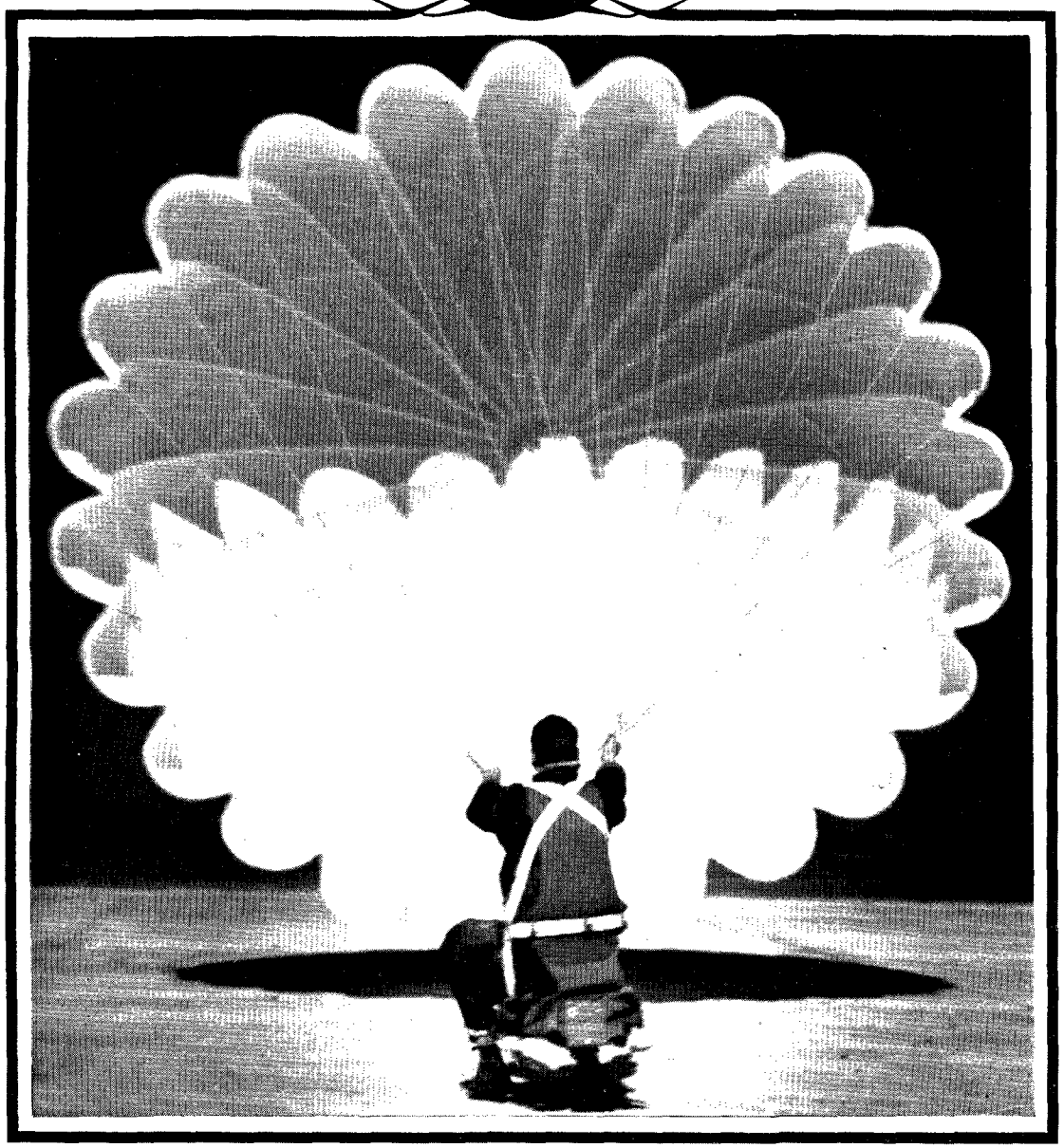
AIR FORCE

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



APRIL 1943

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DEPARTMENTS

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April Brief

A NEW DEPARTMENT, known as Training Aids, makes its initial appearance in AIR FORCE on Page 34 of this issue. It is a feature of the Training Aids Directorate (called TAD) of the Army Air Forces School of Applied Tactics at Orlando, Florida. All material for this department is prepared by the directorate.

The term "training aids" includes literature, training films, film strips, training posters, visual instruction material, recognition material and synthetic devices. You can get the whole story by reading the article "Streamlining AAF Training" in this month's department.

The important subject of aircraft recognition is discussed in the department's other leading article (Page 36), which explains the standardized system of teaching recognition (including recognition of surface craft and ground vehicles) recently approved for the Army Air Forces.

We are planning to introduce additional continuing features, sponsored and prepared by other units of the Air Forces, in subsequent issues of this service journal. Meanwhile, you may have more suggestions. If so, send them in.

P-38S are by now old favorites in the Southwest Pacific area. But there's a first for everything, and in this issue we are happy to document the 38s' first combat action in that theater.

Our coverage on the subject came about in this manner: Lieut. General George C. Kenney, commanding general of the Allied Air Forces in the Southwest Pacific area, sent a personal letter to General Arnold enclosing the reports of P-38 pilots who took on about 30 to 35 Jap fighters and bombers in their first time at bat.

You can see for yourself how the 38 boys made out by reading several of the reports, written a few minutes after landing, which appear on Page 4.

Just a hint of the results: "Right now the morale in that squadron is so high it almost scares you," wrote General Kenney to the Commanding General. Excerpts from his letter are printed along with the pilots' reports.

AIR DEFENSE of the United States brings into play the all-important but little-understood Aircraft Warning Service of the Army Air Forces. In an article on Page 15, Brig. General Gordon P. Saville, Director of Air Defense, tells about the inside workings of that unit. In explanation, General Saville presumes a mythical air attack on the Pacific Coast and describes the play by play behind-the-scenes action that takes place from the time enemy aircraft are first detected to the time our own fighter planes are guided by ground personnel to intercept the invaders.

ANTISUBMARINE WARFARE is generally recognized as a top priority problem of the allied nations. Two articles in this issue discuss the role of the Army Air Forces in combating the U-boat. The first, on Page 6, explains the functions and operations of the Army Air Forces Antisubmarine Command. It is written by Lieut. Colonel Clinton A. Burrows, assistant chief of staff, A-2, for the Command. In the second article, on Page 7, Captain Charles D. Frazer of the AIR FORCE staff describes a night mission hunting subs in a B-18 over the Caribbean.

AFTER BAILING OUT of a shot-up, gasless P-40, Lieutenant Clarence E. Sanford swam three miles and landed exhausted on a barren desert island off the northern tip of Australia. His equipment: one religious medallion, one ring, one pair of shorts.

The pilot's fight for survival on that small island is described on Page 10 in an article prepared by the Arctic, Desert and Tropic Information Center of Eglin Field, Florida. In addition, experts attached to the Information Center have analyzed the experience from the standpoint of solving the problems which confronted the pilot.

Lieutenant Sanford states today that if he had known then what he knows now much of his suffering, including eleven weeks in Australian hospitals after his rescue, could have been avoided. That's why we think this type of article pretty important for airmen.

"CALLING DOCTOR KILDARE!" has become something of a password, so we thought it worth mentioning that the author of "Flying in the Cellar," on Page 12, wrote most of the original articles and supplied most of the research for the Doctor Kildare movie series during the last two years. He is Lieutenant Lawrence P. Bachmann, now attached to the Training Aids Directorate at the School of Applied Tactics, who started out to be a psychiatrist and landed in the motion picture business. In this issue Lieutenant Bachmann discusses what the Air Forces is doing to test your ability to take high altitude.

THE FRONT COVER picture this month is the work of Corporal Harry W. Lemmon of the photographic laboratory, Blackland Army Flying School, Waco, Texas.

AIR FORCE is primarily a medium for the exchange of ideas and information among Army Air Forces personnel. Opinions expressed by individual contributors do not necessarily express the official attitude of the Army Air Forces or the War Department.

FORMERLY THE AIR FORCES NEWS LETTER

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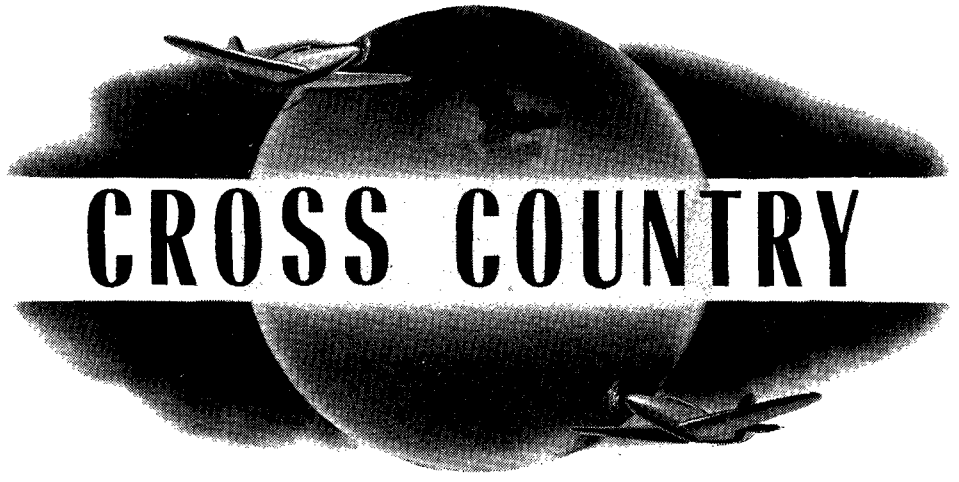


THE ARMY AIR FORCES got its fourth star last month.

