew whose safety and inspection record is judged the best each month.



Judges consider the available flying time on each hangar's planes, accident prevention efforts and general appearance, using the merit and demerit system of grading.

An honor flag flies over the current prize-winning hangar.

'Your Safety Harness'

An AAF motion picture, now being released by the Training Aids Division, shows the proper use of safety shoulder harness.

A product of the combined efforts of the Office of Flying Safety, the Training Aids Division and the First Motion Picture Unit, the film explains the purpose of the harness and shows exactly how it should be used.

Procurement number for "Your Safety Harness" is TF 1-3391 and it may be obtained by requisitioning the Training Aids Division, 1 Park Avenue, New York, N. Y.



Mechs at Greenville Field, Miss., have been ordered by their commanding officer to pull chocks for a take-off only after the pilot shows he is wearing safety shoulder harness.

Strap Readjustment

Regional safety officers report they found many aircrewmembers were wearing loose parachute harnesses. Fitted last winter over bulky flying suits, the straps had not been readjusted since the men changed to summer clothing. Jumpers may suffer serious injuries from the chute's opening impact if the harness is not fitted properly.

School for Survival

The pilot school at Chico Field, Calif., is making sure its graduates will know how to use emergency equipment if they are forced to bail out over water. Every trainee receives at least four hours of instruction in techniques for survival and rescue at sea.

The base swimming pool serves as the classroom. Simulated parachute jumps are made from the diving platform with the trainee wearing a Mae West and carrying a one-man life raft.

Students are taught correct procedures for extrication from a parachute harness, inflation of a life vest and life raft, use of emergency rations, treatment of minor ailments and escaping detection by the enemy. They also learn the different rescue methods employed in the several theatres of operations.

A similar course has been conducted by the water safety department of Boca Raton Field, Fla., for many months. Operations there, however, are on a larger and more elaborate scale. ☆

P. & I. SAYS:

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

DAGGET, CALIF.—While flying CFR to Las Vegas an A-20 pilot without an instrument rating encountered instrument weather. He continued his flight into the overcast, crashed and was killed.

P & I COMMENT: Clearance regulations published by the AAF exist for the sole purpose of saving lives and airplanes. Pilots must obey them. When a pilot is cleared CFR he must fly contact. A 180 degree turn was the answer for this pilot. However, a pilot qualified to fly instruments may request a change of flight plan by radio and continue IFR when approval is granted.

STOUT FIELD, IND.—A pilot blew out both main tires in landing his P-39 when shortness of the runway necessitated his locking the brakes.

P & I COMMENT: The pilot should have used better judgment and landed at one of the more suitable fields nearby after he had observed that the only runway available at Stout Field was short and had to be approached over a high obstruction.

If fields along a flight route are unfamiliar to a pilot, he should check their landing facilities before he takes off. Such precaution is particularly essential when a high-performance plane is flown.

SAN FRANCISCO—Preparing for take-off the pilot of a P-39 noticed his landing-gear switch was in the "down" position and he flipped it toward neutral. When he started taxiing, the landing gear collapsed.

P & I COMMENT: It is clear that this accident was the result of the pilot's failure to school himself in the cockpit check practice. The switch was found to be in the "up" position, instead of neutral. Self-discipline would have resulted in correct cockpit procedure and prevented the accident.

DAYTON, OHIO—A ferry pilot flying a P-39 from Dayton to Nashville, Tenn., became hopelessly lost. Faced with a fuel shortage, he made a safe landing on a highway, refueled with automobile gasoline and took off. Ten minutes earlier, however, he had passed over a suitable airfield.

P & I COMMENT: Although the pilot displayed skill in landing and taking off from a highway, his flying-sense rating is practically zero. He elected not to land at the available airfield because the runways appeared shorter than those he was accustomed to using. His second choice, a narrow highway, was at best a very poor substitute. Furthermore, servicing a P-39 with automobile gasoline is risky business. Absence of accident in this case doesn't vindicate the pilot's judgment.

SALINE, MICH.—Vapor locks caused both engines of an A-20J to fail, necessitating a forced landing in which the pilot was injured.

P & I COMMENT: Investigators learned that the pilot had waited until the fuel in both auxiliary tanks had been exhausted and the engines had conked before he switched

to the main tanks. They also found that he did not know the correct procedure for restarting the engines. There is no excuse for running tanks completely dry before switching. What besides air can the pilot expect to be sucked into the fuel lines?

TULSA, OKLA.—During the night, high winds over the airfield caused a C-47 to swing around and crash into a nearby A-20. Both planes were damaged extensively.

P & I COMMENT: It isn't always the pilot who makes the errors. If the C-47 had been properly secured, these planes would not have been damaged. Valuable man-hours, training time and air cargo space was lost because line crewmen goofed off. Pilots can help a lot by inspecting their planes carefully before leaving them for the night.

MINDEN, NEV.—A C-46 instructor-pilot decided to land quickly because of turbulent air. With a slight tail wind behind it, the plane came in high and its wheels didn't touch the ground until more than half the runway had been overshot. The plane wound up in a ditch past the end of the runway.

P & I COMMENT: This C-46 is now Class 26 because of a series of errors. First, the pilot should have pulled up and gone around. Second, too much pressure on the brakes at high speed burned them out immediately. Third, his attempt to ground-loop was foiled because the tailwheel was still locked.

LOUISVILLE, KY.—Coming in for a landing, a C-47 bounced 40 feet in the air twice, climbed steeply to approximately 400 feet, went into a spin and then crashed in a Cub parking area. Three men were killed, one was injured, the C-47 and five Cubs were burned and two I-2s were damaged.

P & I COMMENT: The surviving engineer said that the baggage had been shifted to a correct nose-heavy condition and that he and the radio operator had moved to the rear of the plane for the landing. It was found that one elevator control was still locked when the plane crashed. Thus, when the pilot tried to go around he could not correct the tail-heavy ship. A control check and a proper line check before take-off would have revealed the presence of the lock.

TULSA, OKLA.—A pilot landing a P-51 was unable to hold the plane straight on the runway despite the use of brakes. The plane swerved off the runway, damaging the fuselage and washing out the tail gear.

P & I COMMENT: Responsibility for the accident was charged to the ground crew which had checked the oleos. One oleo had been pumped too high. Relieved of the weight of the plane after take-off, the oleo was extended to its limit by internal pressure, with the result that the plane landed with one wing far above the other. After its oleos have been pumped up, a plane should be taxied and re-inspected before take-off. This is particularly essential in checking fighters.

ROLL OF HONOR

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

MEDAL OF HONOR

Howard, James H., Lt. Col.

DISTINGUISHED SERVICE CROSS

Herriot Harold T., Lt.
Holzberg, Wilfred G., Lt.

LEGION OF MERIT

Agan, Arthur C., Col.
Andrew, Edwin A., Capt.
Arnold, William H., Lt. Col.
Auld, Harry C., W/O
Blackburn, Harry A., S/Sgt.
Ellis, Melvin R., S/Sgt.
Hallock, Jackson, Capt.
Hills, Philip K., Maj.
Kessler, Frank H., S/Sgt.
MacIntyre, Samuel E., S/Sgt.
McMillan, Harold F., T/Sgt.
Neal, Philip A., Capt.
Ogleby, James H., T/Sgt.
Pahst, John, Maj.
Piper, John A., Capt.
Smith, Charles W., M/Sgt.
Smyth, William H., Col.
Thom, Frank J., T/Sgt.
Thomas, Gordon F., Col.
Waltersfeld, Richard W., Lt. Col.

SILVER STAR

Alto, Joseph F., S/Sgt.
Aubright, Lloyd V., S/Sgt.
Armer, John L., Capt.
Aron, Leslie W., S/Sgt.
Baker, Herbert W., S/Sgt.
Bell, Robert J., T/Sgt.
Blitzer, John E., S/Sgt.
Brandberry, Earl K., S/Sgt.
Brown, Burt L., S/Sgt.
Brown, James L., S/Sgt.
Burgess, Walter D., S/Sgt.
Carr, Warren G., S/Sgt.
Cartmill, Reese D., T/Sgt.
Cervus, John M., Lt.
Cecil, Floyd M., Capt.
Corone, Aldo, Lt.
Crank, Thomas P., Lt.
Cook, Orin V., Lt.
Casper, Clyde W., Lt.
Cottam, Clifford C., Lt.
Cradock, Raymond C., Capt.
Dante, Emmett S., Lt. Col.
Dawitt, William J., Lt. Col.
Dowd, Zach, Lt.
Dr. Hixon, Robert M., Lt.
Dremsel, John S., Lt.
Ekins, Lawrence M., Lt.
Fay, Edward A., Jr., Lt.
Fisher, Carl J., T/Sgt.
Foley, Bernard L., Lt.
Foss, Robert, Lt.
Franklin, Thomas W., Lt.
Gavin, James F., Lt.
Gibson, Lem, T/Sgt.
Gilmere, William F., Maj.
Gins, G. L., Lt.
Givens, George N., Capt.
Gromblich, Richard, Lt.
Hallett, Robert H., Capt.
Hamer, Melvin L., S/Sgt.
Hargreaves, Frederic O., Capt.
Harrigan, William R., S/Sgt.
Harris, Frederick A., Capt.
Harrison, Edward F., Sgt.
Hatcher, Joseph H., T/Sgt.
Hawkes, Alfred J., T/Sgt.
Hensby, John P., Lt. Col.
Hungerford, James A., Jr., Lt.
James, Carlos E., S/Sgt.
Jewell, George G., Lt.
Johnson, Stanley W., Lt.
Jones, Emmett, T/Sgt.
Kemp, Harold J., S/Sgt.
Knox, Woody H., Jr., Lt.
Klaxinger, Harold L., Lt.
Klontz, Dwight L., Jr., Lt.
Kohlman, Lawrence E., Lt.
Liddle, Homer F., Lt.
MacDonald, Charles H., Lt. Col.
McClure, Kenneth D., Lt.
McMann, Jack D., T/Sgt.
Mackay, William C., Lt.
Maitland, Herbert I., Lt.
Manson, Gordon A., Lt.
Maurer, Edward J., Jr., Capt.
Miller, Jesse C., T/Sgt.
Miller, Robert H., Lt.
Minor, Leland E., Lt.
Moers, James W., Jr., S/Sgt.
Moore, Warren E., S/Sgt.

* Posthumous

Muelter, Wayne L., Lt.
Murphy, Raymond, T/Sgt.
Nichols, James D., S/Sgt.
Oakley, Hubert W., S/Sgt.
O'Brien, John T., Lt.
Ochsner, Sanford E., Lt.
Oeller, Howard L., S/Sgt.
Parker, Robert, Lt.
Pavitt, Elmer L., Lt.
Pearson, William T., Lt.
Pugh, Joseph G., T/Sgt.
Renar, Milan, S/Sgt.
Rensick, Henry C., S/Sgt.
Rice, Everett A., Lt.
Rosenberg, Harry A., Lt.
Roussois, Philip J., Lt.
Savage, Robert T., Lt.
Shattuck, Lonnie C., Jr., Lt.
Shorman, Earl G., Lt.
Shoop, Jay I., Jr.
Smith, Billy H., Jr., S/Sgt.
Smith, Richard E., S/Sgt.
Staines, Thomas G., T/Sgt.
Tenezza, Fred J., S/Sgt.
Tidwell, Joseph A., S/Sgt.
Teth, Stephen P., Lt.
Werner, James A., Lt.
Wilcox, Arthur E., Lt.
Wilbrecht, Erwin L., S/Sgt.

2ND OAK LEAF CLUSTER TO SILVER STAR

Bulls, Harry J., Maj.

OAK LEAF CLUSTER TO SILVER STAR

Carroll, Joseph A., S/Sgt.

DISTINGUISHED FLYING CROSS

Adams, Allen D., Capt.
Adams, Frank G., Lt.
Ahl, William M., Jr., Lt.
Ahlgren, Russell R., T/Sgt.
Alquist, Gerald R., Lt.
Ahmann, Everett L., S/Sgt.
Aiken, John, Jr., Lt.
Aker, J. C., S/Sgt.
Alber, George B., Lt.
Arnold, Milton W., Col.
Aubrey, Eudred L., S/Sgt.
Baier, Raymond W., Lt.
Barger, Thomas J., Lt.
Barnett, Earl R., T/Sgt.
Barnett, Thomas J., Sgt.
Barney, Charles H., Sgt.
(& 2 OLC)
Barnhart, Albert B., Sgt.
Barnhill, George D., Lt.
Barnum, Eugene E., Jr., Lt.
Barns, Ernest F., S/Sgt.
Barr, Edward M., Lt.
Barr, Sam L., Capt.
Barrzoughs, Edmund L., Lt.
Barrall, Robert W., Lt.
Barrut, Maxwell P., Lt.
Barrow, Leonard J., Jr., Maj.
Barr, John J., S/Sgt.
Barry, Robert H., T/Sgt.
Barry, William H., S/Sgt.
Barrow, Ronald S., Lt.
Bassham, Roy D., T/Sgt.
Baskham, Walter C., Capt.
Bassham, Blak G., Capt.
(& OLC)
Bassett, B. L., S/Sgt.
Bennett, Robert H., Lt.
Bessett, Goran C., S/Sgt.
(& OLC)
Benson, Robert F., Lt.
Benson, Frank T., Lt.
Benson, Harry L., S/Sgt.
Benson, Harry O., Lt.
Benson, Roland S., S/Sgt.
Bentley, Clark M., S/Sgt.
Berkow, Joseph J., Capt.
Berkowitz, Jack, Lt. (& OLC)
Berletto, Leland G., Lt.
Bernard, Robert J., Lt.
Bernard, Roger J., Lt.
Bernick, Robert L., T/Sgt.
Bernier, Louis P., S/Sgt.
Best, Ezra, Maj.
Biketh, Kenneth R., Lt.
Boeths, Harry J., Lt.
Borden, Edward F., Lt.
Borden, Robert E., T/Sgt.
Boren, Thomas L., Jr., Lt.
Boring, Wallace D., Capt.
(& OLC)