Number Four went on the shoulders of the Old Man, and it shone all down the line—like wings on a new cadet.

Of course, to the thousands who have come into the Air Forces in these last busy months, he's always been The General. But to more than a few old timers he's still plain "Hap." To all of us he's the man who grew up with Army aviation and played a strong personal role in its development.

In the last year General Arnold has flown some 85,000 miles to keep in touch with his spreading organization. And we don't expect the weight of a fourth star to hold him down. We have a hunch those four stars will continue to show up on the flight line—whether it be in Texas, Tunisia or Tulagi.

In announcing the General's promotion the War Department commented:

"The growth of the Air Forces toward a strength of 1,500,000 officers and men, the responsibilities of General Arnold for the maintenance of our air forces fighting in many theatres and his position as a member of the United States Joint Chiefs of Staff made General Arnold's promotion necessary from a command standpoint and also as a recognition of outstanding accomplishments."

Officers and men of the Air Forces will go along with that. And we'll go further. We honor it as a reward for able, inspiring leadership, and as a symbol of the position air power holds in the military future of our country. And, with due modesty, each one of us—from C.O. to rawest recruit—feels as if he had received a personal pat on the back.

NEW CADET TRAINING PROGRAM

THE new aviation cadet procurement program includes several important changes in procedure for Air Forces enlisted men desiring to qualify for air crew cadet training.

In the first place, the more stringent Form 64 physical examination will replace the modified version of the Form 63 test formerly used. This means that the enlisted applicant will have to pass the tougher examination before being transferred from his present unit.

Then, too, except for a small percentage of applicants who are exceptionally well qualified from an educational standpoint, most of the successful enlisted applicants will be sent to one of a number of selected colleges throughout the country for "pre-aviation cadet training". This training will consist of 60 hours credit in each of five academic courses: modern history, English, geography and mathematics (through trigonometry), and 180 hours of physics. Additional courses will cover drill, military discipline, customs of the service, and physical education.

A third feature of the new plan, which differs somewhat from the old Air Forces system, is the increased responsibility of the company or organization commander to effect the release and transfer of enlisted men. Here, briefly, is the new procedure:

The enlisted man obtains a birth certificate and three letters of recommendation and asks his company commander for Application Form No. 60. (C.O.'s have been directed to have these forms available at all times.)

The completed application, the birth certificate and the letters of recommendation are turned over to the company commander, who then has the authority to indorse or reject the application. (Under the new regulations, rejection should not be forthcoming without due cause.)

With the necessary indorsement, plus the application, birth certificate and letters, the enlisted man is directed to the nearest cadet examining board for the aptitude test.

If he passes this test, the applicant is advised of the nearest physical examining board which he must visit for the Form 64 examination. He then returns to his company commander.

Within a few days the physical examination forms are forwarded to the original

Changes in Aviation Cadet qualifications for enlisted men; other developments of the month within the Army Air Forces.

board. If the applicant has passed the physical, this board sends the necessary papers, with a request for transfer to pre-aviation cadet training, to the Commanding General of the Service Command in which the applicant is stationed.

The Commanding General then will issue the necessary orders to effect the transfer; the applicant's papers will be forwarded to his organization commander. The latter will attach the papers to the soldier's service record, make other routine entries and turn the records over to the applicant, who by this time is under orders to be transferred for his new training.

Enlisted men in other arms and services of the Army of the United States also are eligible to apply for air crew cadet training under the new program. They should follow the same procedure outlined above.

AIRCRAFT WARNING SERVICE

WE may not all appreciate the fact that one of the Air Forces most important units is made up of some 1,500,000 civilian volunteers, attached to our Fighter Commands.

These volunteers are the backbone of our Aircraft Warning Service. Almost all of them serve as ground observers (they object to "aircraft spotters") in the Ground Observer Corps.

General Arnold recently stated: "The service rendered by ground observers in our system of national defense is frequently misunderstood and generally underestimated. They must all realize that their part is a *vital* one in the national defense."

Now and then an Air Forces unit gets an opportunity to appreciate in full the role being played by our ground observers. This was the case recently when ground observers saved a flight of nine fighter planes lost in bad weather over an isolated section of the Allegheny Mountains. (Continued)

Peculiar atmospheric conditions prevented the flight from maintaining radio contact with base. The flight could receive messages but couldn't send any. Ground observers in the area didn't know that, of course. All they knew was that planes were circling overhead. But continued and accurate reporting by several observers, whose reports were flashed back to an information center and charted on an operations board, led to only one conclusion: the planes were lost; something was wrong with their radio.

In the hope that the ships might still be able to receive messages, a controller at the information center radioed position on the pre-arranged frequency for that flight and gave instructions on how to proceed. Almost out of gas, the planes immediately straightened out their course. Shortly after, they all landed safely.

For the ground observers it was all in a day's work—the type of work being done on a 24-hour schedule at thousands of observation posts throughout the country. And sometimes the work is carried on despite hell and high snow. For example:

After heavy snow had made it impossible to commute to the Live Oak Mountain observation post in Oregon's Camas Valley, it looked very much as if the post would have to be abandoned. The ground observers held a meeting to find out.

"Not if I can help it," shouted a wiry little middle-aged woman. "If Jane will come with me, we'll go up there and live until the roads are clear again." Next day

the two women left with winter supplies to dig in at the lonely mountain shack. For 72 long days and nights they kept around-the-clock duty.

In all this time, not one plane flew over the post. Yet, this negative information, reported regularly by the two women, was just as important to the Air Forces as if there had been a flight every hour. That's a hint of the intricate mechanism behind our Aircraft Warning Service.

Insignia for Instructors

Gold wings sleeve insignia have been authorized for wear by flying instructors of the Army Air Forces during the time they are assigned to such duty. An instructor who has satisfactorily performed a total of six months' duty as flight instructor will be authorized to wear the insignia permanently. The gold wings, embroidered in silk, are two inches from tip to tip, of the same design as the Air Forces insignia, omitting the propeller.

The insignia will be worn on the middle line of the outside half of the right sleeve of the service coat, four inches from the end of the sleeve.

Tenth Air Force

At bases in India and China, thousands of miles from its birthplace at Patterson Field, Ohio, the Tenth Air Force on February 12 celebrated its first birthday.

We have just received a summary of the Tenth's activities during its first twelve months, as it was presented that day by Brigadier General Clayton Bissell, commanding.

The Tenth is described as a melting pot of air personnel, with men of the basic organization and those who have since joined it from the States, fighting alongside men

who, before joining the Tenth, faced the enemy in the Philippines, Java and Australia, and in China with the American Volunteer Group, and men who were the first to bomb Tokyo.

As members of the Tenth Air Force, the summary reported, they achieved at least 165 confirmed victories in the air (presumably as of early February—Ed.), or an average of seven enemy planes destroyed for each one of their own lost. This included the destruction of many Jap bombers, against only three lost by the Tenth, according to the summary. Disregarding bomber losses, the score in China stands at eight victories over the enemy for each plane lost by the Tenth. Also reported was the destruction "of at least eight enemy planes on the ground for each tactical plane we have lost."

About bomber operations: "From our principal bases in India to our most routine targets exceeds the distance from British bases to Berlin. And again, we may enter modestly a claim unrivaled by any other combatant air force in any other theater. Our raids against enemy objectives in Bangkok, Thailand, represent the greatest distance flown from base to target by any bomber formation thus far in the war, in any theater at any time. For missions flown we believe we stand incomparable for the shipping losses we have inflicted on the enemy."

General Bissell called establishment of the air link to China over the Burma Road "one of the proudest chapters of the Tenth Air Force," explaining: "The operation of the India-China transport line is no longer a responsibility of the Tenth Air Force. Our present task is merely to protect it, but let it not be forgotten that the Tenth Air Force inaugurated that service, protected it from interruption, and for the best part of 1942 kept it operating through the monsoon and severe icing conditions which came with cold weather. That feat played a vital role in keeping China effectively in the war."

On the humanitarian side: "In our earliest days, when our serviceable equipment could be counted on the fingers of one hand, we answered an emergency call by our major ally in this theater for help by flying into Burma a battalion of fully-equipped troops. Returning, we rescued from the enemy over 400 women and children in combat bombers turned into transports. A few weeks later our new ferry command devoted its planes to a similar service, bringing out from northern Burma bases more than 3,600 refugees, plus more than 600 wounded Allied ground fighters . . . When Burma fell, large numbers of our Chinese allies were stranded in the jungle canyons in upper Burma. For weeks and months that brave band of allies, never giving up, were fed by Tenth Air Force planes, which literally reenacted the parable of the ravens feeding Elijah. Until they could find a way out of the mountains into Burma weeks later, food and medical supplies dropped by Tenth Air Force planes gave them strength to fight their way out, to face our common enemy once more in the future."

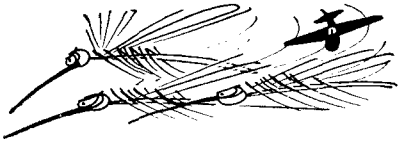
Legion of Merit

A new decoration, the Legion of Merit, is being awarded to members of the armed forces who, after September 8, 1939, shall have distinguished themselves by "exceptionally meritorious conduct in the performance of outstanding services where the service performed was not necessarily in a duty of great responsibility warranting the award of the Distinguished Service Medal."

Mosquito Patrol

With malaria a Number One health threat in the Caribbean area, a mosquito patrol has been established at Losey Field, Puerto Rico.