Borick, Edwin J., T/Sgt.
Boutwell, Thomas M., Lt.
Bourden, Louis F., S/Sgt.
Bower, William M., Lt.
Bowles, Charles W., Col.
Bowman, Chester E., Lt.
Bowman, Otto R., Lt.
Bowman, Paul, Lt.
Bowman, Vergil E., S/Sgt.
Bowler, Robert H., Lt.
Box, Paul L., Sgt.
Boyd, Alton G., Lt.
Boyd, Benjamin M., S/Sgt.
(& 2 OLC)
Boyd, Billie B., Jr., S/Sgt.
Boyd, Raymond W., S/Sgt.
Boyd, Richard G., Lt. (& 2 OLC)
Boyd, William H., Cpl.
Boyd, William H., Sgt. (& OLC)
Boydston, J. C., S/Sgt.
Boyden, Robert S., Lt.
Boyer, Arthur M., S/Sgt.
Boyer, Clarence W., S/Sgt.
Boyle, Fred E., T/Sgt.
Boynston, Robert A., T/Sgt.
Bozeman, William A., T/Sgt.
Bracey, Richard M., T/Sgt.
Brookman, Edgar W., T/Sgt.
Bradbury, Joe E., Lt. (& OLC)
Braddock, Edward I., Lt.
Braden, Morie S., Lt.
Braden, Ralph W., Sgt.
Bradford, Nathan T., Jr., Lt.
(& OLC)
Bradford, Wallace W., Sgt.
Bradley, James L., Jr., Lt.
Bradley, James M., Lt.
Bradley, James N., Lt.
Bradley, James O., Lt.
Bradley, John H., F/O
Bridges, Kenneth L., S/Sgt.
Brissan, Anthony N., Jr., Lt.
Briski, Frank J., T/Sgt.
Brinton, George A., Lt.
Briscoe, Carroll D., Lt. (& OLC)
Briscoe, Tommy A., Lt.
Brislow, Robert D., S/Sgt.
Brittain, James A., S/Sgt.
Brittain, William D., S/Sgt.
Brittainbach, Robert G., Lt.
Brittin, George F., Lt.
Britton, Hubert L., S/Sgt.
Broach, William G., Lt.
Brooks, Raymond L., Lt.
Brown, Edward W., Lt.
Brown, Ellis L., Capt.
Brown, Eugene B., Lt.
Brown, Gale A., S/Sgt.
Brown, Gerald M., S/Sgt.
Brown, Paul, T/Sgt.
Brown, Quince L., Lt.
Brown, Ralph O., Capt.
Brown, Rex M., T/Sgt.
Brown, Robert E., Lt.
Brown, Robert N., Lt.
Brown, Robert O., Lt.
Brown, Virgil E., S/Sgt.
Brown, Walter C., T/Sgt.
Brown, Willard W., Lt.
Brown, William, Lt.
Brown, William T., Lt. (& OLC)
Browning, Archie B., Lt.
Browning, George D., S/Sgt.
(& OLC)
Browning, James L., F/O
Browning, Orville T., S/Sgt.
Broyles, Clayton, S/Sgt.
Brook, Forrest D., S/Sgt.
(& 2 OLC)
Brook, Robert D., Jr., Capt.
Brook, Virgil M., Lt.
Brook, William T., Jr., Lt.
Brook, Nick R., S/Sgt.
Brook, John E., S/Sgt.
Brook, Robert L., F/O
Brook, Cyrus R., Jr., F/O
Brook, Lawrence C., Lt.
Brook, James A., Lt.
Brook, James O., Jr., S/Sgt.
Brook, James R., Lt.
Brook, Levi H., T/Sgt.
Brook, Richard, T/Sgt.
Brook, Kenneth M., S/Sgt.
Brook, Michael, F/O
Christensen, Harold R., Lt.
Cox, Tom L., Jr., Lt.
Curren, Arthur T., Lt.
Day, William C., Jr., Lt.
(& OLC)
Deaughy, Kenneth E., Lt.
Entrikin, William R., Sgt.
Epp, Ernest H., M/Sgt. (& OLC)
Erb, Theodore H., Maj.
Erdsman, Elmer E., S/Sgt.
Erdsman, Orville L., Lt.
Erhardt, John H., S/Sgt.
Erickson, Bertil C., S/Sgt.
Erickson, Clifford T., T/Sgt.
Erickson, Gordon J., T/Sgt.
Erickson, Melville A., Lt.
Erickson, Jack A., Lt.
Erner, Roland R., S/Sgt.
Erskine, Evans, Lt.
Erwin, Elmer J., Lt.

Echols, Jerry, S/Sgt.
Eckels, Charles, Lt.
Egan, Herbert L., Sgt.
Egle, Earl W., Maj.
Elias, Chandler B., Lt.
Elias, James A., Lt.
Eliot, James T., Lt.
Eliot, Joseph S., Sgt.
Eliot, Thomas Johnson, Lt.
Etheridge, James E., S/Sgt.
(& OLC)
Euwer, Walter C., Lt.
Evanoff, Alexander G., Maj.
Evans, Alfred D., Lt.
Evans, Anthony, Lt.
Evans, Charles M., S/Sgt.
Evans, Delbert T., S/Sgt.
(& OLC)
Evans, Edward H., Jr., T/Sgt.
Evans, Emmett H., T/Sgt.
Evans, Floyd A., Capt.
Evans, Francis A., Lt.
Evans, Francis D., S/Sgt.
Evans, Frank B., Lt.
Evans, Harry W., Lt.
Evans, Henry W., Lt. (& OLC)
Evans, Paul G., Sgt.
Evans, Roy W., Capt. (& OLC)
Evans, Thomas, Jr., S/Sgt.
Evans, Vincent B., Lt.
Evans, William F., Lt.
Evanston, Ernest F., F/O
Everett, Harold J., S/Sgt.
Ewert, Leroy B., Jr., Capt.
Evertshausch, Fred S., Capt.
Evonuk, Eugene, Sgt. (& OLC)
Ewadinger, Vincent J., S/Sgt.
Ewhank, John N., Jr., Maj.
Ewan, Henry T., Sgt.
Ewan, Benjamin J., Lt.
Ewin, Harlan, Sgt. (& OLC)
Ewing, George W., Jr., Lt.
Ewing, John D., Capt.
Ewing, Richard E., Lt.
Eynaud, Emilie A., M/Sgt.
Fahs, Alfred W., Lt.
Fahs, Theodore A., Jr., Lt.
Fabianno, Peter R., Sgt.
Facteau, Leo G., Lt.
Fahrenhold, William W., S/Sgt.
Fair, Albert L., Jr., Lt.
Fair, Frederick E., Maj.
Fairbairn, Desmond M., Lt.
Fairchild, Ruyus H., Lt.
Fairry, John P., S/Sgt.
(& 3 OLC)
Fairman, Gordon P., Lt.
Falkowski, Stanley E., Lt.
Fall, James L., Jr., T/Sgt.
Fall, Paul S., Lt.
Fallwell, John, Jr., Lt.
Falvo, Patry J., S/Sgt.
Fannin, Richard L., Lt.
Fanning, Grover E., Lt.
(& 3 OLC)
Fanning, Thorey L., Sgt.
Farber, Harry J., Lt.
Farber, Paul Edward
Farpe, Marvin E., T/Sgt.
Fariello, Frank N., Lt.
Faringer, Leroy, Lt.
Farish, Floyd C., Jr., Lt.
Farish, Jack F., S/Sgt.
Farish, William J., Lt.
Farley, Stanley B., Jr., F/O
Farley, Thomas J., Lt.
Farley, William E., T/Sgt.
Farmer, Joseph E., T/Sgt.
Farmer, Percy L., Jr., S/Sgt.
Farman, Victor E., Lt.
Farnell, Leland B., Capt.
Farworth, Stanley L., S/Sgt.
Farquharson, Albert B., Lt.
Farrar, James B., S/Sgt.
Farrar, John H., Lt.
Farrall, John R., S/Sgt.
Farsh, Lawrence C., Lt.
Farrell, Martin T., Lt.
Farrell, Roger J., Lt.
Farris, Charles G., Lt.
Farris, Ross W., S/Sgt.
Fasano, Joseph J., Sgt.
Fasano, Norman J., S/Sgt.
Fassman, Leroy J., Lt.
Fasut, Henry, III, S/Sgt.
Fawkes, John E., Jr., Lt.
Faulz, John E., S/Sgt.
Fee, Andrew D., Capt.
Feetman, Lloyd J., S/Sgt.
Feetman, Fred G., Lt.
Fedora, Harold J., T/Sgt.
Fedyk, Andrew F., Lt.
Feeley, Edward C., Capt.
Feeney, Francis R., Maj.
Fehr, Charles F., S/Sgt.
Fellbach, James P., Lt.
Feller, William J., Capt.
Fellie, Edward A., Jr., Lt.
(& OLC)
Feldman, David, T/Sgt.
Feldman, Harvey G., S/Sgt.
Feldman, Joseph D., Lt.
Feldman, Leon, Lt.
Feldstein, Alex A., Lt.

Felt, Albert W., Lt.
Feltan, George B., Lt.
Feltan, George B., Capt.
Feltz, Albert L., T/Sgt.
Fenwick, Frank P., Lt.
Ferebee, Thomas W., Capt.
Ferguson, Gray V., Capt.
Ferguson, Eugene R., Pvt.
Ferguson, Omar N., S/Sgt.
Ferguson, Robert M., Lt.
Ferguson, Roger W., Sgt.
Fernandez, Joseph P., Lt.
Fernstedt, Robert H., S/Sgt.
Ferry, Frank H., Sgt.
Ferre, Ralph J., Lt.
Ferro, Frank C., T/Sgt.
Forsell, Joseph C., S/Sgt.
Forris, Dana C., Lt.
Forris, William R., Lt.
Fotkiw, Paul, S/Sgt.
Fotrow, Richard V., S/Sgt.
Fotzer, William H., Cpl.
(& 2 OLC)
Foy, Ernest O., T/Sgt.
Foy, Marvin W., Lt.
Fiala, Victor E., Lt.
Fierasz, John R., T/Sgt.
Fichtner, Andrew H., Sgt.
(& 2 OLC)
Ficks, Louis P., S/Sgt.
Fickler, Lloyd J., F/O
Fidler, Neal F., T/Sgt.
Fidler, William R., Sgt.
Fields, Leon, Lt.
Fields, Lloyd F., Capt.
Fields, Virgil C., Jr., Maj.
Fienup, Victor E., Lt.
Fiero, Trinidad, Pfc.
Fihn, John A., S/Sgt. (& OLC)
Fink, George K., Lt.
Finkberg, Fred, Capt.
Fischer, Gilbert H., Lt.
Fischer, Floyd B., F/O
Fischer, Keyvan A., Sgt.
(& OLC)
Fink, Frank M., Lt.
Fink, Harold, S/Sgt.
Finkielstein, Samuel, S/Sgt.
Finley, Austin, Lt.
Finney, George R., S/Sgt.
Finney, Robert, S/Sgt.
Finsberg, William E., Sgt.
Finsberg, Charles R., Lt.
Fish, Charles E., T/Sgt.
Fishbaugh, Fred C., Cpl.
(& OLC)
Fishner, Harold C., S/Sgt.
Fisher, Albert E., S/Sgt.
Fisher, Byron W., Lt.
Fisher, Dwight A., Lt.
Fisher, George P., S/Sgt.
Fisher, James A., T/Sgt.
Fisher, Kennel S., T/Sgt.
Fisher, Layton L., Lt.
Fisher, Melville W., Lt.
Fisher, Rodney W., Lt.
Fisher, Fred D., F/O
Fisk, Jack A., Lt.
Fissell, James R., S/Sgt.
Fitch, Frank C., Lt.
Fitzgerald, Edward P., Lt.
Fitzgerald, Harold, T/Sgt.
(& OLC)
Fitzgerald, Wayne R., Lt.
Fitzgerald, William R., Lt.
Fitzgibbon, Maurice I., T/Sgt.
Fitzpatrick, Frederick J., T/Sgt.
Fitzpatrick, James D., T/Sgt.
Fitzpatrick, Robert L., Capt.
Fitzpatrick, William A., S/Sgt.
(& OLC)
Fitzwater, John L., Pfc.
(& OLC)
Flick, Louis B., Sgt.
Flick, Nelson D., Jr., Lt.
Flick, Rudolph E., Maj.
Flick, Walter Edwin, Capt.
Flioherty, Thomas A., Lt.
Flinnagan, George E., T/Sgt.
Flux, Irving V., S/Sgt.
Flood, Charles S., Lt.
Flood, Edward E., Lt.
Fleming, Thomas E., Capt.
Fleming, Thomas J., Sgt.
Fleming, William W., S/Sgt.
Fletcher, Robert Eugene, Maj.
Fletcher, David J., Lt.
Fletcher, Edward G., Capt.
Fletcher, Hugh R., Lt.
Fletcher, Lewis T., S/Sgt.
Fletcher, Moss K., Lt.
Fletcher, Ralph, T/Sgt.
(& OLC)
Fletcher, Richard E., Lt.
Fletcher, Robert L., S/Sgt.
Flick, Carl, Lt.
Fliener, Gilbert A., Sgt.
Fliat, Knute W., Lt.
Fliat, Luther E., S/Sgt.
Flockhart, John K., S/Sgt.
Flood, Edward C., Lt. (& OLC)
Flood, Emil F., Sgt.

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Fire chief, in charge of both fire fighting and rescue operations, orders firemen to open a path with fog sprays for the rescue members.

In crash fire fighting the right thing must be done in the shortest possible time; ignorance or indecision will be paid off in human life.

PRESENT methods of fighting airplane crash fires have evolved from hard and bitter experience, and the lessons learned should be known at every AAF base.

Currently working on standardizing fire fighting procedures are the Office of Flying Safety, Headquarters AAF; the Equipment Laboratory, Engineering Division, Wright Field, and the Corps of Engineers.

Key to the thinking of all these groups is "speed," for seconds count if men are to be saved from a burning plane. Improper location or use of the equipment, slow communications or ignorance of terrain around a base can cause these seconds to tick away irrevocably.

A widespread belief in the AAF is that foam—a heavy soapy, sudsy substance—is the principal agent used in crash

fire fighting. Actually, foam plays a secondary role once fire has broken out. It is used mainly as a fire prevention measure for crash-landed planes or for smothering spill fires on ground surfaces.

The two principal agencies are fog, created by water under high pressure, and CO₂ gas, discharged from low pressure refrigerated tank trucks such as the Class 150 or so-called Cardox truck. Fog is more commonly used because of the comparative scarcity of Class 150 equipment.

The fog spray is developed by Class 155 trucks and Class 125 trucks, under pressures up to 750 pounds per square inch. The Class 135 truck also develops fog. Its maximum pressure is about 450 pounds, which does not furnish the extreme range or effectiveness of the other trucks.

While water fog is not as spectacular as the powerful straight streams usually associated with fire fighting, it is infinitely more effective in subduing an airplane fire. The myriad of tiny droplets presents an immense surface for absorbing heat and the transformation into steam limits the oxygen feeding the flames. Furthermore, the velocity of the

how to fight them

spray tends to wash away a portion of the inflammable fluid (the main function of the straight stream).

Extensive experiments show that the best method of reaching a burning plane is to drive a wedge forward with two hosemen stationed about eight feet apart holding the hose nozzles near the ground.

Streams from a second truck, another Class 125 or a Class 135 truck, supplement the two primary lines. These hosemen are stationed slightly to the rear and outside to provide protection for the forward men.

Once a path has been cut and held, the hosemen work out with a sweeping motion extending the extinguished area.

The Class 155 truck is the daddy of this type equipment. It carries 1,000 gallons of water, about three times as much as the smaller fog trucks, has two turret nozzles and a separate engine for operating the pump.

The separate engine allows water pressure to be built up enroute to a crash for instantaneous operation upon arrival. Pumps on other trucks are not engaged until the vehicle has been brought to a stop, a procedure which consumes a precious eight or ten seconds.