A belly tank from a P-39 has been attached to the underpart of the fuselage of an O-49 and equipped with a small pro-



peller. The tank is filled with a mixture of paris green and lime. This "ammunition" is sprayed on the fields and swamps surrounding the base.

The enemy (malarial mosquito) has a normal cruising range of about four miles, but with a tailwind he can fly twelve miles or more. So the patrol has to be quite extensive, especially in the direction of the prevailing winds.

We are told that the patrol is raising quite a bit of hell with the malarial mosquito pilots.

Bombardier-Navigator

The "bombardier-navigator" officer makes his appearance under a new training program for the Air Forces. Full training courses at both bombardier and navigator schools, plus five weeks of aerial gunnery, will hatch a large number of these combina-

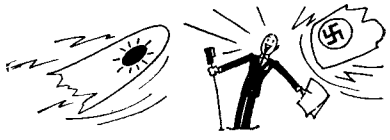
tion crewmen who will be appointed flight officers or commissioned second lieutenants at the end of the first phase of their training. Those appointed flight officers will be commissioned second lieutenants upon successful completion of the second phase.

No economizing of personnel is involved. Under present plans, for instance, many heavy bombers now carrying both a bombardier and navigator will carry two combination bombardier-navigator officers. Object: to enable one officer to relieve the other in the event of fatigue or casualty on missions. Exception: navigators trained for the Air Transport Command.

You may be wondering what happens if, for instance, a student who has successfully completed his bombardier training subsequently washes out in navigation. The answer: he retains his status as bombardier.

Among My Souvenirs

DURING a recent broadcast of a War Department radio program short-waved to troops overseas, the announcer asked his front line audience to "tear off the top of a Jap Zero or German Stuka and send it in



with your request for musical numbers". It was meant just as a gag, of course, but the answers were exceptionally realistic.

From a lieutenant in the Southwest Pacific, with a request for "Concerto for a Trumpet" by Harry James' orchestra, came the tail piece of a Zero. And from two sergeants in North Africa who wanted "Somebody Else's Moon" and "Star Dust", came a rather bulky package with this note scribbled on the contents: "Regret Stukas and Zeros not available. Will this small piece of wing covering from a German troop carrying glider do just as well? If it isn't sufficient we will send a couple of Jerries."

Retribution

A FERRYING crew was flying a medium bomber south from the States. Since the beginning of the trip, the pilot's life had been one headache after another. The plane seemed to be a jinx job. There had been engine trouble, lay-overs, bad weather, bad landings, and what have you.

As they approached a Transport Command field in the Caribbean, it happened again. The wheels wouldn't come down. The pilot flew around and around trying to dump the gear, but no luck. Finally he gave up and came in for a belly landing.

The bomber slithered along the ground. Then, the final straw. The plane caught fire. Flames and smoke enveloped it.

A crash truck, streaking to the rescue, found the crew had cleared the ship without injury. The crew members huddled around watching the fire. All except the pilot. He stood apart from the rest. With a vengeful look on his face, he was busy throwing rocks at the burning ship.

Delayed Action

CREWMEN of a B-17 had a surprise recently while flying over a quiet sector of England when a 20 mm. shell exploded in the left horizontal stabilizer. They had reason to be surprised. There wasn't an enemy plane in sight.

After the big bomber had landed, Captain Henry J. Schmidt, an engineering officer with the Eighth Air Force, began investigating. He found that the B-17 had been carrying the shell around ever since it had attacked German installations in France some three weeks before. During that attack the shell had pierced the stabilizer without exploding. The hole it made was subsequently repaired, but without knowledge on anyone's part that the missile was still in the ship.

Notes on Leadership

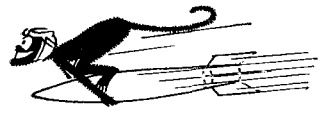
- ★ **Keep your mind open to new ideas.**
- ★ **Delay action when you are mad; don't hold grievances.**
- ★ **Obey orders without quibbling.**
- ★ **When you give orders, see that they are obeyed.**
- ★ **Get all you can out of your troops; get all you can for your troops.**
- ★ **Use velvet gloves on an iron hand; make each man believe he is the best.**
- ★ **Use only enough punishment to assure an offense won't be repeated.**
- ★ **Give loyalty to superiors; expect loyalty from juniors.**
- ★ **Remember, sins of omission are greater than sins of commission.**
- ★ **Give credit where credit is due. Don't grab credit for yourself. If your organization is good you will get credit for what your men do.**
- ★ **If you want to know about a man, ask his contemporaries.**
- ★ **Try a man by court martial only if you have to, then push it hard.**
- ★ **Set forth clearly the responsibility of every man.**
- ★ **Be positive, but don't bluff or threaten.**
- ★ **Know your men personally as far as possible, but don't enter factions.**
- ★ **Make each man in your organization feel that you are his best friend—because you are.**
- ★ **Give your own punishment; don't delegate it to staff officers, but insist on your subordinate commanders doing likewise.**
- ★ **Ride maintenance and pilotage.**
- ★ **Have an understudy for every job. Turn all jobs over to others and leave yourself free to supervise and inspect.**
- ★ **Assume that an officer does his duty but inspect, and then inspect again. See for yourself. Have an inspector on your staff. Insist on all your people making constant inspections.**

Combat Flight Patch

A RECTANGULAR patch of ultramarine blue cloth or other suitable material has been authorized as a background for the aviation badge to identify Air Forces personnel outside continental United States who are currently assigned to combat flight duty in a combat area. Qualified to wear the patch are personnel who hold effective aeronautical ratings or who are authorized to wear the aviation badge of air crew member. The patch is not a decoration or device designed for permanent wear on a uniform. When the individual ceases to serve on combat flight duty or when he leaves the combat area or theater to which assigned, the patch will be removed.

Bombs Away

A BOMBARDMENT squadron of the 9th Air Force in the Middle East has a monkey mascot named Eta. Eta has learned how to pull the handle marked "Salvo" on the B-24s with which the squadron is equipped. Eta's possessive master, Lieutenant Kenneth G. Hebert, says she has progressed quite



rapidly in her "basic training" although she is not permitted to pull the salvo handle when the bomb racks are loaded. Incidentally, Eta's name represents a contraction of the term "Estimated Time of Arrival".

Dance Floor Orders

A REPORTER on The Retake, weekly publication of the Air Forces First Motion Picture Unit, is credited with a daring exploit on the home front: invasion of a hostess' dressing room at a west coast USO center and capture of a "tactical" manual for USO girls.

The Retake reports that the captured document revealed the following questions which every USO girl must ask herself before going on dance floor duty with the G.I. wolf pack:

"1. Is your hair combed, make-up fresh, seams straight, slip O. K.?

"2. How about your posture—shoulders straight, tummy in, smile contagious?

"3. Can you go more than half way without being fresh or sarcastic?

"4. Is it the uniform or the man you're helping to entertain?

"5. Can you help make the party go when things are slow?

"6. Do you realize most of the fellows have girls back home? Enjoying your company for three dances does not mean they are seeking a permanent alliance for the duration."—THE EDITOR.

FROM A LETTER TO THE COMMANDING GENERAL —

Dear General Arnold:

As a matter of interest I am enclosing the reports of the P-38 pilots who took on a collection of about 30 to 35 fighters and bombers a couple of weeks ago. This was the first time the P-38's had ever been in combat in this theater. An analysis of these pilots' reports, written a few minutes after landing, shows 12 definite, 3 probable, 1 possible and results unobserved in 6 cases. Final returns to date confirm 15. We had 12 P-38's in the show. One of them had a forced landing at — with a shot-up engine. The airplane is repairable. The rest came home. No casualties. This batch of Japs came from New Britain and I expect that some of them in addition to the 15 never got back. The boys did pretty well for their first combat although they opened fire too far away and did entirely too much dog-fighting. They learned a lot, however, and will do better next time. Right now the morale in that squadron is so high it almost scares you. . . .

The Jap weakness and our real hope for victory is in the air. His fleet and his army can hold their own in any league but he simply cannot train airmen to compare with ours in a hurry. His original highly trained crews were superb but they are dead. His new crews cannot fly in bad weather, his night efforts are piddling and his combat skill is low. Our hurriedly trained youngsters are outflying and outshooting him at every encounter. All he has left is sheer guts. We wipe out a large percentage of his raiding squadrons but he keeps coming. . . .

Sincerely,

GEORGE C. KENNEY, LIEUT. GENERAL, U. S. ARMY,
COMMANDING GENERAL ALLIED AIR FORCES, SOUTHWEST PACIFIC AREA.

Since full names were lacking, positive identification of the pilots who made these reports could not be obtained at press time.—ED.

"I SAW HIM CRASH . . ."

Arrived Buna 1200, 21,000 feet. At 1205 saw aircraft 2:00 o'clock, low. Flight went into circling dive to right. Japs were about fifteen Zeros flying in two ship elements with no particular element formation. I kept my element (second) about 500 feet above the first element and followed. As we approached Japs, my wing man passed me and joined first element. At this time, our first three ships attacked Zeros and I dove on one Zero directly below me and to my left. I fired a twenty degree deflection shot from his left near quarter at a range of 300 yards, closing to thirty yards. His engine began smoking heavily from the cowling, the smoke completely blanketing the cockpit. The aircraft went into a vertical dive off his left wing, and I saw him crash into the ocean.

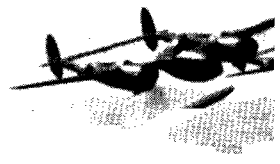
I then climbed to about 11,000 feet getting snap deflection shots at three more Zeros on my way; results not certain, but I believe I got hits on one. At this time, I saw a Zero crossing me 1,000 feet below and slightly to my right. I dove on him and he pulled around to the right, passing me going in the opposite direction.

When I looked around I found five Zeros on my tail. I nosed over into a seventy degree dive and found my left engine cut. During this dive I sighted two "Val" dive bombers. The rear "Val" turned off to the right so I opened on the leading "Val" at extreme range and fired until my guns stopped. I saw my explosive bullets striking both wings and the fuselage, and pieces flew off the wings; smoke also came from the wings. The "Val" did not alter course, but went into shallow dive gradually increasing to fifty degrees. Heavy smoke was then coming from the fuselage. I did not see him strike the water.

My plane was tending to nose up and would not indicate over 175 mph., so I went to—and managed to land. My nose-wheel door was shot up and the nose-wheel would not come down and I nosed over on landing. I found one 20 mm. hole in the horizontal stabilizer just inside the left rudder, one .30 caliber machine gun hole in the leading edge of my right wing, and one .30 caliber machine gun hole through the front end of the nose-wheel door, cutting it loose, also one .30 caliber machine gun hole through the left flaps beside and behind the cockpit.

Battle Reports

from P-38 pilots in the Southwest Pacific



"Bomber blew up . . ."

Direct to Buna, arrived 1205, 21,000 feet. Wewoka called 27 Zeros. Saw seven or eight "Val" dive bombers, seven to nine Zeros (Mitsubishi). Dive bombers low, Zeros above 2,000 to 3,000 feet; dive bombers about 4,000 feet. Bombed area old Buna Strip and went down on water to northeast.

Flight dove on a Zero. I dropped my belly-tank, took pass at Zeros without firing, dove away from four Zeros which jumped my tail, taking shot at Zero on way down without result. Reversed direction in dive, took shot at one dive bomber near Buna, missed.

Turned left; out at sea at 500 feet. Saw dive bomber. Fired at range of 350 yards, long burst; dive bomber blew up, result direct hit cannon, crashed in water.

Turned toward shore. Zero passed in front of me. I fired very short burst 50 yards. Zero crashed in water.

Zeros on my tail, so I headed out to sea. Three dive bombers ahead of me; right dive bomber pulled off to right. Zeros still behind me, so took short burst at center dive bomber without observed results.

Made shallow turn to right, found one lone dive bomber, took pass; out of ammunition, went home. Combat lasted 1210 to 1218.

"A large splash . . ."

Hood Point 1140. Identified four B-26s, 5,000 feet. Four "F's" to Buna 1150, arrived —1210, 17,000 feet. Wewoka advised 26 Zeros 17,000 feet. Could not locate, climbed to 2,000 feet.

Wewoka advised two Zeros strafing ——. Went down to 5,000 feet; could not locate. Climbed to 10,000 just north Buna, saw three Zeros low, dove on them from their front left quarter; Zeros turned into me, causing me to overshoot first two. Right Zero turned to right, left to left; center Zero did slow roll. Followed one which turned to his right, who continued evasive turns and rolls while diving slightly. I fired two bursts at 300 yards from his right rear quarter, and second burst entered cockpit. His plane dove into water in straight-ahead dive.

I continued my turn to right and saw one P-40 fighting one Zero. Zero broke away and turned toward Zero. P-40 and I both fired, saw bullets strike Zero, passed over it and did not sight it again, but I looked back and saw a large splash in the water.

I continued inland above and received order to return to base about 1250, landed 1315. Combat from 1220 to 1230. I did not see any Zeros fire at all.

"Burst into flames . . ."

Arrived——1220. Wewoka advised two Zeros strafing——. I was at 20,000 feet and due to cloud formation did not want to go down until positive no ships covering strafers. Flying under a cloud formation at 20,000 feet, chasing unidentified aircraft toward ——, we were jumped by four Zeros from the clouds. My second element turned to the left and dove. My wing man shot a Zero off my tail.

The second fleet of six Zeros jumped my tail. Number two Zero overshot and I got him as we went by. He burst into flames after a long burst, starting at 100 yards, and continuing until I had to break away to avoid collision. He crashed in the water. I saw another aircraft crash at the same time.

I continued my dive, turned to left, made a couple of turns trying to join my wing man. A Zero came across me, rolled away in front of me and down; I rolled with him, took shot but did not observe result. My second element and another aircraft chased this Zero inland with me following from 2,000 to 3,000 feet above, both ships firing. I saw an explosive shell hit in tail section. Directly after, pilot and ship went into nose-dive from 5,000 feet and crashed two miles south of ——.

There were at least 30 enemy aircraft visible during the initial contact. I do not know if they were joined by more ships later. My wing man, and my leader (second element) had become separated from us during the melee. I tried to reform the flight over—— but Lieutenant —— was only one to join me to come home.

After first burst, my right engine would not pull over 30 inches manifold pressure. Lieutenant —— and I returned 1250, landed 1315. Combat lasted from 1225 to 1240. I identified only Zeros but I believe there were Mitsubishi Zeros there. I saw no dive bombers. Aircraft had brown camouflage with silver bellies.

"No smoke, no fragments . . ."

Buna 1150, 22,000 feet. Wewoka advised two Zeros over ——. Went toward —— and saw seven aircraft low (7,000), identified as P-40s; followed above them.

I dove on flight of four "Oscars" which were off to right of main group. Observed total of 20 to 30; believe all "Oscars"; all dark brown paint, red circle both wings and fuselage, of

(Continued on Page 38)

AIR FORCES

Antisub COMMAND

By Lt. Col. C. A. Burrows

ASSISTANT CHIEF OF STAFF, A-2

Brig. Gen. Westside T. Larson congratulates Captain John Shaw and his fellow crew-members of the plane "Tidewater Tillie" for sinking an Axis sub. At right, Sergts. Jack Weems, Luther Williams and Don Everhart load an anti-sub ship with a depth bomb—at an air base "somewhere in England".

A new component of the Army Air Forces organized to combat the U-boat menace.

PROMINENT in the United Nations' program to control and eliminate submarine activity is a recently announced component of the Army Air Forces—the Antisubmarine Command.

This command is the only unit of the AAF within United States continental limits having a major operational mission, or "shooting job". Its crews patrol all coastal waters and escort merchant ships hundreds of miles out into the sea. In the offensive against U-boats they are not only prime attackers but serve as the eyes and ears for American surface vessels.

Squadrons of the Antisubmarine Command also operate overseas—in any part of the world where enemy subs may be found.

Since this work calls for specialized combat crew training, the command has a school at an Eastern sea coast base and supervises all training in such warfare. Brigadier General Westside T. Larson is commanding general of the Antisubmarine Command, directly responsible to Lieutenant General Henry H. Arnold, Commanding General of the Army Air Forces.

Destroying enemy submarines from the air by land-based planes is definitely a development of this war. The job itself is not very spectacular. Tedious patrol, conducted for long hours, is the main work of antisubmarine squadrons, with occasional bursts of fast and furious action in which a plane has only 30 to 60 seconds to accomplish the sinking of a sub.

However, unspectacular though it may be, the tracking and sinking of U-boats by Army bombers has, through increased perfection of attack, become a vital factor in the combined offensive against the enemy's undersea craft.

Origin of the command dates back to the beginning of the war. On December 8, 1941, the First Bomber Command began operations with the Navy against enemy submarines off the Eastern coast. A few months later, operational control of the First Bomber Command was placed under the Navy's Eastern Sea Frontier and Gulf Sea Frontier.

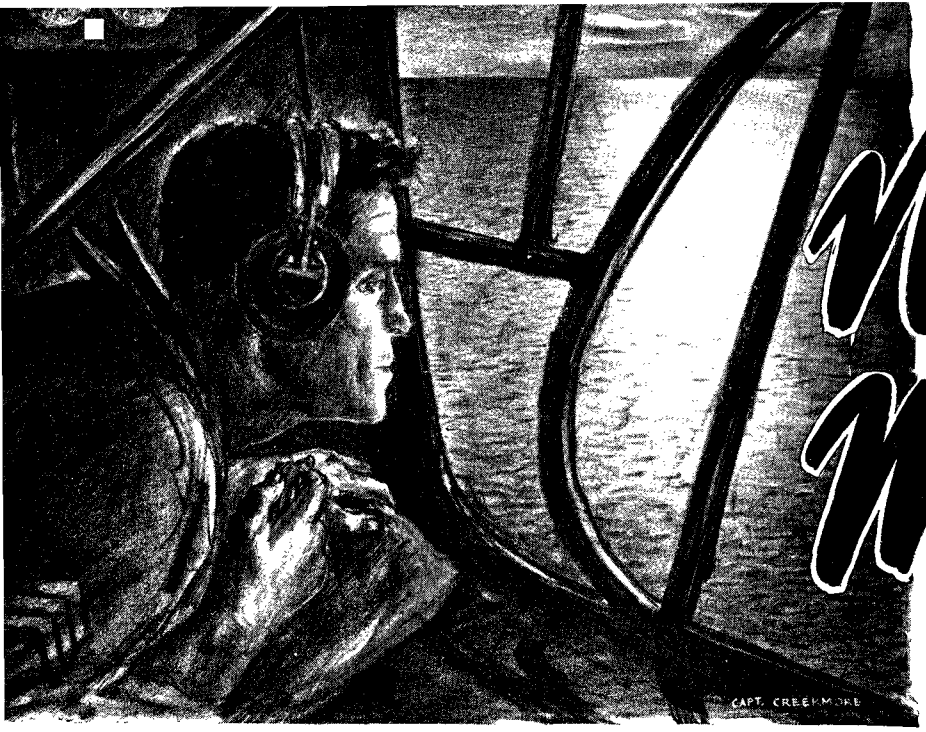
IN THE four months following Pearl Harbor the I Bomber Command and Naval aircraft cooperated with ships to protect unescorted merchant vessels from submarine attacks off our Eastern coast. Finally, in April, 1942, the Navy started escorting coastal convoys, with air escorts continuing. Meanwhile, air operations continued to expand and, in October, 1942, the Antisubmarine Command was formed with the First Bomber Command as a nucleus. The new and enlarged organization was prepared to operate on a world-wide scale.