The turret nozzles on the Class 155 truck, throwing a heavy stream of water, blast burning oil and gas from the path to the plane. Other water trucks use hand lines only.

As the turret nozzles have a discharge rate of more than 500 gallons a minute, they must be turned off as soon as possible, with fog handlines taking over cleanup operations.

Foam is employed to blanket extinguished areas and to prevent back flashes from residual fuel. It is provided by a fireman's hip pack attached to a handline, or by inducing the foam solution into the main water tank or pump suction of the crash fire trucks.

Great care must be exercised to lay foam gently to maintain a continuous surface and to prevent water streams from breaking it up. A fragmentary surface is disintegrated by fire or dissolved by water.

Experiments have been conducted with a premix solution combining fog and foam, but they haven't panned out very well. The mixture lacks some of the cooling effect of straight fog and the foam obstructs the vision of rescuers. Heaviness of the mixture also tends to reduce range.

The Class 150 truck is a very impressive piece of equipment. It barges right into a fire, belching CO₂ gas, and can discharge its load in less than a minute if all nozzles are in operation.

The direct attack and dramatic envelopment of the fire in billowing clouds of gas create the impression that the truck can subdue any fire single handed. This is not true.

When conditions are right, the Class 150 truck gives a wonderful performance. But the equipment's effectiveness is often limited by the wind velocity, the area of burning spillage and the distribution of debris.

At Wright Field recently, a single CO₂ truck extinguished a 300-gallon gasoline fire in forty seconds. The wind was twelve mph and there was a minimum of debris.

Later in the day, when the wind had risen to thirty mph, four Class 150 trucks fought 450 gallons of burning gas, spread over a wider area and mixed with a great amount of debris, for four minutes, fifteen seconds without complete extinction. Nine tons of gas were used in successive operation.

The answer is that all available equipment must be dispatched to every crash, regardless of whether the prime



Rescue knife, shown in top photo, is made with curved blade and cutting edge inside to prevent injury to men being freed from straps.

Class 150 truck, above, is shown in action against a simulated crash fire. It can release a full load of CO₂ gas in less than one minute.

Regular bunker type clothing, the traditional garb of firemen, is worn by rescuers, right. Tests prove it is cooler than asbestos suits.

Operated like an outsize can opener, this tool slices through the fuselage of an airplane to free crewmen. Shearing action reduces sparks.





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Florence, Leonard K., Sgt.
 Floro, Charles E., Capt.
 Fluery, Paul A., Capt.
 Flynn, Joseph M., Lt.
 Flynn, Louis A., Cpl.
 Flynn, Raymond P., S/Sgt.
 Flynt, Charles N., S/Sgt.
 Fogleman, Coin C., Jr., Sgt.
 Foiles, Forrest L., Lt.
 Foley, John E., S/Sgt.
 Foley, John E., Pfc.
 Follmer, William C., Lt.
 Fonorow, Milton S., Lt.
 Fontaine, Robert Y., Lt.
 Fontenrose, John R., Lt.
 Ford, Ernest C., S/Sgt.
 (& 5 OLC)
 Ford, James L., S/Pvt.
 Ford, James R., Cpl.
 Ford, John C., S/Sgt.
 Ford, John T., Capt.
 Ford, Joseph C., III, Maj.
 Ford, Le Roy R., T/Sgt.
 Ford, Ray D., S/Sgt.
 Ford, Robert W., S/Sgt.
 Ford, Robert V., Capt.
 Fordyce, John R., Lt. Col.
 Forget, Leo J., T/Sgt.
 Forkner, Handen L., Lt.
 Formicelli, Arthur, Lt.
 Fornasero, James B., Capt.
 (& OLC)
 Forrest, Harold E., T/Sgt.
 Forsberg, Matthew T., Lt.
 Forsta, Eric J., T/Sgt.
 Forster, Thomas W., S/Sgt.
 (& OLC)
 Forsyth, Allen P., Maj.
 Forsyth, Wilfred G., Lt.
 Forti, Joseph J., S/Sgt.
 Fortino, Michael J., T/Sgt.
 (& OLC)
 Fortunak, Richard C., T/Sgt.
 Foster, Duane J., S/Sgt.
 Foster, Frank J., Sgt.
 Foster, Gene L., Sgt.
 Foster, George M., Capt.
 Foster, Irwin, Lt.
 Foster, John G., Capt.
 (& OLC)
 Foster, Justus D., Lt.
 Foster, Leo J., Jr., Maj.
 Foster, Leonard R., Lt.
 Foster, James B., Capt.
 Fountain, Willard A., Capt.
 Fournier, Francis J., Cpl.
 Fouts, John E., Jr., Capt.
 Foutz, Merrill Y., F/O
 Fowler, Harold K., S/Sgt.
 Fowler, Thomas R., Lt.
 Fowler, William H., Lt.
 Fox, Robert, Sgt.
 Fox, Thomas H., T/Sgt.
 Foyle, Darrell H., S/Sgt.
 Fraja, George G., S/Sgt.
 Fraleigh, Darryl C., Lt.
 France, Victor H., Lt.
 Francine, Jacques L., Maj.
 Francis, Everett R., Capt.
 Francis, John W., Lt.
 Francis, Joseph S., S/Sgt.
 Francis, Robert W., Lt.
 Francis, Russell A., Lt.
 (& OLC)
 Franck, Lewis S., Lt.
 Franco, Victor H., Lt.
 Frank, Donald H., Capt.
 Frank, Irving H., Lt.
 Frank, Robert A., Lt.
 Franke, Arthur C., Lt.
 Franklin, Reidas G., Sgt.
 Frantz, Clement, S/Sgt.
 Frantz, Robert H., S/Sgt.
 Franz, Hugo R., Jr., Lt.
 Franz, Jacob H., Jr., Lt. (& OLC)
 Franz, William J., T/Sgt.
 Fravega, Thomas P., Lt.
 Fraychak, Michael, S/Sgt.
 (& OLC)
 Frazee, John F., S/Sgt.
 Frazier, James L., Jr., S/Sgt.
 Frederick, Gayle R., Cpl.
 Fredericks, Paul H., Maj.
 Frederickson, John C., Lt.
 Freeman, James E., Capt.
 Freeman, Harrison J., Lt.
 (& OLC)
 Freemeyers, Russell L., Lt.
 Freese, Howard W., Capt.
 Fregeau, Emile W., Cpl.
 French, Francis, Lt.
 Freville, Joseph W., Pvt.
 Freyer, George F., Lt.
 Fricks, Robert O., Capt.
 Friedman, Edward T., S/Sgt.
 Friedman, Frank, Lt.
 Friend, Leo E., S/Sgt.
 Friermood, Max J., Lt.
 Fries, Robert A., Sgt.
 Friess, John, T/Sgt.
 Frisby, Robert J., Lt.
 Frischolz, Joseph V., Lt.
 Fritz, John E., T/Sgt. (& OLC)
 Fritzholtz, John T., T/Sgt.
 Froehling, Stuart C., Lt.
 Froning, Alfred C., Lt.
 Frost, Charles E., S/Sgt.
 Frost, Otha H., T/Sgt.
 Frost, Verli, S/Sgt.
 Fruda, Ronald J., Lt.
 Fry, Charles E., H., S/Sgt.
 Fry, Edward W., T/Sgt.
 Fry, George, S/Sgt.
 Fryer, Lyle Vermont, Lt.
 Fryer, Robert R., Capt.
 Frymoyer, Carl E., S/Sgt.
 Fuchs, Ray G., Lt.
 Fuchsmann, Harold L., Lt.
 Fuhr, Albert B., T/Sgt.
 Fulanovich, Charles J., S/Sgt.
 Fuller, Felix T., Lt.
 Fuller, Robert H., Lt.
 Fuller, Robert J., Lt.
 Fullin, Angelo, T/Sgt.
 Fultz, Lalous M., S/Sgt.
 (& OLC)
 Funk, Clarence W., S/Sgt.
 Furbush, Richard D., Lt.
 Furness, Warren E., S/Sgt.

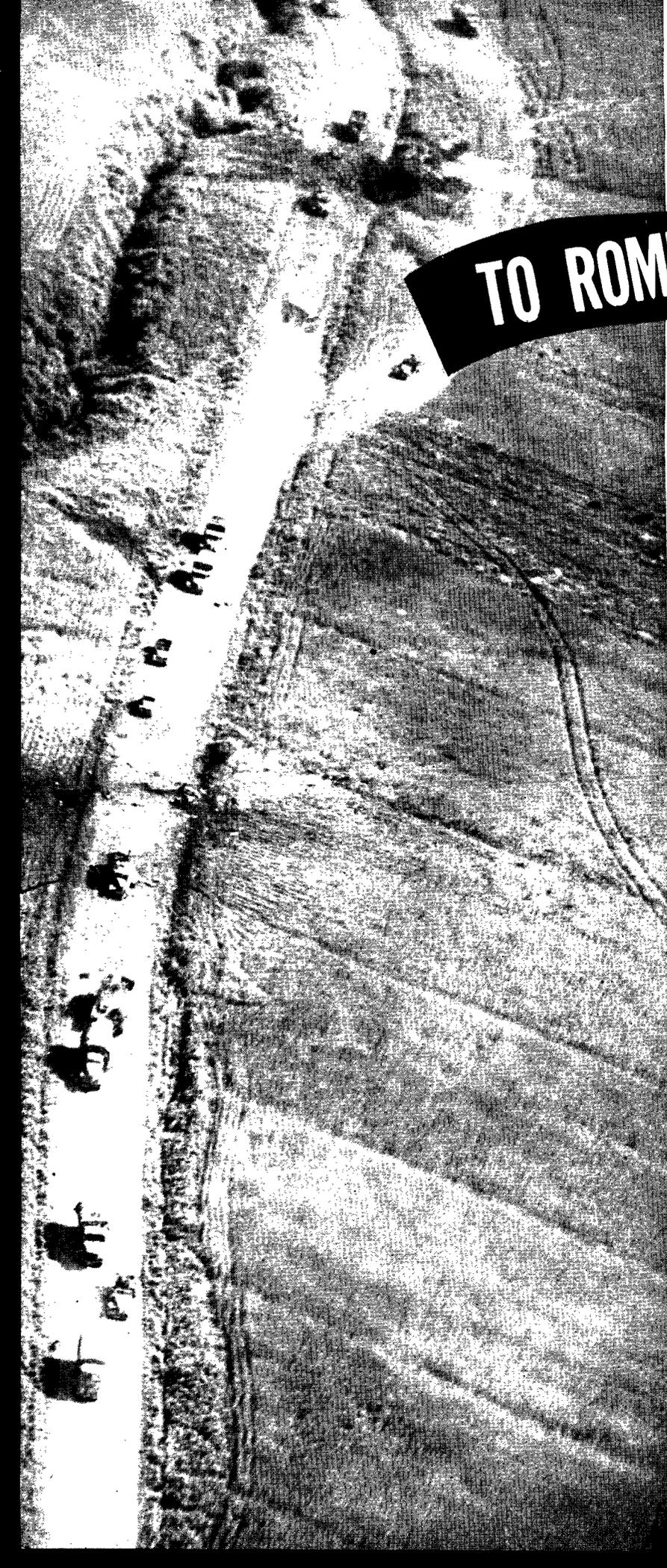
Furniss, Henry L., T/Sgt.
 Furr, Grover C., Jr., Capt.
 Futterer, Arnold T., Sgt.
 Fuzeard, Dan W., S/Sgt.
 Gabble, Chester L., Sgt.
 Gable, Daniel E., S/Sgt.
 Gabler, Gustav W., Sgt.
 Gabreski, Francis S., Maj.
 (& OLC)
 Gabriel, George J., S/Sgt.
 Gaede, David L., Capt.
 (& 2 OLC)
 Gage, Carl C., Lt.
 Gage, Nelson W., Jr., Cpl.
 Gailey, Robert K., S/Sgt.
 Gain, Edward J., S/Sgt.
 Galanti, Ralph J., Cpl.
 Galindo, Michael A., S/Sgt.
 Galindo, Paul, T/Sgt.
 Gallagher, Edward M., S/Sgt.
 Gallagher, Elmer G., T/Sgt.
 Gallagher, John, T/Sgt.
 Gallagher, Raymond K., Maj.
 Galley, Jack, Lt.
 Galmeier, Charles F., Lt.
 Galloway, G. W., S/Sgt.
 Galloway, Paul A., T/Sgt.
 Galloway, Rolland A., S/Sgt.
 Gallup, Charles S., Capt.
 (& OLC)
 Gamble, Jim L., S/Sgt.
 Gamble, Robert H., Jr., Lt.
 (& OLC)
 Gamble, Robert V., S/Sgt.
 Gammans, George W., Lt.
 Gandin, David, Lt.
 Ganwper, Roland D., S/Sgt.
 Gant, George T., S/Sgt.
 Gant, James H., S/Sgt.
 Garcia, Henry, S/Sgt.
 Garcia, Jose A., Lt.
 Garcia, William V., Sgt.
 Gardner, Charles H., S/Sgt.
 Gardner, Henry J., S/Sgt.
 Gardner, Howard D., Lt.
 Gardner, Marvin G., Lt.
 Gardner, Robert E., Lt.
 Gardner, Robert W., Lt.
 Garey, Wayne, Cpl.
 Garman, Dexter N., Jr., Lt.
 Garman, Ralph S., Col.
 Garofalo, James P., S/Sgt.
 Garofalo, Leonard S., S/Sgt.
 (& 2 OLC)
 Garrard, Robert L., Lt.
 Garrett, Edward M., Capt.
 Garrett, Frank O., S/Sgt.
 Garrett, Leslie F., Lt.
 Garsis, James J., S/Sgt.
 Garrison, Donald B., S/Sgt.
 Garrison, Nelson M., S/Sgt.
 Garrow, Richard D., S/Sgt.
 Gartman, Wilmer F., Lt.
 Garvey, John L., Lt.
 Garvin, Norman C., Lt.
 Gary, Frank T., Capt.
 Gashi, Frank T., Maj.
 Gaskell, Robert C., Lt.
 Gasser, Walter, S/Sgt.
 Gaston, Allen B., Lt.
 Gatehell, Donald E., S/Sgt.
 Gately, Richard J., Capt.
 Gates, Frank A., T/Sgt.
 Gates, James F., T/Sgt.
 (& OLC)
 Gault, James A., III, Capt.
 Gault, James R., Jr., T/Sgt.
 Gaunt, Frank L., Capt.
 Gaunt, Ivan, Sgt.
 Gauntz, Paul E., S/Sgt.
 Gavin, Edward F., Lt.
 Gavlak, Emil S., Lt.
 Gay, Jasper D., T/Sgt.
 Gaylor, Don G., Lt. (& 3 OLC)
 Gaylord, Donald A., Lt.
 Gearhart, Fred Z., Lt.
 Geary, John R., Pfc. (& OLC)
 Geenan, Franc C., Lt.
 Geddes, John K., Lt.
 Gehay, John C., T/Sgt.
 Geier, Leonard R., Capt.
 Geiner, Jerome H., Lt.
 Geisler, Paul H., T/Sgt.
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 Gentry, Herbert H., S/Sgt.
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 Gianatsis, James A., Capt.
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 Gibbey, Gola G., S/Sgt.
 Gibbons, Jay W., T/Sgt.
 Gibbs, Harry E., T/Sgt.
 Gibbs, Jerald A., S/Sgt.
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 Gibson, Bruce A., Jr., Capt.
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 Gibson, George M., S/Sgt.
 Gibson, Homer L., Lt.
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 Griffin, Morgan A., Maj.
 Gifford, Earnest E., S/Sgt.

Giguere, Varis, S/Sgt.
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 Giusti, Elton J., Capt.
 Givens, Richard E., Lt.
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 Glass, Orville L., T/Sgt.
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 Glover, Douglas C., T/Sgt.
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 Glynn, William A., Jr., S/Sgt.
 Goad, Harold W., Lt.
 Godley, Lawrence E., Lt.
 Godwin, Harold E., S/Sgt.
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 Goede, Milton N., Lt.
 Goerke, Delton C., Lt.
 Goff, James P., S/Sgt.
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 Goldberg, Martin A., S/Sgt.
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 Goldcamp, Robert J., Lt.
 Golden, Walker E., S/Sgt.
 Goldstein, Fred H., Sgt.
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 Goldstein, Norman S., T/Sgt.
 Gomeringer, Russell K., Cpl.
 Gondelman, Abe, Sgt.
 Gonsky, Philip, S/Sgt.
 Gonsalves, John D., S/Sgt.
 Gonyo, William J., S/Sgt.
 Gonzales, Horace G., S/Sgt.
 Gonzales, Roberto, S/Sgt.
 Good, Donald E., Capt.
 Good, James K., T/Sgt.
 Goodrich, Don M., Capt.
 Goodman, John T., Cpl.
 Goodness, Burnell F., S/Sgt.
 Goodrich, George B., Jr., Sgt.
 Goodrich, Herbert T., Lt.
 Goodrich, Judson J., Lt.
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 Goodwin, Oscar, Sgt.
 Goodwin, Robert E., Lt.
 (& OLC)
 Goolsby, George S., Lt. (& OLC)
 Gordon, Benjamin, T/Sgt.
 Gordon, Bobby H., S/Sgt.
 Gordon, Carl Franklin, Lt.
 Gordon, Gilbert H., Lt.
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 Gordon, Matthew M., Jr., Lt.
 Gordon, Merrill K., Capt.
 Gordon, Michael J., Maj.
 Gormly, Samuel J., Jr., Col.
 Gorman, William B., Lt.
 Gorman, Joseph E., S/Sgt.
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 Gorsuch, Kenneth W., S/Sgt.
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 Gottfried, Mario H., Capt.
 Gottle, Paul W., Lt. (& OLC)
 Gottschock, William A., S/Sgt.
 Gottshalk, Walter L., S/Sgt.
 Gouzae, Roland J., S/Sgt.
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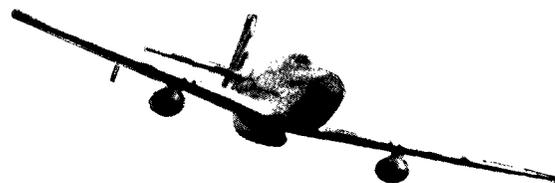
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 Grabowski, Edward M., Lt.
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 Grace, Hal I., Lt.
 Grace, Lealon F., T/Sgt.
 Grady, Martin T., Sgt.
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 Graham, Robert H., Lt.
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 Grammas, George T., Lt.
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 Grant, Charles S., Lt.
 Grant, Marvin E., Lt.
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 Grant, Richard A., Lt.
 Graham, Charles W., T/Sgt.
 Grassi, Amerigo, T/Sgt.
 (& 2 OLC)
 Grauer, Eugene A., Lt.
 Graves, John M., T/Sgt.
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 Gray, Walter J., S/Sgt.
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 Gray, William C., T/Sgt.
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 Green, Charles E., T/Sgt.
 Green, Charles M., S/Sgt.
 Green, Frederick J., T/Sgt.
 Green, John R., S/Sgt.
 Green, Louis S., Lt.
 Green, Milton A., Lt.
 Green, Minor F., T/Sgt.
 Green, Oscar R., S/Sgt.
 Green, Verlie U., Lt.
 Greenwalt, Wilbur D., Lt.
 Greenburg, Samuel H., Jr., Lt.
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 Greene, Harry T., Lt.
 Greene, Harvey R., Lt.
 Greene, Robert C., Lt.
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 Greene, Theodore S., Capt.
 Greene, Victor P., S/Sgt.
 Greenfield, Robert I., T/Sgt.
 (& OLC)
 Green, Glenn F., M/Sgt.
 Greenlaw, Frank D., S/Sgt.
 Greenlee, Louis, T/Sgt.
 Greenlee, Samuel W., S/Sgt.
 Greeno, Harrison M., S/Sgt.
 Greenslade, Rush V., Lt.
 Greenstein, Max J., Lt.
 Greenway, Harry L., Lt.
 Greer, Walter H., Capt.
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 Gregory, Clyde C., Lt.
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 Griggs, Douglas A., W. T/Sgt.
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 Grimm, Jack A., Lt. (& OLC)
 Grine, George A., Cpl.
 Grinslade, Robert A., T/Sgt.
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 Gross, Gale H., S/Sgt.
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 Grove, Robert W., S/Sgt.

Grover, Roy L., Lt.
 Grow, Wesley R., S/Sgt.
 (& 2 OLC)
 Grube, Willis W., Jr., Capt.
 Grund, William F., Capt.
 Gruver, William C., Lt.
 Guaglia, Victor E., Capt.
 Guaglia, Patsy L., S/Sgt.
 Gudenschwager, Lester L., S/Sgt.
 Gudmundsen, Mark, T/Sgt.
 Guerdar, Jack D., S/Sgt.
 Guerin, Horace R., Lt.
 Guerry, Angelo, Cpl.
 Guerry, Alexander, Jr., Lt.
 (& OLC)
 Guffin, Rolland D., T/Sgt.
 Guggenheim, Clifford R., Lt.
 Gugino, Carmelo G., Lt. (& OLC)
 Guili, Curtis E., Sgt.
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 Gulickson, Warren A., T/Sgt.
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 Guminey, John L., T/Sgt.
 Gunn, James A., Jr., Lt.
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 Gunther, Edward A., Lt.
 Gurbindo, Julian J., T/Sgt.
 Gust, Darrell D., Lt.
 Gustafson, Arthur W., Lt.
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 Gutknecht, Wilbur S., T/Sgt.
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 Guyer, Norman E., S/Sgt.
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 Haer, J. W., Cpl.
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 Haegerstrom, James P., Lt.
 Haegman, Eugene G., Lt.
 Hahn, Clifford B., Lt.
 Hahn, Harold L., Sgt. (& OLC)
 Hahn, Howard G., Capt.
 Haigler, Lee C., Lt.
 Hair, Etwood F., S/Sgt.
 Haldy, Henry R., Lt.
 Hale, Charles F., Lt.
 Hale, Jimmie W., Lt.
 Hale, Ronald L., Sgt.
 Halgren, David A., Lt.
 Hall, Alfred C., T/Sgt.
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 Hall, Cecil M., Lt.
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 Hall, Earl O., Capt.
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 Hall, James Goodwin, Col.
 Hall, Jarvis E., T/Sgt.
 Hall, Lowell C., T/Sgt.
 Hall, Robert K., Jr., T/Sgt.
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 (& OLC)
 Halley, Robert E., Capt.
 Halley, Robert W., Sgt.
 (& 3 OLC)
 Haliday, Robert W., Lt.
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 Hallorak, Edward C., Lt.
 Halloran, Francis A., M/Sgt.
 (& OLC)
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 Haltom, Louis L., Capt.
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 Hand, Edward J., Jr., Lt.
 (& OLC)
 Hand, Stanley I., Maj.
 Handel, Donald J., T/Sgt.

(CONTINUED ON PAGE 61)

A large, grainy black and white aerial photograph of a road in Italy. The road is a light-colored strip winding through a dark, textured landscape. A black banner with white text is superimposed over the top of the image.

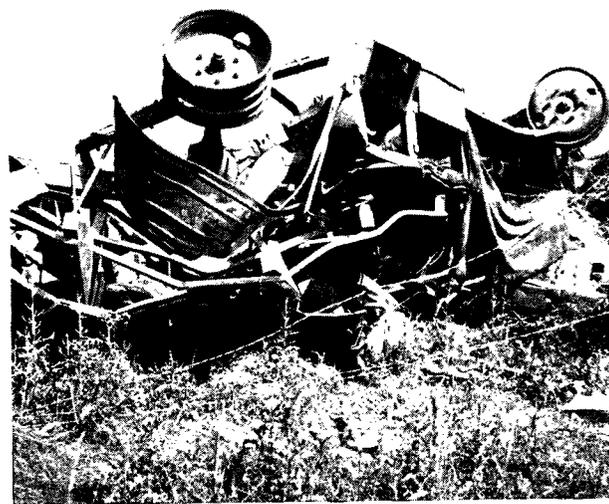
TO ROME AND BEYOND



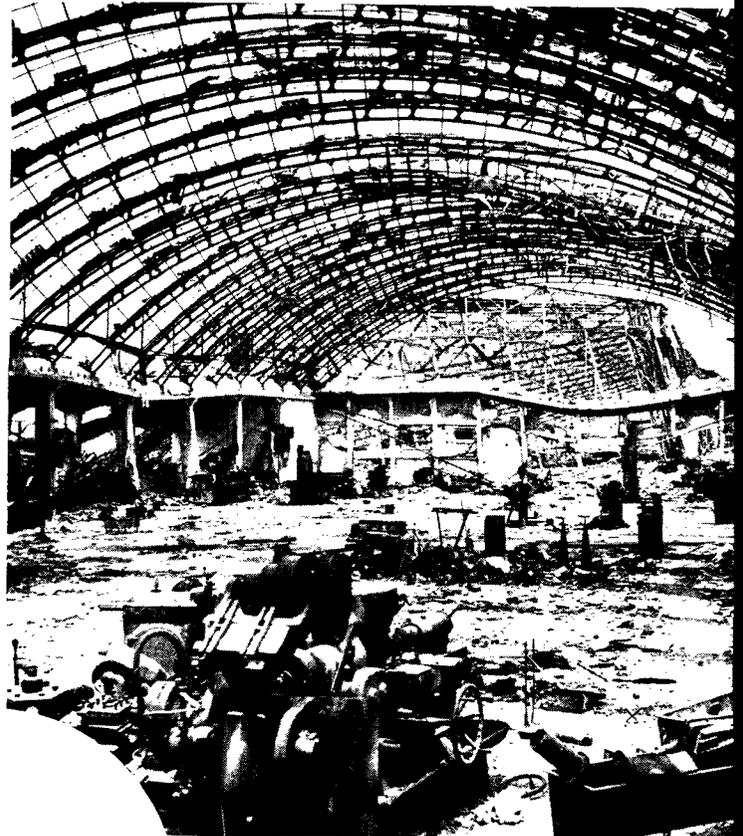
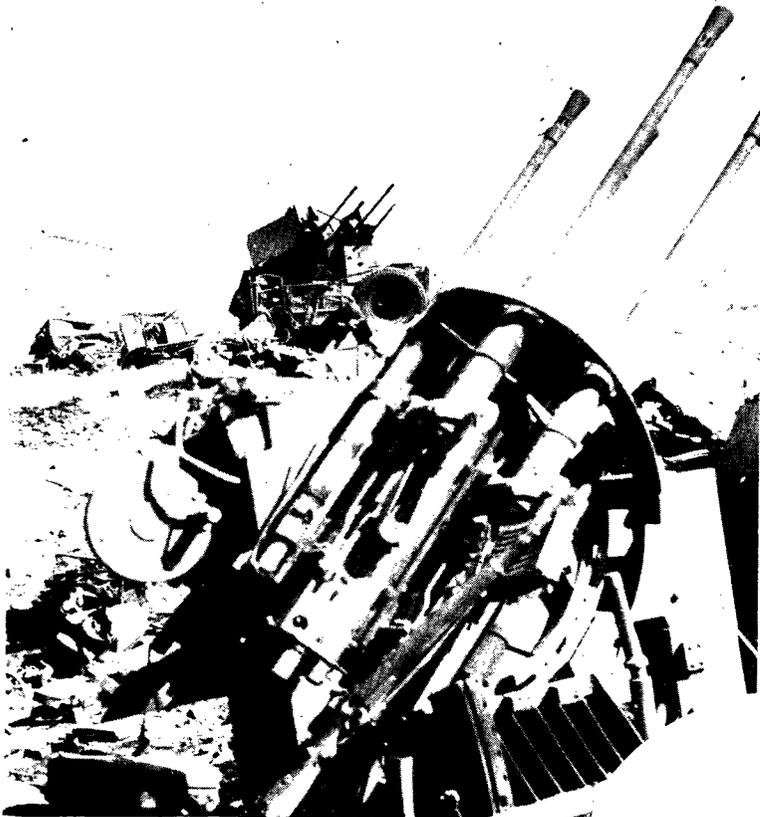
RUNNING interference for the Allied advance up the boot of Italy into Rome and beyond, fighters and mediums of the Mediterranean Allied Air Forces have left a trail of pulverized German equipment and installations. Nazi trucks, half-trucks, tanks, motorcycles and ammunition carriers, lying twisted and battered along the sides of Italian highways lend graphic emphasis to what Maj. Gen. John K. Cannon of the 12th Air Force calls "operational strangle." With their supply columns, mobile weapons, and vital rail bridges and centers under ceaseless pounding, German forces are having a tough time of it in the south.

Havocs and Warhawks flew 2,925 sorties from May 3 to May 6, destroyed 1,260 motor transports, damaged 980 on road between Guilianello and Cori (shown at left).

Twisted, unrecognizable mess, below, is the handiwork of an A-20 which accomplished this result by scoring a direct hit on a Nazi truck loaded with battle equipment.