Within the Command there are a number of Wings, which, for the purpose of receiving complete intelligence and operational data, coordinate their patrol area. At present, planes of the Antisubmarine Command are coordinated with the antisubmarine operations of the Eastern Sea Frontier, the Gulf Sea Frontier and the British Coastal Command. Other wings of an enlarged Antisubmarine Command carry the fight to U-boats wherever they can be found in the world.

The job of tracking and locating subs is a slow task. Sightings from many sources are compiled to give a complete picture of the submarine menace.

Patrols in an area of more than a million square miles are directed from control rooms in New York, Miami and overseas centers. In these rooms large staffs of Army, Navy and Allied communication experts, plotters and intelligence officers receive and evaluate reports of U-boats sighted. Here controllers give the quick orders which send aircraft and naval vessels to the attack.

Sometimes messages announcing sightings prove to be duds. *(Continued on Page 28)*



Night Mission OVER THE CARIBBEAN

By Captain Charles D. Frazer

Hunting submarines off Latin America in a B-18 is hard, tricky, relentless work.

OUR B-18 is in a long turning dive toward the sea.

Twelve hundred feet . . . now 700 . . . 300 . . . 100. In a final rush the bomber levels off at 50 feet and hurls her bulk across the surface like a gallant old cavalry horse making a charge.

There may be a sub ahead. We don't know. Dusk has settled on the Caribbean, merging water and sky into a gray, shapeless mass.

Suddenly, the interphone crackles. It's the bombardier.

"I see something, Lieutenant, dead ahead."

The pilot steadies the ship, then shouts the order: "Bomb bay doors—open."

There's a creaking in the belly of the fuselage. And now we all can see something —something dark and indistinct and apparently motionless on the water.

Once again the bombardier cuts in. This time his voice is dead with disappointment.

"Too bad, Lieutenant. Only a schooner."

The B-18 lifts her nose, starts a climbing turn. A few stars have come out. They seem to spin round in the plexiglas ceiling of the cockpit. At a higher, safer altitude we circle and fly over the vessel, now clearly visible below. Since there's nothing suspicious about it, we resume the original course. Better luck next time; the night's still young.

This mission began, actually, at 1645 in the afternoon from the base of an Antisubmarine Command bombardment squadron attached to the Antilles Air Task Force. The base is many miles from headquarters. A few barracks, a runway, a control tower—that's about all. Hidden in thick jungle, the base is raw and rough and damp. Bugs and mosquitos are a constant diversion, malaria and dysentery a constant threat, snakes abundant and varied.

But this is a key airfield of the Caribbean Sea Frontier, which—except for part of a shipping lane to the far north—is the most active submarine area in the Atlantic Ocean. Here a Joint Army-Navy Command works ceaselessly to control the raids on vital merchant shipping.

THE crew on this night mission is made up of First Lieutenant Lionel J. Cormier, pilot; Second Lieutenant Roger T. Shaw, copilot; Second Lieutenant Peter J. Stampon, navigator; Sergeant Hal B. Page, bombardier; Corporal Ralph Bush, radio operator; and Pfc. Allen Guthrie.

After an early dinner, we assemble at 1715 in the Operations Control Room for briefing.

A blue steel board flanks one side of the room. On it is charted the position of surface ships, the probable positions of submarines, the position of both Army and Navy aircraft out on missions, and a maze of airplane courses, or tracks. These tracks are established hours ahead by Group Headquarters and transmitted to this base.

"You will fly the Nan mission."

First Lieutenant Charles Havens, S-2 of the squadron, indicates the course on the board. It is a point-to-point-and-return, first northwest, then practically due west.

"This is a preliminary sweep," Havens continues. "A convoy of ships is due into this part of our area. You will sweep it clear tonight, and Navy PBYs will provide cover until the convoy is through.

"There's a German submarine somewhere in this vicinity." He points to a far-off section of the Caribbean where it was last seen. "It's reported to be 200 feet long, with the conning tower in the middle.

"This is the only one we feel certain is in the area. Another was reported—here—by a transport plane but Headquarters has no supporting data on it.

"Two or three other subs, however, may be on their way up from the coast of South America to intercept the convoy. We know they were operating down there just a few days ago because one convoy lost some ships."

Havens hands our navigator a map and begins to give more technical instructions.

"There are no vessels patrolling your area tonight. But an American submarine is anchored off a harbor—here. Don't drop anything on that.

"As you know, French or Spanish ships

Y, DAVY JONES

occasionally go through your area. It's particularly important to report their courses.

"The weather should be good. There are clouds over this island but the Mike mission ahead of you reports high ceiling or none at all at sea. With a full moon, your visibility should be excellent.

"Recognition signals will be good 'til eight o'clock tonight (midnight Greenwich time, by which all operations are gauged). Weather signals are good 'til one o'clock.

"Let us hear from you, of course, if anything unusual happens. Otherwise, maintain radio silence at all times. If you have to break it, break in code only."

After one or two questions by Lieutenant Cormier, the briefing is over. It is 1740. We leave the operations barrack, drive in a staff car along a road lined with tall grass to a cleared patch where our B-18 is dispersed.

Cormier, a young, heavy-set chap from New Bedford, Massachusetts, turns and grins. "I hope you're not superstitious." He nods toward the nose of the plane. Her nickname is "Friday The 13th."

Each crew member is dressed in a coverall and wears a pistol, a long knife and a canteen. If you're forced down in this jungle, it is no cinch to get out. One plane, some months ago, crashed only a few miles to the east and it took twenty days for troops to reach the spot on foot through swamp, trees, vines and bush.

Our parachutes have emergency supplies packed in the seats and the airplane itself carries equipment against a landing at sea. There are two rubber rafts containing rations and radio sets which automatically can send SOS messages. To one of the rafts is roped a five-gallon wood keg of water.

The plane is further equipped with a Tommy gun, a hatchet and a supply of smoke bombs.

These smoke bombs may be especially useful. Should we find and attack a sub, one of the bombs can be dropped to serve as a marker while we turn. Or, if we think our navigation is off, we can drop a smoke bomb and get a drift reading.

The loading for submarines consists of heavy depth charges slung in the bomb racks. One will do the business, if the hit is close enough but they carry plenty for a pattern if necessary.

Boarding the plane, Cormier says: "Remember, if we have to make a water landing for any reason, get in the back of the ship and brace yourselves." Our Mae Wests are strapped on.

The engines are switched on, warmed awhile. Then, at a "clear" from the tower, we roll onto the road, taxi along, and finally stop at the foot of the runway. This runway is well concealed between sugar cane paddies on either side. From the ground, you couldn't see it fifty yards away.

Rev the engines now. It's 1758 and we're scheduled to be off within two minutes.

From the tower: "O.K. You're clear to Number One."

"Roger, thank you."

Heavy yet somehow graceful and responsive, our B-18 gathers speed, takes off smoothly, gains altitude, and makes an easy bank to the left.

Darkness comes quickly in the tropics. The sun is sinking red into the sea ahead and already lights are showing in native shacks behind us.

We switch our earphones from R1 to the interphone connection and a voice inquires:

"Bombardier to pilot. What does your altimeter read, Lieutenant?"

After he gets the reading, there's a pause, then:

"What's your airspeed?"

"120."

"Roger, thank you."

LEAVING the jungle and sugar fields and swamp, we are out over water now, passing west of the harbor where the American submarine is anchored. Several merchant vessels are also in the harbor, and many of them obviously will not sail for awhile. Battered and damaged, some of them listing, they have been hauled in for repairs. Nazi subs are tough down here.

Barely half an hour from the base we made that first run on the schooner—and had our first disappointment. You really wouldn't expect to discover a sub so close. But there's no telling. Enemy sub commanders are audacious and tricky. They always get within 1,000 yards of their quarry and have even been known to surface in the middle of a convoy, sending out their torpedoes and shells in all directions at point-blank range.

Following that run on the schooner, we regain altitude and fly at 1,200 feet.

Stampon, the navigator, comes up from the bombardier's cabin to squint through the driftometer. Since there is virtually no wind, the copilot accuses him of looking for mermaids. Why not? Nice night for it.

The pilot glances out his window at the port engine. The exhaust flame is a bright blue. "Blue coal"—too rich a mixture. He adjusts it until the flame is the reddish-orange of a lean mixture. Down in the Caribbean, where there's a shortage of many things, you have to conserve gas.

The automatic pilot is switched on and we drone along our track, peering out the cockpit windows, scrutinizing constantly the dark gray surface below. Ahead, about fifteen degrees to the left, is a rain squall, a rather lively one. There's another further off to the right. They can nearly always be seen in this climate.

Presently the pilot's gaze fixes on the north. A tiny light is twinking at what appears to be horizon level.

"We'll go up and take a look."

The bomber turns slowly. There should be no lights, of course. Ships in this area do not carry them, nor do aircraft. Except for the instrument panel, our plane is as dark as the sky around us.

This light might be a rescue party at work or something else extraordinary. On and on we fly, but seem to get no nearer. That light's a hell of a distance away and the crew, discussing it on the interphone, decides that it must come from an island fifty miles off. This turns out to be the case. After a little, we can see the deep shadow of land.