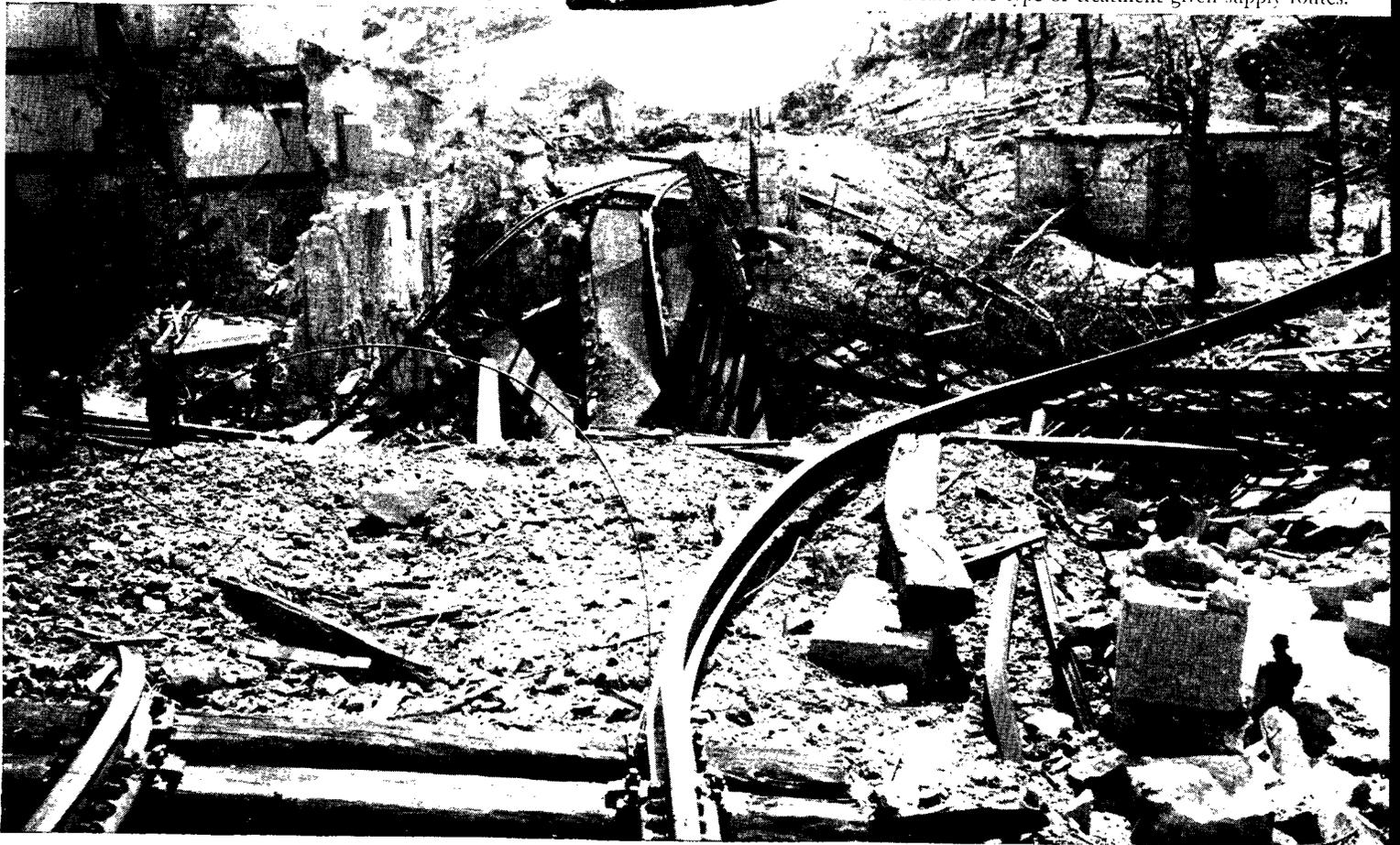
AIR FORCE



At Rome's doorstep fighters discovered the row of German multiple 20 mm anti-aircraft guns and trucks shown above. The fighters flew down the line to put the guns out of commission. At right,



above, the sagging remains of the Littoria airport tell the story of another deadly bombardment. The demolished Carsoli rail bridge, below, indicates the type of treatment given supply routes. 





Iron works at Elba, off the Italian coast, were battered as the "operational strangle" campaign swept north. Elba was later captured.



Blown out of the water by the tremendous impact of M.A.P. bombs, these Nazi ships were caught in San Stefano harbor.



Parts of this German truck were scattered over the road when it was smashed by low-flying fighters. Two of the Nazi passengers lie

dead in the wreckage. Such sights were not uncommon to Allied ground troops as they pressed the offensive to Rome and beyond.

ON THE LINE

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

COME IN ON SAFETY WHEREVER YOU ARE: Ground safety is not kid stuff for military personnel handling supply and maintenance who are governed by AAF Reg. 38-1, Ground Safety Program, dated 11 December 1943. Safety practices, borrowed from those which have proven effective in private industry, do not differ essentially for military and civilian personnel engaged in supply and maintenance procedures.

"Accidents will happen" is an old adage that amounts to just so much prop wash. Factual statistics spotlighting accident situations frequently get the old brushoff. GIs forget that many accidents result from some absurd set-up, which is paralleled by the fact that correct maintenance is usually the easiest and gets the best results.

A big stumbling block to greater safety is horseplay. Crew chiefs groan and gripe over mechanics' antics around hangars, cooked up for laughs and based on a misplaced sense of humor which leads to accidents and costs lost man hours and wasted material.

A master sergeant tells of one such prank in a hangar. A mech was standing on a ladder putting fairing on a wing leading edge. Along comes a GI joker and grabs him by the ankle. Being ticklish, the mechanic lost his balance and when he tried to steady himself, the ladder gave way and he crashed to the floor. An injured arm and broken wrist was the result. Funny? Not at all.



NEED FOR GOOD LIFT: Of 396 accidents in a supply division reported in a one-month period, 169 occurred in handling boxes, crates, barrels, lumber, metal stocks and miscellaneous objects. The greatest number was caused by lifting or carrying excessive weights and improper methods of lifting. It seems that workers simply won't learn to bend knees and use leg muscles. Bending at the waist puts undue strain on back muscles, causes back strain and hernia, and it often means that the object being lifted drops on the lifter's feet. Inadequate gripping is a frequent accompanying cause. Of another group of 137 box-handling accidents, 94 were attributed to poor gripping.

Aircraft workers and carpenters chalk up a large number of accidents in operating joiners and circular saws. Kickback devices not on saws, guards out of place, pusher sticks not being used, operators attempting to pick slivers from moving saw blades and reaching over moving saws or getting sawdust in their eyes are leading reasons. Joiner accidents are traced to broken guards, not using guards and kickbacks, poor lighting and inattention.



WHEN AN AIRPLANE runs up a string of missions without a turnback for mechanical reasons, it's time for the ground crew to take a bow. Here is the crew of the B-17 "Pride o' the Yanks," which has flown 29 consecutive bombing attacks without turning back for mechanical reasons. Twenty-five of these missions were packed into a two month period, six of them over Berlin's factories, airfields and railroad yards. In the photo (left to right) is the ground crew, Sgt. John J. Schmidt, assistant crew chief, Philadelphia; Sgt. Marvin J. Swart, Amsterdam, N. Y.; Cpl. G. E. Brooks, Holyoke, Mass.; Sgt. R. E. Burr, crew chief, Eastport, Maine, and Pfc. C. L. Duryea, Chicago.



BACKING UP THE FIGHTER PILOT are his crew chief and armorer. From England comes this photograph which illustrates how teamwork gets things done. The plane is a P-51 which served as bomber escort, dive bomber, skip bomber and strafier during the invasion activity. The pilot and crew (left to right) are Cpl. Oda D. Stamford, armorer, Raymond, Wash.; First Lieut. William S. Davis, pilot, Camilla, Ga., and Staff Sgt. Carl K. Wood, crew chief, Richmond, Va. In the background is the transportation jeep and driver, Pfc. Robert L. Rowe, Alva-ton, Ga., representing more members of the team: the service unit which tended to service and administrative tasks.

AERONAUTICAL EQUIPMENT — CLEAN CAUTIOUSLY: Every mech knows the toxic qualities of cleaning agents used on aircraft parts present hazards through inhalation or absorption through the skin. Highly toxic carbon tet, benzene, acetone, ethylene dichloride and toluene should be used *only* when petroleum solvents such as kerosene, naphtha, white gasoline and solvent dry cleaning fail to do a satisfactory job.

Volatile cleaning fluids should be used only where aqueous cleaners are unsuitable.

Avoid breathing vapors. Do not apply carbon tet solutions to heated parts; this may produce poisonous phosgene gas.

Keep all solvent containers tightly covered and when not in use to prevent evaporation and reduce concentration of vapor.

Don't place bare hands in solutions; use tongs, holders, or suspend parts by wire or hooks for brushing. On parts that have been immersed in cleaning solutions, rinse with water before handling with bare hands.

A supply angle that proves to be an accident preventer is painting wood corner markers with conspicuous diagonal stripes in order to prevent damage to stacked corrugated containers as well as cautioning personnel against jolts. Placing dunnage strips between boxes when piled enables insertion of the fork without damage, delay or danger.



WISE WELDER WEARS HELMET AND GOGGLES: Flash from the arc causes eye injury in welding according to TO 23-1-5. Respiratory hazards also come from poisonous substances volatilized by heat, such as lead or zinc oxide from galvanized metal.

When a welder throws up his helmet, he may be struck in the eye while chipping or receive a flash from the arc of a fellow worker. It is reasonable, then, to wear spectacle type goggles under the helmet. Goggles must be fitted properly, otherwise chips can enter the eye.

Further protective equipment is authorized by ASC Reg. 40-5 and AAF Reg. 70-3 which includes gloves, shields and respirators. Goggles, respirators, shields and rubber gloves must be washed with soap and water every day and disinfected before re-issue.

Respirators, made of critical materials, require special care and maintenance. Scrub daily after use, especially the face piece, with lukewarm water and soap both as a hygienic practice and to prolong the life of the rubber. Otherwise dirt, oil and perspiration will cause rapid deterioration. Disinfect respirator if worn by a different person; use manufacturer's advice on the disinfecting agent to use in order to avoid damage to parts. If local exhaust systems are in-

stalled, work should be done as close to hood as possible. Gas masks and metal fume respirators must be worn in enclosed areas and in case exhaust systems are not provided.



ISOLATION ADVISABLE FOR GRINDERS:

A number of grinder accidents are traced to passers by being injured from grinding operations. Isolating grinders is an important safety measure. Since the glass shield is insufficient protection, goggles must also be worn during grinding operations. Magnesium fire cannot be extinguished by water, carbon dioxide gas, or dry chemical foam type extinguishers; these extinguishers accelerate the burning and may lead to an explosion. Full details are contained in TO 23-25-1.



PAINT, DOPE, SPRAY WITHOUT DISMAY:

Stick to your booth when spraying or drying. Necessary ventilation must be provided. All electric devices must be vapor proof and the equipment grounded to prevent static discharges in accordance with AMF Reg. 85-6. Check for adequate provision in removal of fumes and prevention of fire when using volatile material. These *musts* are contained in TO 07-1-4 which gives full directions.

Inflammable paint removers unless used outdoors require adequate ventilation with particular care to avoid exposed flames and sparks. Supervision by men trained in the application of highly inflammable materials is required. In using chlorinated solvents (tri chloroethylene or carbon tet) exercise extreme care to avoid inhalation of poisonous vapors. Complete details will be found in TO 01-1-1.

When using spray paints and dopes in specially constructed buildings with adequate ventilation, you do not need to use a respirator. Operations invariably require use of protective cream, Spec. 18,000 C, which can be used on any part of the body; it prevents injury and permits ready removal of paint. See full explanation in TO 07-1-4.

A new non inflammable solution that is safe to handle cleans oil coolers better than solutions used formerly. Instructions for use are contained in TOs 03-15-9, 13-15-14 and 13-15-1.

Color developer used in processing Kodak color reversal film con-

tains aromatic amine which may cause irritation if contacting the skin or injury if the dust is breathed. See precautions outlined in TO 10-5-15.

A glance at TO 23-25-1 will warn never to place magnesium or magnesium alloys in hot salt bath as an explosion may occur.

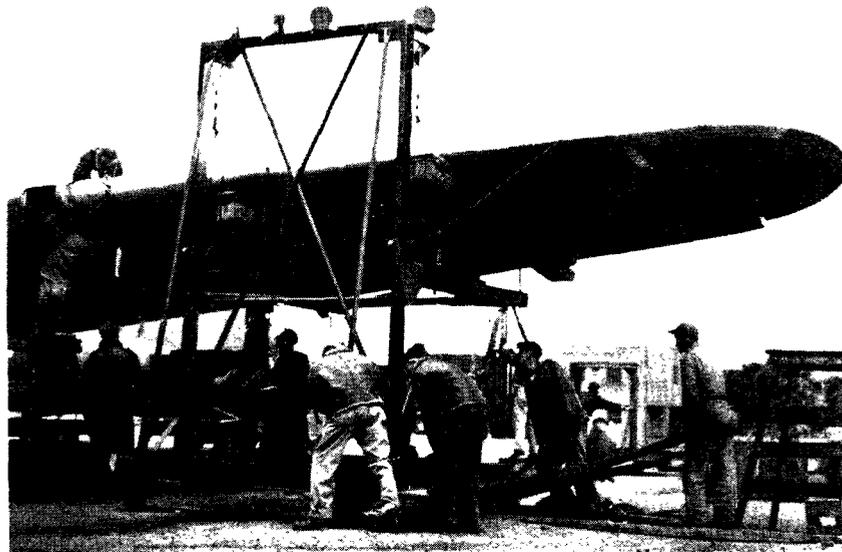


BATTERIES, BOMB BAYS AND VALVES:

Inhaling a cigarette is certainly preferable to inhaling battery fumes which are highly toxic. Battery electrolyte is no beauty balm on hands and body; spillage may cause painful burns. Remove storage batteries from airplanes before cleaning.

Never attempt to mutilate sodium filled valves; metallic sodium, when brought into contact with moisture gives off hydrogen gas which is highly inflammable. And don't pack off those valves with other parts or materials turned over to salvage officers for disposal as scrap. Always dispose of sodium filled valves in accordance with TO 02-1-67.

No MP will check on you, but beware of being caught or struck by bomb bay doors when airplane is on the ground; hydraulically operated doors may open or close with considerable force because of stored energy in the hydraulic accumulator, even though the airplane has been standing for some time. Apply warning stencil to bomb bay in accordance with TO 01-1-56. Also, when the airplane is on the ground, make certain that all personnel and obstructions are clear of bomb bay doors before the control handle is operated.



INGENUITY OF ASC TECHNICIANS IN THEATRES where highly technical equipment cannot always be available for AMF combat planes has become one of the most voluminous and important factors in the air war. Here, at a service command base in North Africa, is another of many examples that are becoming legion around the globe. This huge wing hoist, a tremendous time and labor saver, was created and constructed by Sgt. Joseph R. Ortolani of Rochester, N. Y., and his outfit. It was built entirely of scrap iron and is capable of lifting a complete wing section of any plane. In the photo the wing of a B-17 is being moved back into place after the bomber underwent a sheet metal repair job. This is the second and larger of two such hoists built at this base by Sergeant Ortolani. Hats off to these mechs of the AMF!

RESERVE FIRE FOR THE ENEMY: The first consideration in common preventives for fire is readiness of fire extinguishers. Proper tags should show last date of inspection, test, cleaning and refilling, as prescribed by instructions issued by the Chief of Engineers.

Directions for inspecting fire extinguishers can be checked in TO 03-45C-1, Section V, and TO 16-20-2, Par. 7, c., 1. Watch safety wire on quick release valve of CO₂ fire extinguisher in accordance with TO 01-1-65.

While not advisable to use Kerrick cleaners inside hangars, it is possible to clean airplanes in hangars by stringing hose. Do not use gasoline as a fuel for Kerrick cleaners. Store alcohol in closed glass or earthenware containers. All this, and more, come from TO 01-1-1.

Danger of ignition from contact of grease with oxygen requires steady caution. Keep the oxygen system clean and free of oil and grease. Be sure hands and clothes are free of oil to prevent combustion. Best bet is to know how through TOs 03-50-1 and 03-50A-1.



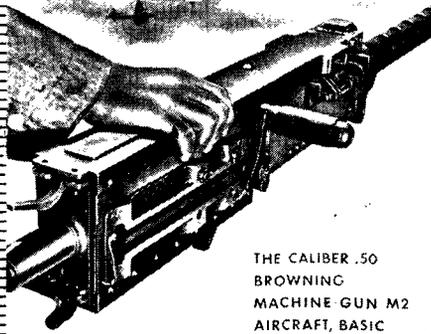
SAVE YOUR SKIN: Occupational dermatitis or skin inflammation, of which the most common type is folliculitis (boils), can be caused by the use of cutting oils. When hair follicles become plugged with oil, grease, dirt or metal, use of unapproved cleansers such as kerosene, naphtha, and carbon tet to remove dirt causes drying or cracking of the skin. Skin inflammation results. Keep clean; wash in hot water with mild soap such as Lam-o-Kleen, wear

clean work clothes whenever possible and use protective hand cream before contact with cutting oils. On all parts of the body which contact oil, grease and dirt use a hand protective cream recommended by the post surgeon.

New cutting oils and those kept clean are usually harmless. Lard base oils that become rancid and oxidized in use cause skin irritations. Oil cleaned with an absorption agent, such as Fuller's earth-blotter paper filter, is more highly refined than when originally taken from the manufacturer's container, and skin-irritating elements are completely removed.

Hydrofluoric acid is poisonous and produces severe skin burns which are slow to heal. Keep in the clear by wearing rubber gloves and goggles, as instructed in TO 01-1A-1.

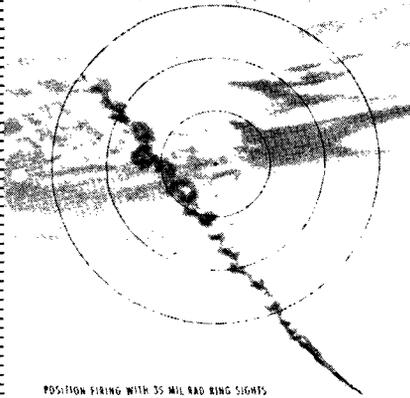
THIS IS YOUR GUN



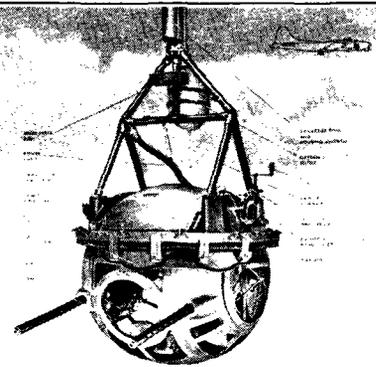
THE CALIBER .50
BROWNING
MACHINE GUN M2
AIRCRAFT, BASIC

With brief instructions on the caliber .30 machine gun and caliber .45 automatic, p. 10

SIGHTING AND SIGHTS



POSITION FIRING WITH 35 MIL RING SIGHTS



THE SPERRY BALL

A NEW BOOK FOR GUNNERS

The science and practice of aerial gunnery, from stripping a machine gun to aiming with the newest type of automatic computing sight, have been described and compiled in a single volume, the *Gunner's Information File*.

Designed for both training and reference purposes, the *GIF* provides a single source for information which formerly has been scattered through countless TOs, TMs, mimeographed lesson sheets, check lists and various special publications of the combat air forces.

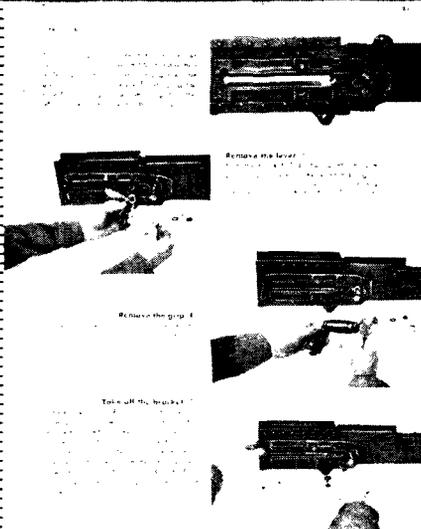
Throughout the book, photographs and illustrations have been used wherever possible to explain difficult technical points and to increase readability. The volume, 8 1/4 by 11 inches in size, is printed in three colors and bound in a looseleaf binder to permit revisions and additions. Designated AAF Manual No. 20, it was prepared by

the Publications Division of the AAF Central School for Flexible Gunnery.

The first section in *GIF* gives complete detail on the caliber .50 machine gun. Section Two covers Position Firing and the use of all types of flexible gun sights. Section Three contains instructions for operating all types of AAF turrets, and Section Four includes a full set of aircraft recognition photographs and silhouettes.

The *GIF* is to be distributed to all basic gunnery schools in the Training Command and to all stations concerned with the gunnery training program in the four training air forces. A small distribution will be made to operational air forces for reference purposes. Distribution of the *GIF* is the responsibility of the Commanding Officer, AAF Central School for Flexible Gunnery, Laredo AAF, Laredo, Texas, Att: Liaison Division.

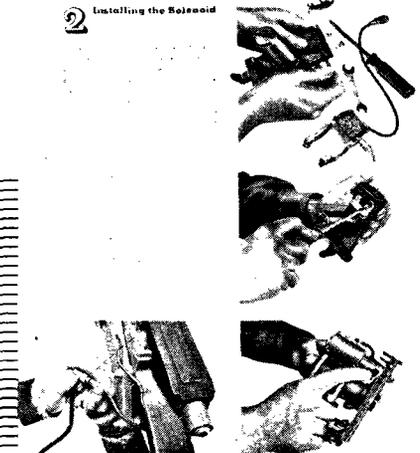
REPRODUCED HERE ARE SELECTED PAGES FROM THE GUNNER'S INFORMATION FILE



RETRACTING SLIDE GROUP



2 Installing the Rojevid





(CONTINUED FROM PAGE 53)

Hanes, Eugene G., Lt.
 Hanes, William E., Capt.
 Haney, William F., Maj.
 Hanlon, John H., Lt.
 Hanly, Thomas J., Jr., S/Sgt.
 Hanna, Harry T., Lt.
 Hanna, Joe Kermit, Lt.
 Hannah, George L., Lt.
 Hannev, Thomas K., Lt.
 Hannigan, William J., Jr., T/Sgt.
 Hannley, Vincent P., Lt.
 Hanover, Don C., Jr., Lt.
 (& OLC)
 Hansell, Haywood S., Brig. Gen.
 Hansen, Elmer B., T/Sgt.
 Hansen, Ernest E., S/Sgt.
 Hansen, Henry C., Lt.
 Hansen, John G., S/Sgt.
 Hansen, John H., M/Sgt.
 (& OLC)
 Hansen, Milton T., Pfc.
 Hansen, Orville W., Sgt.
 Hansen, Philip W., S/Sgt.
 Hansen, Robin, Lt.
 Hansen, Theodore A., Jr., Cpl.
 Hanson, Walter R., S/Sgt.
 Hanson, Archie T., Lt.
 Hanson, John D., Lt.
 Hanson, Owen R., T/Sgt.
 Hanson, Robert P., Lt.
 Hanson, William C., Sgt.
 Hanst, Harry M., S/Sgt.
 Hanson, John T., Lt.
 Hanzel, Thomas C., Lt.
 Hape, Herbert M., T/Sgt.
 Happel, James, Lt.
 Hapgood, Donald D., S/Sgt.
 Harber, Walt H., T/Sgt.
 Harbour, David F., Capt.
 Hardaway, Sidney T., T/Sgt.
 Hardee, Norman T., Lt.
 (& 2 OLC)
 Harden, James D., Lt.
 Harnden, Lionel I., Cpl.
 Hardin, John T., Capt.
 Hardin, Ross G., S/Sgt.
 Hardy, Bruce A., Sgt.
 Hardy, Fred P., Lt. (& OLC)
 Hare, Richard L., T/Sgt.
 Hare, Warren J., Lt.
 Hargheimer, Frederic G., Lt.
 Hargrove, James O., Lt.
 Harkavey, George L., Lt.
 Harker, Vernon D., Jr., Capt.
 (& OLC)
 Harkey, Ralph E., Lt. (& OLC)
 Harkness, Harold J., S/Sgt.
 Harland, Delmar C., T/Sgt.
 Harlin, Charles J., Lt.
 Harling, Tom, S/Sgt.
 Harlow, Harrison, Lt.
 Harlow, Logan S., Jr., T Sgt.
 Harmon, Adney J., S/Sgt.
 Harmon, Crockett L., T/Sgt.
 Harmon, Edward Z., S Sgt.
 Harmon, George W., Lt.
 Harmon, Hubert R., Maj. Gen.
 Harms, Norman L., Lt.
 Harms, Ralph F., S/Sgt.
 Harms, Robert H., T/Sgt.
 Harman, Kenneth F., Capt.
 Harper, Harold T., Lt.
 Harper, James F., Cpl.
 Harper, William B., Lt.
 Harper, William J., Lt.
 Harpool, Charles J., F/O
 Harrison, Woodrow A., F/O
 Harrington, Elmer E., S/Sgt.
 (& 3 OLC)
 Harrington, Reuis J., Lt.
 Harris, Charles R., S/Sgt.
 Harris, Chester L., Capt.
 Harris, Claude S., Capt.
 Harris, Ernest A., Lt. (& 3 OLC)
 Harris, Frederick A., Lt.
 (& OLC)
 Harris, George T., Jr., Lt.
 Harris, Jack C., Lt.
 Harris, James J., S/Sgt.
 Harris, James P., Lt.
 Harris, James W., III, Lt.
 (& OLC)
 Harris, Lewis S., Lt.
 Harris, Maurice S., S/Sgt.
 Harris, Reginald G., S/Sgt.
 Harris, Thomas H., T/Sgt.
 Harris, Tommie T., T/Sgt.
 (& OLC)
 Harris, William B., Lt.
 (& OLC)
 Harrison, Bobby T., Lt.
 Harrison, Charles R., Lt.
 Harrison, Edward, Sgt.
 Harrison, James A., S/Sgt.
 Harrison, James T., Lt.
 Harrison, Lee H., Capt.
 (& OLC)
 Harrison, Lynn R., F/O
 Harrison, Robert D., Sgt.
 Harsh, Forrest R., Maj.
 Harsh, John W., Capt.
 Harshbarger, William M., Lt.
 (& 2 OLC)
 Hart, Allen G., Capt. (& OLC)
 Hart, Clifford M., S/Sgt.
 Hart, John M., Lt. (& OLC)
 Hart, Joseph H., Sgt.
 Hart, Richard I., Lt.
 Hartge, William E., S/Sgt.
 Hartley, Lester J., Lt.
 Hartman, Ernest D., Lt.
 Hartman, George T., Lt.
 Hartman, William D., Capt.
 Hartviu, Douglas M., Lt.
 Hartwig, Ralph, T/Sgt.
 Hartzog, James W., Lt.
 Harvey, Clyde L., Jr., Lt.
 Harvey, Eugene M., Lt.
 (& OLC)
 Havey, Norman S., Capt.
 Harvey, William A., T/Sgt.
 Harvie, Warren L., T/Sgt.
 Hasel, Gaynard A., Lt.
 Hasbrouck, Richard M., S/Sgt.
 Haselby, Johnie W., Lt.
 Haselden, Joseph L., Lt.
 Haseltine, Richard S., T/Sgt.

Haskell, Harris M., T/Sgt.
 Haslip, George A., S/Sgt.
 Hassler, Kenneth C., T/Sgt.
 Hassinger, David W., Maj.
 Hassinger, Walter J., T/Sgt.
 Hastings, Edwin L., S/Sgt.
 Hastings, Edgar A., S/Sgt.
 Hastings, Harold T., Maj.
 Hastings, Lyle R., T/Sgt.
 Hatala, John J., S/Sgt.
 Hatch, Robert R., Lt. (& OLC)
 Hatcher, Joseph H., T/Sgt.
 Hathaway, Gerald L., S/Sgt.
 Hatleberg, Maynard M., T/Sgt.
 Hatley, Sherman R., T/Sgt.
 Hatt, Kermit R., Capt.
 Hatten, Audis W., Lt.
 Hattendorf, Wilbur S., Lt.
 Hauer, Eddy G., Jr., Lt.
 Haugen, Marshall B., T/Sgt.
 Haughey, Robert F., Lt.
 Haupt, Fred J., F/O
 Haut, Walter, S/Sgt.
 Havrilla, Joseph R., S/Sgt.
 Hawes, Samuel A., Lt.
 Hawkins, Elvey J., S/Sgt.
 Hawkins, Gerald L., Lt.
 Hawkins, John E., Lt.
 Hawkins, John G., Lt.
 Hawkins, Paul T., Lt.
 Hawkins, Thaddeus I., Jr., Lt.
 Hawkins, William B., Lt.
 Hawkins, Wilma L., Lt.
 Hawley, Robert L., Lt. (& OLC)
 Hay, Henry G., Lt.
 Hay, Lewis E., Lt.
 Hay, Thomas G., Lt.
 Hayden, ary J., Lt.
 Hayden, Kenneth W., S/Sgt.
 Hayes, Frank, Maj.
 Hayes, Jack W., Jr., Maj.
 Hayes, James J., Capt.
 Hayes, John Joseph, S/Sgt.
 Hayes, Joseph C., T/Sgt.
 Hayes, Raymond A., S/Sgt.
 Hayes, Wesley J., Sgt.
 Hayman, Albert W., T/Sgt.
 Haynes, Jack P., Lt.
 Haynes, Frank V., Capt.
 Haynes, Robert E., Lt. Col.
 (& OLC)
 Hays, George J., Lt.
 Hays, William T., T/Sgt.
 Hazen, Carl O., Lt.
 Hazellon, Walter L., S/Sgt.
 Hazle, John H., Lt.
 Hazzard, William W., Jr., Lt.
 Healdy, Robert L., Sgt.
 Healey, Patrick J., S/Sgt.
 Healy, William C., Capt.
 (& OLC)
 Healer, Earl W., Lt.
 Heard, John A., Lt.
 Hearn, Walter J., Capt.
 Heath, Charles C., Lt.
 Heath, John H., Lt.
 Heather, William J., Jr., Capt.
 Hebert, James F., Lt. (& OLC)
 Hebert, Kenneth G., Capt.
 (& OLC)
 Hebrer, Paul C., Lt.
 Heckerson, Burton E., S/Sgt.
 Heckert, George A., Lt.
 Heckard, William C., Lt.
 Heffernan, Paul W., Lt.
 Heekin, Donald W., Lt.
 Helev, Elton C., Lt. (& OLC)
 Heugan, William T., Jr., Lt.
 Heustead, Lester O., Lt.
 Heay, Clarence F., Col.
 Hecker, Alfred E., S/Sgt.
 Heil, Robert F., Lt.
 Heily, William H., Lt.
 Heim, Lester N., Cpl.
 Heinmiller, Philip R., Lt.
 Heinz, Eugene M., Lt. (& OLC)
 Heinz, George W., Lt.
 Heissel, Manvill O., Lt.
 Heitkamp, Brian J., S/Sgt.
 Hejny, Robert L., Lt.
 Heibert, Joseph E., Capt.
 Held, Alfred D., S/Sgt.
 Heldreth, Howard S., Lt.
 Heller, John M., S/Sgt.
 (& OLC)
 Hellman, Abraham, Lt.
 Hellwig, Alwin, S/Sgt. (& OLC)
 Helmiak, Frederick E., Lt.
 Helms, Barney W., T/Sgt.
 Helstowski, John J., S/Sgt.