Since this investigation has taken us some distance from our prescribed track, the navigator is busy with charts and graphs. He will plot a new course from this point.

"O.K., Lieutenant, you can change course any time now," he says, and gives us a new compass direction. Friday The 13th swings gently and heads west. We will fly for nearly two hours on this track.

Anti-submarine work by this Bombardment Group is offensive warfare. This is quite different from the defensive tactics employed elsewhere—that is, day-after-day patrol of specified areas.

Colonel Charles A. Born, commanding the group, believes that the true function of aircraft is to attack submarines before they can do any damage. His intelligence staff at headquarters closely analyzes sub operations both in and outside the area, and predicts future operations.

On the basis of known and predicted data, Colonel Born's staff—in collaboration with the Navy—schedules missions according to where subs are expected to be. Squadrons of the Group provide coverage for convoys passing through, naturally, but more often their missions are to seek, find and bomb. If and when four-engine planes become available, Colonel Born hopes to send them ranging far into the mid-Atlantic to intercept the Nazis before they can reach the Caribbean.

Headquarters of the Caribbean Sea Frontier plots its information on a master board far more complex than those at operational bases. Working in a Joint Control Room, Army and Navy officers pool their data, chart positions of all ships and aircraft in that entire section of the Atlantic.

Every reported submarine has a designation. Every attack on a vessel is charted, as is every sighting or attack on a sub, the location of wreck survivors, the location of torpedoed ships, the estimated past course of a submarine and its possible future courses.

Through such intelligence as this, the Control Room establishes complete coordination between Army and Navy aircraft, and between all aircraft and surface patrol vessels.

But submarine control remains a most difficult problem. The odds are heavily on the enemy's side.

Night air operations are effective only when the moon provides some measure of visibility. On bad nights, aircraft are confined to the actual coverage of convoys.

It is hard to hit a sub. Air attacks depend largely on surprise and generally the enemy can see you before you see him, no doubt aided by special aircraft detecting equipment. He can crash-dive in about thirty seconds, leaving only a swirl on the water. You can drop your depth charges ahead of the swirl but he may have turned right or left

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

as he dove. Rarely can you tell whether you hit him. Oil may appear on the surface; he may have shot it up himself. Debris may appear. But subs have been known to carry debris to shoot up, merely to mislead attackers. The German being what he is, it is not beyond reason to suppose that survivors have been sent up to the surface for the same reason.

Contrary to opinion, submarines do not have to come up each night to recharge their batteries (although this must be done frequently), nor do they require mother submarines. An ordinary sub can carry fuel for three months' operation, ample for voyages back and forth to the French coast.

The B-18s of the Group attack usually from about 50 feet, using no bombsight whatever or only a simple strip of adhesive tape across the nose panel.

But it is not frequent that a crew has a chance to sight and attack a U-boat. The crew of Friday The 13th had made an attack two weeks before our flight—doing certain damage yet not scoring a "kill". Since then, they hadn't even glimpsed one.

The time is 1925—we still have an hour to go in this direction.

Cormier turns the stick over to Lieutenant Shaw, copilot, and hunches through to the rear of the plane. Soon, there are sharp cracks just behind the starboard engine. A machine gun. Back there, to relieve the monotony, the pilot is practicing. As he fires at the ocean, you watch the fiery tracers as they seem to curve downward until they plink into the water.

After what seems an endless flight, the navigator announces that we have reached our destination point. It is 2030 and we're two and a half hours from the base. Friday The 13th makes a ninety-degree turn to the south.

WHILE the copilot flies, Cormier sets his face toward the moon to scan carefully every square mile of that silver water. Occasionally the sheen is broken by the shadow of a cloud but otherwise—nothing.

Soon we make another turn and are on the track home. We will cover virtually the same route. Ahead of us, the Mike mission is flying a box-like course and later missions will have still different tracks, so by morning the whole area will be chequered.

Off to our right is a flat, bald island. There's nothing on it except herds of goats. Every so often, however, a plane will make an emergency landing there. Flying low over it, shining our spotlight, we find nothing.

Below, on the water, is a slender, wavering line. Down in the bombardier's compartment, Sergeant Page explains it. "That's oil. The wake of a ship. It may stay on the surface for days or even weeks."

After many missions of this kind, he knows the habits of submarines intimately and tells about them.

"The best time to catch one is when he's refilling his torpedo tubes. He can't dive until his tubes are closed and that gives you a little bulge on him. If he's only charging batteries, he can crash-dive on you."

It has to be really fast work, then?

"Yes, *sir*. To be sure of a kill, you've got to drop a charge on him within 30 seconds after he starts to crash-dive. It has to explode within fifteen feet. Otherwise, all you get is a probable.

"And it's next to impossible to surprise a sub. They're smart, these Germans. When you see one, you got no time to lose."

Our plane has been droning on mile after mile. Suddenly Page claps a hand to his earphone, stiffens and peers eagerly ahead.

"We've got a target," he whispers.

WE do not have to be told. Friday The 13th has gone into a dive—steep and aggressive. The water rushes up at us, nearer, nearer, right into our faces, until at last the pilot pulls out and we find ourselves a bare twenty feet above the surface. Our altimeter, set at fifty feet, reads less than zero.

We have turned right toward the darkness outside the moonpath. Page pulls a switch to open the bomb bay doors, another to unlock the racks. Maybe, just maybe, we're in luck.

There—something dark on the water, directly ahead at our eye level. We're rushing toward it. The Sergeant's hand grasps a lever, ready . . .

Oh, hell.

"Another schooner, Lieutenant," Page cries into the mouthpiece.

We're still walloping along toward the schooner and the top of its masts are higher than we are. Had it been a sub, we'd have been right on the button. Nice flying.

Our plane pulls away to the right, banks and climbs, circles, returns for a closer investigation. Same old story—nothing suspicious. Disgruntled, we head for home, still an hour or so away.

Approaching an island base and a harbor, we see flares rising into the sky. It's the American submarine, taking no chance of an attack from us. Don't worry, Captain, we know about you.

Soon we're nearing our own field. The runway lights go on and we call the tower. Our radio fails just as we are about to land but that's all right. Old Friday The 13th puts her wheels down exactly at 2300.

Lieutenant Cormier and his crew will be out again tomorrow night or the following morning. Submarine control is a high priority problem, equipment is limited, and crews here are flying 100 to 120 hours a month.

Old Friday The 13th taxis back to its dispersal point. All tenseness gone, crew members kid each other like a winning football team in the shower room.

A tractor comes out to meet us, draws us backward into the "hardstand", the engines are cut and we climb out, glad for the chance to stretch.

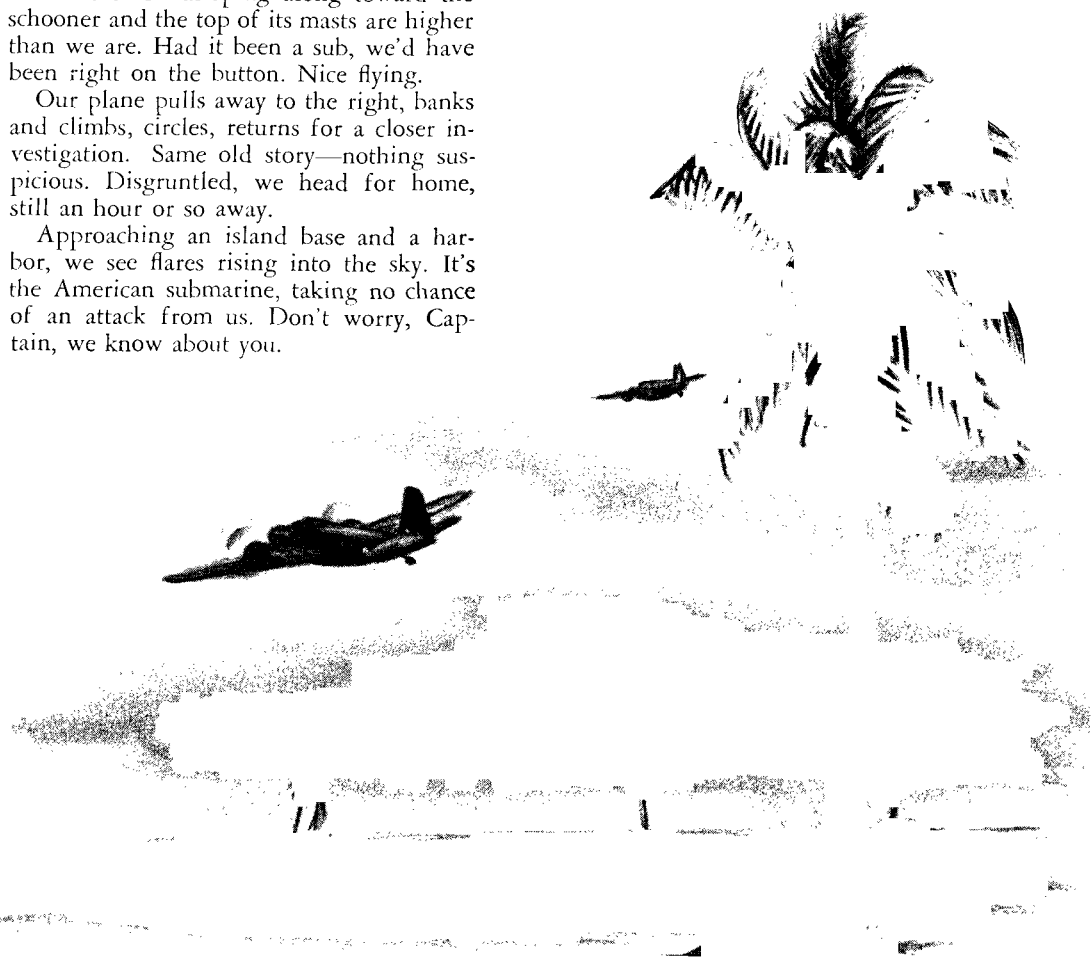
Back in Operations, Lieutenant Havens questions us about the flight and makes notes of every detail. The crew answers with the glib cheeriness of men who know they've done a job well.