Helton James G., M/Sgt.
 Helvey Hazen D., Lt.
 Hemberger, Frank C., S/Sgt.
 Hembre, William T., T/Sgt.
 Hemphill, Robert C., Capt.
 Henaire, Joseph A., S/Sgt.
 Henderson, George W., S/Sgt.
 Henderson, Paul E., S/Sgt.
 Henderson, Ralph C., S/Sgt.
 Henderson, Wilburn S., Lt.
 Hendricks, Dean W., W/O
 Hendricks, Wayne J., Lt.
 Hendrix, Lloyd O., Lt.
 Hendry, Phillip L., Lt.
 Hendrix, Tom, S/Sgt.
 Hendry, John W., Jr., Lt.
 Henebry, John P., Capt.
 (& 2 OLC)
 Henery, William M., Lt.
 Henington, Henry M., Lt.
 Henion, Glen, S/Sgt.
 Henion, John O., Cpl.
 Henkel, Henry H., S/Sgt.
 Henley, Justin O., Lt.
 Henley, William O., Pfc.
 (& OLC)
 Henn, Raymond J., S/Sgt.
 Henn, William J., Capt.
 (& OLC)
 Henry, George F., Lt.
 Henry, Harry C., Maj.
 Henry, Howard D., Lt.
 Henry, Lawrence C., T/Sgt.
 (& OLC)
 Henry, William H., Lt.
 Henry, William W., S/Sgt.
 Hensen, Helmuth F., Lt.
 Hensler, Joseph E., Lt.
 Henslovitz, Marvin, T/Sgt.
 Henson, Walter C., Lt.
 Hephner, George W., Lt.
 Herbert, Robert C., Lt.
 Herman, Boyd F., Lt.
 Herman, Charles L., Lt.
 Herman, Leonard W., Lt.
 Hermann, Max W., Lt.
 Herman, Howard E., T/Sgt.
 Herndon, Albert V., S/Sgt.
 Herndon, Joseph L., Lt.
 Herod, Henry W., T/Sgt.
 Herren, Travis R., S/Sgt.
 Herried, Richard S., Lt.
 Herring, William J., Lt.
 Herron, Christian I., Lt.
 (& OLC)
 Hers, Leonard, Lt.
 Herter, Glenn A., Lt.
 Hertzberg, Frank E., Lt.
 (& OLC)
 Herzog, Frederick C., Jr., Lt.
 (& OLC)
 Hester, Paul M., F/O
 Hess, William J., S/Sgt.
 Hesse, Charles, Capt.
 Hester, Elbert Lynn, Lt.
 Hester, Virgil R., T/Sgt.
 Heuser, Herbert A., Lt.
 Hevener, Harold G., Jr., Lt.
 Hewitt, Charles H., Cpl.
 Heyman, Alfred A., Lt.
 Hiatt, Dean R., Lt.
 Hibbs, Ralph L., Sgt.
 Himmel, Edward, Pfc.
 Hihner, Edwin L., Capt.
 Hickey, Thomas J., Cpl.
 Hickman, Richard H., Sgt.
 Hickman, Roland C., T/Sgt.
 Hickok, Ralph H., T/Sgt.
 Hicks, William G., S/Sgt.
 Hiffer, William J., S/Sgt.
 Higgins, Harry C., Lt. (& OLC)
 Higgins, Landon G., Lt.
 Higgins, Thomas D., Jr., Lt.
 High, Ashburn L., S/Sgt.
 Highove, Peter, T/Sgt.
 Hight, Gordon L., Jr., Lt.

Hightower, James D., S/Sgt.
 Hilbert, George A., Jr., Capt.
 Hildreth, Elmer L., M/Sgt.
 Hilder, Elvin D., Jr., T/Sgt.
 Hilbert, Donald B., Lt.
 Hill, Charles E., Jr., Lt.
 Hill, Frank A., Maj.
 Hill, James Ellison, Lt.
 Hill, Joe L., Jr., Lt.
 Hill, John E., S/Sgt.
 Hill, John F., S/Sgt.
 Hill, Kelly, Jr., S/Sgt.
 Hill, Lawrence E., Cpl.
 Hill, Lewis A., S/Sgt.
 Hillabrant, John J., S/Sgt.
 Hillegass, Paul J., S/Sgt.
 illiard, Ray M., Lt. (& OLC)
 Hilsabeck, Frank H., S/Sgt.
 Hilsley, Arthur F., Cpl.
 Hime, Bobbie L., Lt.
 Himmel, Lynn M., Cpl.
 Hinds, Durward L., S/Sgt.
 Hinds, Francis G., T/Sgt.
 Hine, Raymond K., Lt.
 Hinebaugh, Dan L., Jr., T/Sgt.
 Hines, Amos D., Lt.
 Hines, Cary L., Lt.
 Hines, Thomas M., Jr., Lt.
 Hiny, Jesse L., T/Sgt.
 Hinton, Robert W., Lt.
 Hipple, Ellsworth G., Sgt.
 Hirsch, Nathan J., Lt.
 Hirschburg, Ivan E., Lt.
 Hise, Bobbie L., Lt.
 Hitchcock, Craig R., Lt.
 Hitchcock, James W., Lt.
 Hively, Howard D., Lt.
 Hlouchal, Otto A., Jr., Lt.
 Hnatyk, Nicholas J., Lt.
 Hoag, Roger H., Lt.
 Hoag, Stanley D., Lt.
 Hoagland, John G., Lt.
 Hoagland, Ralph, Jr., Lt.
 Hobbs, Frank B., S/Sgt.
 Hobbs, James M., S/Sgt.
 Hobert, Robert D., Lt.
 Hobson, Kenneth B., Col.
 Hobson, William R., Lt.
 Hockery, John J., Lt.
 Hockin, Robert A., Lt.
 Hocutt, Ealon S., Lt.
 Hodge, John E., T/Sgt.
 Hodges, Edwin L., S/Sgt.
 (& OLC)
 Hodges, Phillip, Lt.
 Hodgson, Thomas D., Lt.
 Hodson, Charles A., Lt.
 Hodson, Robert G., Lt.
 Hodson, Robert I., Capt.
 (& OLC)
 Hodson, Robert L., Capt.
 Hoerster, Morton K., Lt.
 Hoey, Charles J., Capt.
 Hofer, Herbert E., Lt.
 Hoffacker, Victor A., S/Sgt.
 Hoffman, Shirl J., T/Sgt.
 Hoffman, Wilbur F., T/Sgt.
 Hogan, David, T/Sgt.
 Hoge, Everett J., T/Sgt.
 Hoggan, Donald W., Lt.
 Hoggatt, James L., Lt.
 Holman, Jack, F/O
 Holman, Carl A., Lt.
 Holter, Ralph M., S/Sgt.
 Hoke, Robert A., Capt.
 Holbert, George R., S/Sgt.
 Holcomb, James R., S/Sgt.
 Holcombe, Richard E., Capt.
 Holcombe, Robert G., Lt.
 Holcombe, Wesley C., Lt.
 (& OLC)
 Holden, Warren A., Lt.
 Holder, Maxwell R., Lt.
 Hole, Howard D., Cpl.
 Holman, Jose L., Lt.
 Holland, Curry W., S/Sgt.
 Holland, John G., Lt.
 Holland, Thomas E., Sgt.
 Holleman, Steven H., S/Sgt.

5th OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

Adams, Ira A., S/Sgt.
 Carlson, Robert E., Lt.

4th OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

Anderson, Alf Lester, S/Sgt.
 Ashley, Burl S., F/O
 Bong, Richard I., Maj.
 Dial, Irwin W., S/Sgt.

3rd OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

Arts, Henry F., Jr., S/Sgt.
 Burlingame, Albert H., Lt.
 Corkrum, Uriah F., Lt.
 Crawford, George H., S/Sgt.

2nd OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

Andrews, Stanley O., Lt.
 Applegate, Rex A., Sgt.
 Arnett, John P., Sgt.
 Arzen, Cyril H., Pvt.
 Bailey, John D., Lt.
 Ballantine, John V., Pvt.
 Barber, Glenn E., T/Sgt.
 Benner, John G., Lt.
 Berryman, Lester C., Pfc.
 Billmeier, Lawrence P., Cpl.
 Bonito, Frank L., Cpl.
 Brown, Llewellyn L., Lt.
 Carlson, William E., Lt.
 Cartwright, Phillip E., Lt.
 Chadin, Harold N., Capt.
 Church, Frank C., Capt.
 Creech, Robert M., Capt.
 Culver, David, S/Sgt.
 Dabner, Dorsey T., Cpl.
 Dorch, Paul H., M Sgt.
 Dougherty, John, Maj.
 Dubisher, Francis E., Lt.

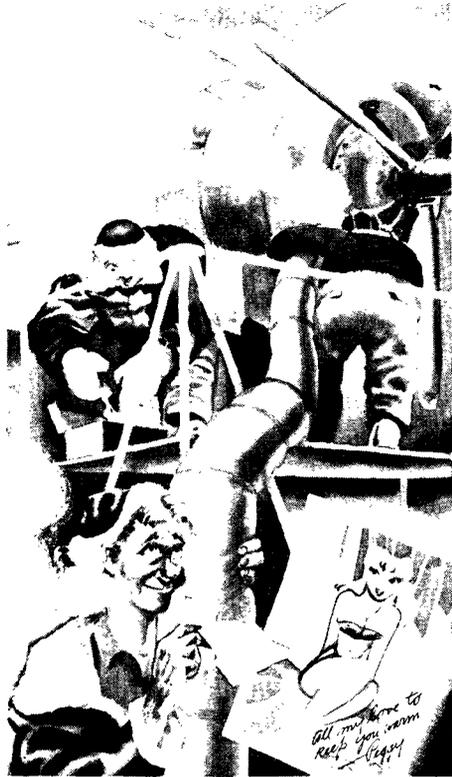
OAK LEAF CLUSTER TO DISTINGUISHED FLYING CROSS

Adams, Forrest M., S/Sgt.
 Aldridge, Leoy A., Sgt.
 Allen, David W., Lt.
 Amann, John R., Lt.
 Andrade, Michael R., Pfc.
 Asbell, Clarence E., Sgt.
 Babbly, Edward L., Jr., S/Sgt.
 Baker, Robert M., Lt.
 Barton, Bruce Dero, Capt.
 Bennett, Charles E., T/Sgt.
 Bennett, Ravelle A., S/Sgt.
 Bilyeu, Hal E., Lt.
 Birdson, George P., Lt.
 Blakely, William A., Lt.
 Bowden, Robert M., Sgt.
 Bradley, William Barcliff, Cpl.
 Bradford, William R., Maj.
 Brown, Robert E., Capt.
 Burns, Wilbert R., Sgt.
 Cain, Carroll J., Lt.
 Calhoun, William R., Jr., Lt.
 Campbell, William Haddock, Lt.
 Castellotti, Julio G., S/Sgt.
 Cederholm, Bernard, Lt.
 Chandler, George W., Lt.
 Check, Willis, T/Sgt.
 Colburn, Lewis L., Sgt.
 Cornut, Charles, Lt.
 Cornut, William A., Sgt.
 Coury, Charles L., Pfc.
 Cox, John D., S/Sgt.
 Cross, Frank E., T/Sgt.
 Daigle, Llewellyn C., Maj.
 Davidson, Paul E., S/Sgt.
 Deniston, Dale R., Lt.
 Deviney, James C., Capt.
 Deyarmond, Jacob W., Pfc.
 Doss, Edwin A., Capt.
 Durbin, Cecil, Lt.
 Eastus, Wardin M., Cpl.
 Ehlers, Meville V., Lt.
 Faulkner, Cecil L., Lt. Col.
 Ford, Walter R., Capt.
 Ingram, Virgil, Jr., Capt.
 Janacek, Meink J., S/Sgt.
 Kaboth, Jack W., Lt.
 Lutz, Willis S., T/Sgt.
 McDonald, Norman L., Lt.
 McIntyre, Patrick W., Capt.
 McLaughlin, Tim O., S/Sgt.
 Pezzella, Alfred W., Lt.
 Prouty, R. V., Lt.
 Toomey, John Marshall, Maj.
 White, Sam B., Jr., Capt.
 Witcox, John R., Lt.
 Wilkinson, Warren S., Capt.
 Young, John S., Lt.

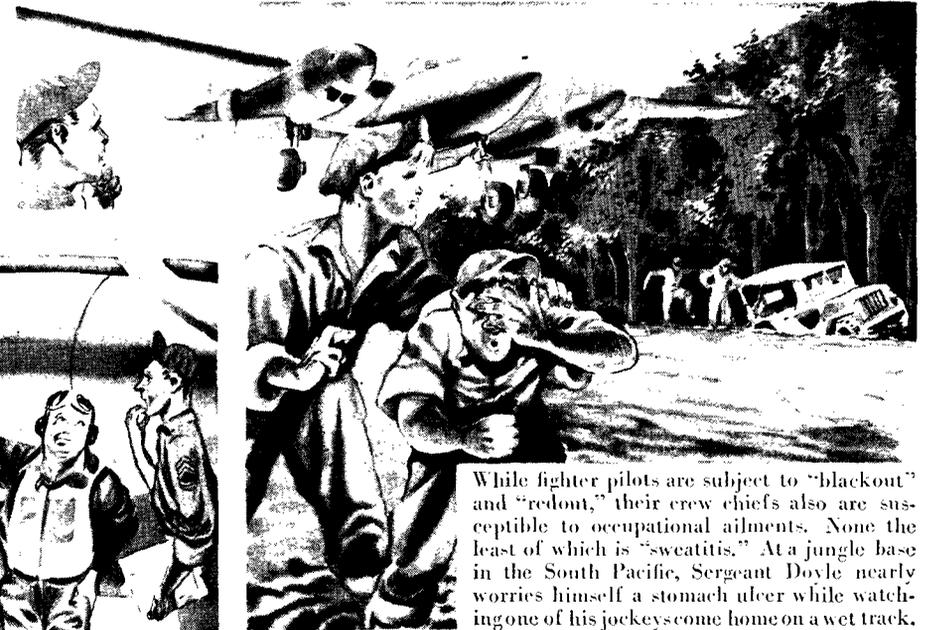
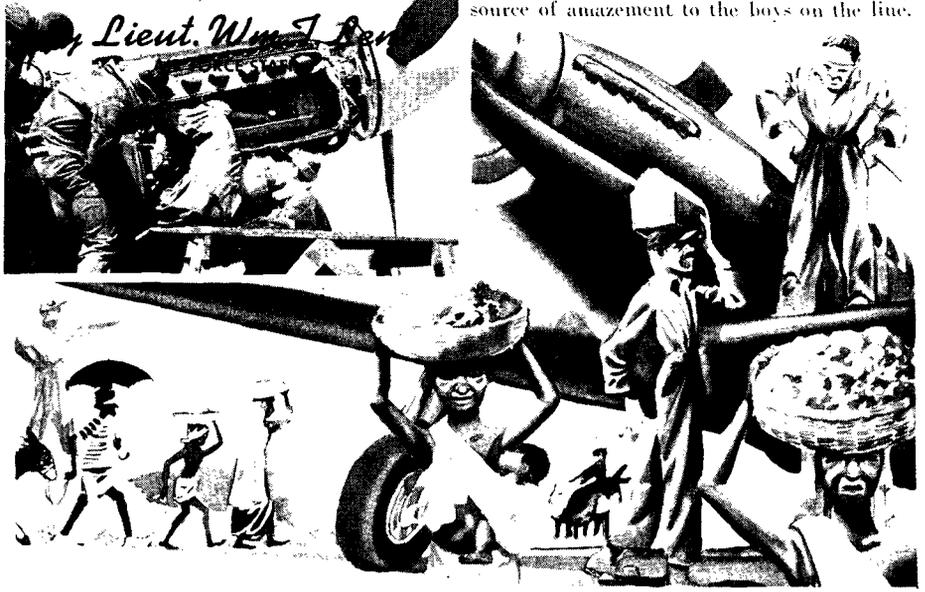
Answers to Quiz on page 36

- (c) 20th Air Force
- (c) 800 rounds per minute
- (d) Twin-engine, twin-tail fighter
- (b) Northern Burma
- (a) The compression ratio of the engine
- (a) 2,000 miles
- True
- (b) \$300. WD Cir. 50, 4 Feb. 1944
- (d) Radio operator
- (b) Twin-engine fighter
- (b) San Angelo, Texas
- (b) \$1,800
- (c) Off the northwestern tip of New Guinea
- A demolition bomb dropped by parachute
- (c) Six. WD Cir. 268, 30 June 1944
- (d) Gen. Lewis H. Brereton
- (d) Military personnel attached to the Allied Military Government
- (b) False. Anyone who desires may join the Society.
- (b) Bangkok
- Douglas C-54 (left) and Focke-Wulf 200.

Here we have a couple of GI radiators, Arctic model. At an Alaskan base, Sergeants Brown and Kelly warm the engines of a B-24 with a gas-oil heater, while Sergeant Rawls thaws himself with a letter and snapshot from his little hometown de-icer.



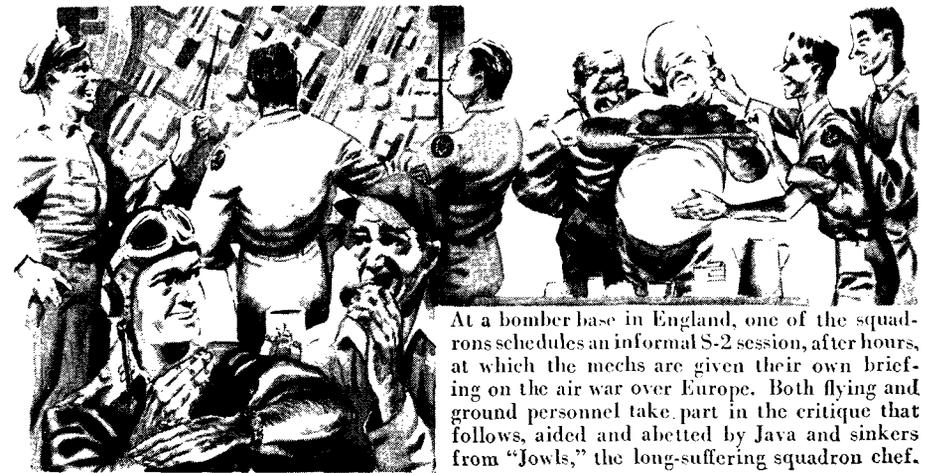
GROUND CREW



While fighter pilots are subject to "blackout" and "redout," their crew chiefs also are susceptible to occupational ailments. None the least of which is "sweatitis." At a jungle base in the South Pacific, Sergeant Doyle nearly worries himself a stomach ulcer while watching one of his jockeys come home on a wet track.



Captain Knight and Sergeant Cole are at opposite ends of a shuttle bombing route between an AAF base in England and a Soviet airfield. Both are Texans, which may account for the Captain's ability to bring an occasional arm-load of scarce items from London for the ground crew.



At a bomber base in England, one of the squadrons schedules an informal S-2 session, after hours, at which the mechs are given their own briefing on the air war over Europe. Both flying and ground personnel take part in the critique that follows, aided and abetted by Java and sinkers from "Jowls," the long-suffering squadron chef.

CROSS COUNTRY

(Continued from Page 1)

For a year or more up to the time the B-29 went into combat, the AAF was filled with rumors about the new super bomber and its activities. This month we give you the story of what happened during that year or more of silence on the B-29. Our article is written by Brig. Gen. Kenneth B. Wolfe, first leader of the original B-29 outfit and now commanding general of the Materiel Command. It appears on Page 4.

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Are there any copies of the January and February, 1943, issues of AIR FORCE still intact around dayrooms, lounges or canteens at overseas or domestic bases? If so, we'd appreciate your sending them to us at 101 Park Avenue, New York 17, N. Y. We like to keep a number of copies of each issue for our files and we happen to be short on copies for those two months.

☆

"AUS (AC)" is no more. This familiar symbol, which labeled most Air Corps officer grades for nearly two and a half years, had served its purpose. On August 1, it was discarded, and all temporary officer grades were changed from AUS (AC) to AUS.

AUS means Army of the United States. AUS (AC) means Army of the United States (Air Corps), a designation established under authority of an Act of Congress shortly after Pearl Harbor to permit the Air Corps to advance its officers more rapidly than was permissible under AUS policy. The Air Corps was growing faster than any other branch of the Army. Officers had to be advanced fast enough to keep pace with the expansion of the Air Corps itself.

At that time, an officer must have served for at least six months in a position calling for a higher grade to qualify for promotion in AUS. In AUS (AC), the qualification was three months in grade. Therefore, an Air Corps officer advanced somewhat faster in AUS (AC) than in AUS, but his higher grade held only so long as he was in the Air Corps. If he was transferred to another branch, he reverted to his AUS grade.

As assignment vacancies were filled, the requirements were stiffened for both AUS and AUS (AC). In each instance, graduated scales of minimum time in grade were adopted, the higher the grade the longer the minimum. In addition, standards of minimum length of commissioned service were established in 1943 for promotions of Air Corps officers, both AUS and AUS (AC).

By 1944, promotions in AUS and AUS (AC) had slowed down to a walk. But by that time, more than two-thirds of the Air Corps officers had two ranks: one AUS, the other AUS (AC). The latter was from one to three grades higher than the former.

It was the officer in this situation who was affected by the August 1 order. In each case, the officer was promoted to an AUS grade corresponding to his AUS (AC) rank. The new AUS grades date from August 1, but in determining time in grade for promotion purposes full credit is given for time in AUS (AC) grade. Service outside continental U. S. or in Alaska counts as time-



and a half toward time in grade requirements for all AUS promotions.

Minimum times in grade now are as follows: To colonel, eighteen months; to lieutenant colonel, fifteen months; to major, twelve months; to captain, nine months; to first lieutenant, six months.

In explaining the new requirements, Army Reg. 605-12 points out that minimum time in grade should not be considered "as either the average time an officer should remain in a grade or as entitling an individual to promotion upon completion thereof."

The regulation adds that no officer should be recommended for promotion until he has demonstrated his qualifications by actually occupying a position and performing duties appropriate to the higher grade for at least three months. For promotion to lieutenant colonel or colonel, he should occupy for at least three months the specific position he is to hold after promotion.

These requirements, including minimum time in grade, may be waived in "exceptional circumstances" by theatre commanders in the case of officers who have demonstrated clearly their fitness for promotion by outstanding performances in actual combat.

The Civil Aeronautics Administration has proposed an amendment to the Civil Air Regulations designed to facilitate the issuance of pilot certificates to military pilots following their discharge from the service. The test of the proposed amendment is published here as a matter of interest to military pilots:

An applicant who is or was within the preceding twelve calendar months on solo flying status as a member of the armed forces of the United States or the armed forces of any government allied with the United States as a rated military pilot and has served as such with solo flying status for a period of not less than six consecutive months shall be deemed to have met the aeronautical knowledge, experience and skill requirements of the Civil Air Regulations for the issuance of a pilot certificate of appropriate type and grade if:

(a) The requirements for the military pilot rating held are at least equivalent to the requirements of the Civil Air Regulations for type and grade of pilot certificate sought;

(b) He passes the written examination on the Civil Air Regulations required of applicants for the type and grade of certificate sought; and

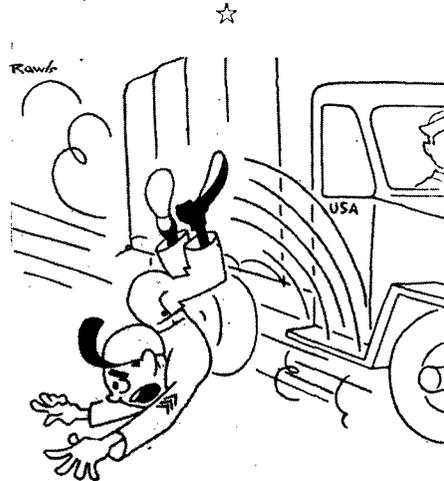
(c) He submits to an Inspector of the Administrator:

(1) Documentary evidence that he is a member of the armed forces specified above, or that he has been honorably discharged or returned to inactive status, and

(2) A certificate from the appropriate officer in charge of flying showing the applicant's flight record as a military pilot and

setting forth the pilot rating held by him, and the type, class and horsepower of aircraft he has been officially rated as competent to pilot.

Responsibilities of the Assistant Chief of Air Staff, Materiel and Services, are clarified in AAF Regulation 20-43, amended as of 27 July 1944. He is accountable for "establishing AAF policies in the field of materiel and services, exercising staff supervision over the execution of policies in the field of materiel and services and for necessary liaison with War Department and other government agencies."



What did you do in the war, Pop?

What will you tell him? That you were tossed on your bean while riding on a truck fender and had to spend 100 days in the hospital, or will you remember this simple rule?

When you ride anything (except a horse or a motorcycle), RIDE INSIDE.

In our June issue, we reported that a station of the India-China Wing of the Air Transport Command had claimed for one of its C-47s a new GI operational record—360 hours and 10 minutes for the month of February, a daily average of 12 hours and 25 minutes.

Lieut. Col. Joseph C. Mackey, commanding officer of Headquarters Detachment, 563rd AAF Base Unit, Ferrying Division, Air Transport Command, Miami, Fla., now comes forth with a new claimant to the record—a C-87 numbered 004, which on the famous "Fireball" run between Miami and India hung up 40 $\frac{1}{2}$ hours during April.

The colonel also supplies figures on seven other C-87s—all on the Fireball run—which have bettered the achievement of the India-China Wing station's candidate for top honors. He declares that No. 249 operated 369 hours and 35 minutes in March; No. 162, 372 hours and 20 minutes, and No. 148, 382 hours and 55 minutes, both in April; No. 733, 380 hours and 45 minutes in May, and No. 745, 381 hours and 15 minutes, and No. 249, 377 hours and 20 minutes, and No. 139, 362 hours and ten minutes, all three in June.

"I might mention, too," adds Colonel Mackey, "that the overall fleet average for the Fireball run for the eight months from its inception to 16 July 1944 is ten hours and 23 minutes. This operation is over a route approximately 14,000 miles in each direction, and is GI operated under the supervision of Brig. Gen. William H. Tunner, commanding general, Ferrying Division, Air Transport Command."

Thanks for the information, Colonel.

There probably are other outfits which have claims to operational or other records. Let's hear about them.

AAF commanders have been directed to ground all flying personnel for 24 hours after they have given blood donations. A donor may be grounded for a longer period if the flight surgeon finds it advisable. It is the duty of the individual to advise his commanding officer and flight surgeon at the time the donation is made.

Lost Parachutes

Nos. 36-1847, 37-300, 37-1445, 37-1447, 37-1448, 37-1495, 38-1004, 38-1555, 38-1556, 38-2244, 38-2248, 39-1026, 41-7067, 41-7068, 41-7069, 41-7080, 41-7082, 41-7061, 41-7084, 41-7085, 41-7086, 41-28271, 41-28272, 41-28273, 41-28274, 41-28275, 41-28276, 41-28277, 41-28279, 41-28285, 41-28305, 41-28307, 41-28308, 41-28310, 41-28311, 41-30899, 41-31269, 42-63452, 42-63453, 42-63454, 42-63455, 42-63461, 42-63463, 42-63465, 42-63466, 42-63467, 42-210090, 42-383815, 42-383827, 42-386456, 42-386468, 42-386470, 42-386478, 42-386489, 42-386492, 42-386495, 42-386499, 42-701024.

Return these parachutes, or address correspondence concerning them to Supply Officer, Base Operations, Bolling Field, D. C.

No. 42-488956 lost at Long Beach Army Air Base, Calif. Communicate with Lieut. M. J. Bidwell, Special Service Officer, Fort Ord, Calif., or return to Amarillo Army Air Base, Amarillo, Texas.

No. 42-543783, quick attachable type: return to Operations Officer, Army Air Forces, Lambert Field, St. Louis, Mo.

No. 42-108389, seat type: return to Operations Officer, AAF Pilot School (Basic), Majors Field, Greenville, Texas.

Found

No. 39-2522 held by Headquarters, AAF Pilot School (Basic), Perrin Field, Sherman, Texas.

PICTURE CREDITS

THIRD & FOURTH COVERS: T/Sgt. Roger Coster, AIR FORCE Staff, 19; U. S. Army Signal Corps, 22-23; Royal New Zealand Air Force. All other illustrations secured through official Army Air Forces sources. Requests for prints of photographs for official use and publication appearing in AIR FORCE should be directed to the AAF Photographic Library, Headquarters, AAF, Washington 25, D. C.



These returned combat veterans are starting their last lap in aerial evacuation. They are aboard a C-47 which will take them to hospitals within the geographic area of their homes. The story of air evacuation inside the United States is told in this issue of AIR FORCE.



GOT HIM!



This is aerial gunnery that brings crews home—
guarantees the success of a mission. But this kind
of shooting isn't luck. It takes the highest degree of knowledge
and technical skill, developed and maintained by constant training.