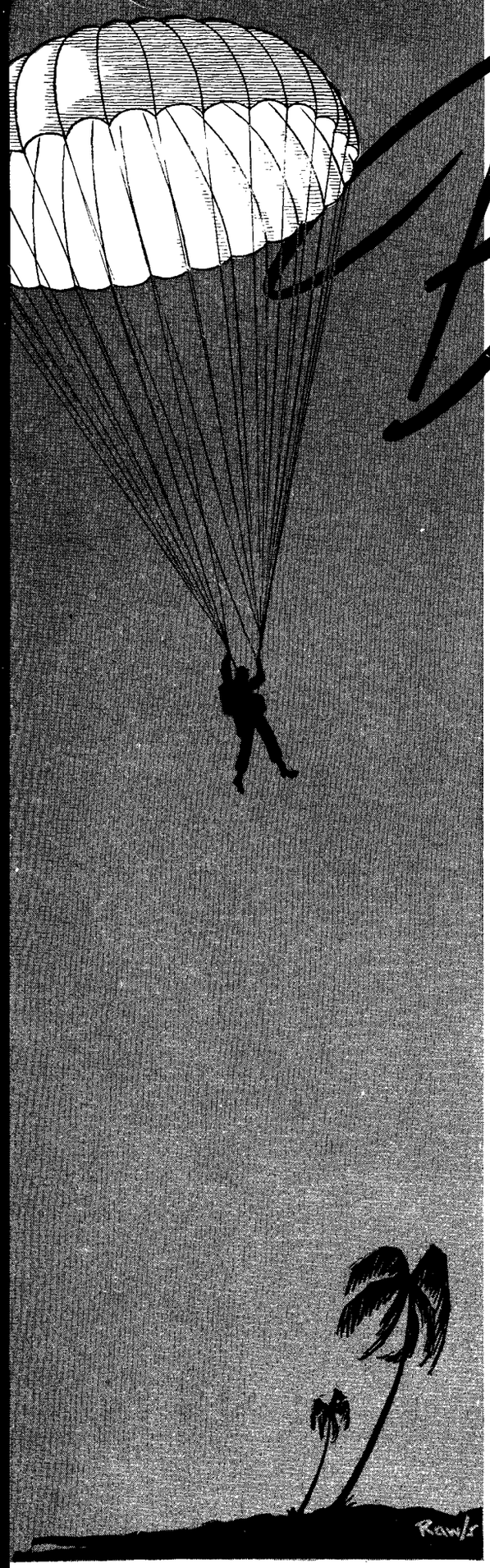
"You couldn't have swept the area better with a broom."

Shaw, the copilot, grins and says, "We sorta picked your teeth with the masts of that schooner, didn't we?"

Soon the mission is completely over. We have done what we could for the convoy, perhaps kept a couple of subs down, at least. Tomorrow the PBYs will take over.

We can't go to bed yet, naturally. Everyone has to have a coke in the club and talk a while. But it breaks up around midnight. Tomorrow is another day. ☆





Bail-out OFF AUSTRALIA

There are lessons for every airman in this fighter pilot's story of survival

THIS is the story of Lieutenant Clarence E. Sanford, pilot of a fighter group operating with an advanced echelon off the northern tip of Australia.

On the fourteenth of March, 1942, Lieutenant Sanford, on an interception mission with three other American P-40s, encountered twelve Zeros and ten Jap bombers. Six Zeros were downed in the melee. Sanford, who accounted for two, chose to chase one of the bombers.

His P-40 was pretty badly shot up. The only instruments he had left were his airspeed, altimeter and compass; the canopy was gone, and Sanford himself had caught a grazing foot wound. The remaining Zeros caught him at 15,000 feet and mauled him further. He got away from them through a 1,500 foot overcast, but when he pulled back up to 9,000 feet, his wheels were down, the hydraulic system shot up, and the right wing heavy. Altogether, his P-40 was in a very decrepit state. He headed south and west, and just as his fuel gave out, he saw land.

Sanford bailed out over water at about five in the afternoon, three miles from shore, carrying only his jungle pack. He got out of his chute fifteen feet before he hit the water. To his dismay, his Mae West failed him. He got rid of it, and discarded his shirt, shoes, and sox. The jungle kit got waterlogged quickly as he swam. He discarded it as useless, salvaging only the machete. But the machete impeded his swimming. It began to weigh a ton and to assume the proportions of a fire-axe. He tried holding it between his teeth, but it cut his mouth. Finally, in desperation, he let it go, and struck out in earnest for the distant land. Luckily, the offshore tide was slack and, with the last strength remaining in him, he stumbled up on the beach and promptly fainted.

Sanford came to before dark. The prospect was bleak and terrifying. He found himself on a sandy, barren island he judged to be about five miles long and two miles wide. Frantically taking stock of the situation, he found himself appallingly defenseless. Inventory: one religious medallion, one ring, one pair of shorts and a shocked Sanford inside them. Exhaustion mercifully blotted out the prospect in sleep on the beach.

HE awoke in a blazing sun. He was hungry and thirsty. He hunted for food. He caught sight of a "dingo" (native dog) but couldn't get near it. Finally, he found some shrub roots with nodules on them. They were soft to the bite, proved edible. There were some leaves, too, which he nibbled. He found he could get water by scraping the sand some hundred yards from the shore. The water seeped up. It was brackish, but it was free from sea salt. All this time the sun blazed. Sanford estimated the temperature at well over 125°F. There was no shelter, no shade. He began to burn painfully. The symptoms of sunstroke came on. Late that afternoon, in a mental bout with fantastic colored images, he lost consciousness.

This time, he was awakened by a sensation of the presence of life near him. Three Caledon Bay headmen stood their distance, eyeing him intently. One held a spear in readiness.

"Are you Jap?" came the query from

A PERSONAL EXPERIENCE COMBAT REPORT FROM THE

the spearman, using three of his twelve words of Pidgin English. Sanford shook his head violently in the negative.

"English?"

Sanford replied: "American."

They didn't seem to understand. Sanford pointed vaguely to suggest that he came from far away. He wasn't doing too well. Suddenly, the spearman pointed to the medallion and asked: "Jesus?" Sanford nodded "Yes." There was a prolonged pow-wow among the three natives. They came closer. Sanford, lying there, scratched a rough outline of Australia in the sand and asked them in sign language to point out his position. They seemed to understand and pointed it out.

Finally they seemed to reach an agreement. They carried the helpless Sanford away from the beach, dug a hole in the sand, laid him in it, and covered him with leaves and branches. Then they brought him turtle eggs to suck, and fish which they speared ingeniously in the surf and cooked in a fire started in boy-scout wood-spindle fashion. Sanford didn't eat much. One of the eggs was bad. Finally, the natives covered him with sand as dusk fell. He couldn't sleep. He was scared. He had feverish visions of a cannibal feast. He could see the waiting pot.

In the morning, he felt stronger and started to hike with the natives to the end of the island. The hot rocks burned his bare feet. His sunburn broke into blisters. The three natives talked about a "missionary" and pointed toward the mainland. They came to a dugout canoe drawn up on the beach. There was another long pow-wow which left Sanford apprehensive. It turned out the Caledons were waiting for the tide. Finally, late in the afternoon, they set out in the canoe across five miles of water toward the mainland. They sat close to the water and schools of sharks bumped the frail craft. Sanford didn't like it at all.

They got to the mainland all right. They left the canoe on the beach and struck out along the shore on foot. Sanford got woozy again and rested. The natives brought him water. His sunburn was torturing. Open wounds began to appear. He struggled into the sea-water at intervals for temporary relief. The Caledons didn't seem to understand sunburn.

Sanford doesn't remember, but he thinks they spent the night on the beach. In the morning, they resumed the trek again. His feet were terribly swollen. The skin cracked open. Wantjuik, the spearman, removed his own loinknot, tore it into strips, and with some green bark made mocassins for Sanford's feet. That helped. They hiked on. They ate more turtle eggs and raw fish. They drank brackish water seeping up from the scraped sand.

Sanford was still apprehensive, felt he was being spared only to become cannibal bait. He armed himself with a jagged piece of coral. Wantjuik sensed his fear. He took the coral out of Sanford's hand, had another pow-wow with his buddies, and suddenly all three broke into the hymnal strains of "Don't pass me by" sung in native Kopapingo. Sanford couldn't appreciate the humor of the situation. But he began to feel reassured. Physically he was deteriorating rapidly. His sunburn was excruciatingly painful; his tongue had begun to swell; his liver had gone bad, and the symptoms of yellow jaundice were setting in; he was feverish. When he cried out in pain the Caledons laughed aloud. They couldn't understand it.

The trek to the mission covered 50 terrible miles, alternately along the beach and back into the bush when steep cliffs intervened. Sanford gave out completely some five miles outside the mission station. Wantjuik picked him up and carried him in. One of the Caledons went ahead bringing the news. The missionary came out to meet Sanford, bringing bully beef and water. The pilot was put to bed, suffering from jaundice, fever, sunburn, and shock.

The experience related in this article is one of the many gathered by the Arctic, Desert, and Tropic Information Center at Eglin Field, Florida. It is the function of this organization to prepare and disseminate information on all aspects of Air Force operations (maintenance, health, shelter, clothing, etc.) in non-temperate zones. Information on forced landing procedures and survival is a major interest of the Center. All Air Force units are invited to request such information from the Arctic, Desert, and Tropic Information Center.

The missionary called Darwin on his pedal wireless, and did what he could for Sanford. The three natives were rewarded with tobacco and a bolt of cloth. They felt kinglike and were local heroes. Later, Sanford learned that they had seen him bail out and regarded his descent as a major miracle. They frequented Sanford's island for one or two days each six or seven months on hunting expeditions, and their presence was Sanford's great luck. They had been educated at the mission, knew a little about Australian geography, knew about the war and hated the Japs (who annoyed Caledon women on their local pearl-fishing expeditions).

After a week and a half, Sanford was transferred by mission boat 350 miles up the coast to Millingimbi, the main mission station in the region. He stayed there for five days and grew steadily worse. The missionary wirelessed to Darwin, describing his critical condition. A Hudson bomber flew out and brought Sanford back to Darwin—just in time to catch a strong Jap bombing raid. It proved almost the last straw when a bomb fell just a few yards from where Sanford lay. Finally, however, he was transported to Brisbane where he spent eleven weeks in various hospitals. Several months later, and apparently none the worse for wear, Sanford came home to the States.

His story holds a significant moral for every combat crewman. Sanford now states that if he knew when these events transpired what he knows today, much of his suffering could have been avoided. His native resourcefulness and his great good luck were the sole factors in his survival.

In examining Sanford's experience, these vital facts stand out:

1. Before you set out on a given mission, check your emergency equipment. If Sanford had checked his CO_2 bottles, his Mae West wouldn't have failed him. Also, if he had considered the possibility of bailing out over water, he would have carried a flotation-type emergency kit. If Sanford had carried a map of the region in his plane and had oriented himself during the flight, he would have had an idea of his position—an important factor in survival.

2. Stay calm when you are face-to-face with a forced landing or bail-out emergency. Weigh the factors. Don't get frantic. If you know what you're doing, you can survive even under the most discouraging circumstances.

3. Knowledge of the terrain and conditions under which you are operating is all-important. It prevents hysteria and panic. It's insurance for survival. Sanford would have been helped measurably if he had known more about the natives and their language; if he had possessed a practical working knowledge of the edible plant and animal life of the region, and if he had known how to obtain and use them. He learned the facts when he watched the Caledons. Sanford had no grasp of the terrible effect of the sun on the exposed body. He could see no way of escaping the sun once his clothing was gone. There was no shade anywhere. Yet there was a way—the natives showed him how to dig himself into the sand and to cover himself with brush. Today, Sanford declares that if he had possessed this knowledge, he would have had the utmost confidence in his ability to survive for months if necessary on his desolate island. ☆

ARCTIC, DESERT AND TROPIC INFORMATION CENTER

Flying IN THE CELLAR

By Lieut. Lawrence P. Bachmann

DIRECTORATE OF TRAINING AIDS
SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

THE other day seven of us were up to 38,000 feet for three hours.

We didn't go anywhere and didn't see anything. We didn't have to wear winter flying suits and took no parachutes along. We were on a flight in a portable decompression chamber, or, as someone described it, "We went cellar flying."

We were at 38,000 feet, all right. We were up there just as surely as any crew flying that high ever was there. If you don't believe it, try cellar flying. When you get to 38,000 feet take off your oxygen mask. Chances are you'll remain conscious just fifteen seconds.

Flying in the basement is not being done to amuse or keep busy the scientists and research men. There is a definite tactical reason why every man on flying status must be tested for his ability to take high altitudes.

Everyone knows the advantages of an airplane with high ceiling. We know how high our planes can go. We have tested them. But we don't know how high the men who fly the planes can go. And that is what we are finding out.

It would not only be stupid, but criminal to send a man to 38,000 feet without knowing whether he could stand such a height. We can provide him with the best oxygen equipment available and everything else. But that is not enough. The final answer lies in the man himself, in his body—can he take high altitude?

THERE are several large decompression chambers at centrally located places, but valuable training time would be lost if men had to travel to and from these points.

Portable decompression chambers were developed several years ago. At this moment trucks pulling trailers which resemble a cross between a small gasoline tank and a cement mixer are rolling up to our airfields all over the world to test flying personnel for high altitude work.

Let's do some basement flying. It is dark outside when we report to the officer in charge of the chamber. We fill out cards, leaving blank the space provided for symptoms until the end of the flight. Then we are carefully fitted with oxygen masks.

"Just cover the end of the hose connection with your hand," advises the officer. "Breathe in. If the mask has no leaks, it will collapse around the sides of your face."

The outside door of the chamber swings open heavily and silently, like the entrance to a bank vault. Seven men come out. Their oxygen masks are taken from them by other members of the crew. The masks will be sterilized for the next group.

"All right. You're up now," says the officer. "Lieutenant Smith is going with you. He is your flight officer."

Lieutenant Smith grins and leads the way. He's built like a football coach's dream of an All-American guard.

Starting up the steps, we have to shout loudly through the mask to make him hear.

"No, we don't stop running the cham-

ber," the lieutenant replies to a question. "It goes twenty-four hours a day except when we're traveling to the next field."

We enter a small anteroom or chamber large enough for two people. Then through another open door and into the large working chamber. It is about ten feet long, seven feet wide, and six feet, two inches high. Two benches run along the length, facing each other. Above the benches, attached to the wall, are the oxygen lines with outlets and regulators.

"Take any seat," says Lieutenant Smith. "Three on each side. Hook the hose connection into an outlet and you're all set."

THE flight officer sits perpendicular to the two long benches, facing the door. Now he puts on his mask and tests the microphone. He is the only one equipped to talk to the outside. Conversation is carried on through a loud-speaker system.

There is a heavy thud and a metallic clang. The door is shut. From the distance the sounds are repeated. The other door between the lock and the outside is closed.

"Are you all ready, sir?" The voice is metallic and hollow through the loud-speaker.

The flight officer looks at the six of us. We nod in turn. Nothing can be heard but the slight suction of the regulator each time we inhale.

"Take her up!"

"Three thousand feet, sir—6,000 feet—9,000 feet—." The voice drones every minute.

We sit on the benches facing each other, saying nothing.

"Thirty-eight thousand feet, sir. We're leveling off. Everything okay?"

Again Lieutenant Smith looks questioningly at the six of us.

"Everything's all right. Keep us at 38,000 feet. We'll be here three hours. You might as well make yourselves comfortable."

This last is for us. It's getting warm. I take off my shirt and open a magazine and begin to read. It's a pretty good murder mystery. Imagine reading a murder mystery at 38,000 feet, wearing an undershirt!

"That second man on your right, sir!"

My head snaps up. The voice over the loud speaker is urgent.

"Are you all right?"

The tall man on my right with hair the color of straw points to his knee. Quickly a pad and pencil are passed to him. He writes. I watch the marks on the page turn into words.

"My knee is beginning to hurt. I'll be all right," it reads.

It is passed on to the flight officer.

"Better be sure," he says. "You've got bends. Sometimes the pain increases very quickly."

The man shrugs. His nose and mouth are covered but there is no reason for him to speak. His blue eyes are expressive above the gray of the oxygen mask.

"Don't take any chances," the flight officer says. "It's nothing against you if you develop bends at this altitude. We'll take you down. Just be thankful you learned you were susceptible to bends here, in a decompression chamber, instead of at 38,000 feet when you were flying a mission and altitude was your protection from the enemy."

A mission may depend on your ability to take high altitude. Here's how that ability is tested.

The pages of my magazine flutter unheeded. We are all watching. Beads of sweat are coming to the blonde man's forehead.

"Shall we take you down, sir, to 27,000 and get him out through the lock?"

The face of the chief operator peers through the heavy glass of the porthole like an anxious fish in an aquarium.

"Take us down!"

The blonde boy shakes his head but there is relief in his eyes.

"Keep swallowing," the flight officer says. "Swallowing will equalize the pressure in your inner ear as the altitude changes."

I swallow. The hiss of air entering the chamber gets dimmer. It feels as if someone is stuffing invisible cotton into my ears. I swallow again. The cotton is gone. The sounds are no longer muffled.

"Twenty-eight thousand feet, sir," says the voice from outside.

There is a hollow ring of steel against steel. The heavy door directly opposite the flight officer slowly swings open. The lock man comes in. A long tube connects his oxygen mask with the regulator in the lock.

"Take the walk-around bottle," says the flight officer.

The small fat cylinder is passed to the man next to me. It is surprisingly light.

"There's enough oxygen in it for eight to ten minutes. Take a deep breath. Hold it!"

The lock man separates the hose of the mask from the regulator and connects it to the walk-around bottle. It is done quicker than it takes to tell about it.

"Breathe now," says the flight officer. "You'll feel fine as soon as you get down to ground level. Bends rarely last long below 25,000 feet."

The two men walk into the lock, the small anteroom that separates the working chamber from the outside. The door closes.

"Shall I take you up, sir?"

The chief operator never takes his face out of the porthole. On the other side we see another face. It is the observer. He, too, continually has us under surveillance.

"Take us up to 38,000 feet again."

Our ears adjust themselves easier going up than coming down. I return to my reading. So far in the book, only one person has been murdered and the blurb says that there are three more to go. Dimly we can hear the door open that connects the lock with the outside. The blonde man with bends and the lock man are down.

"Two and a half hours to go, sir. Everythink okay?"

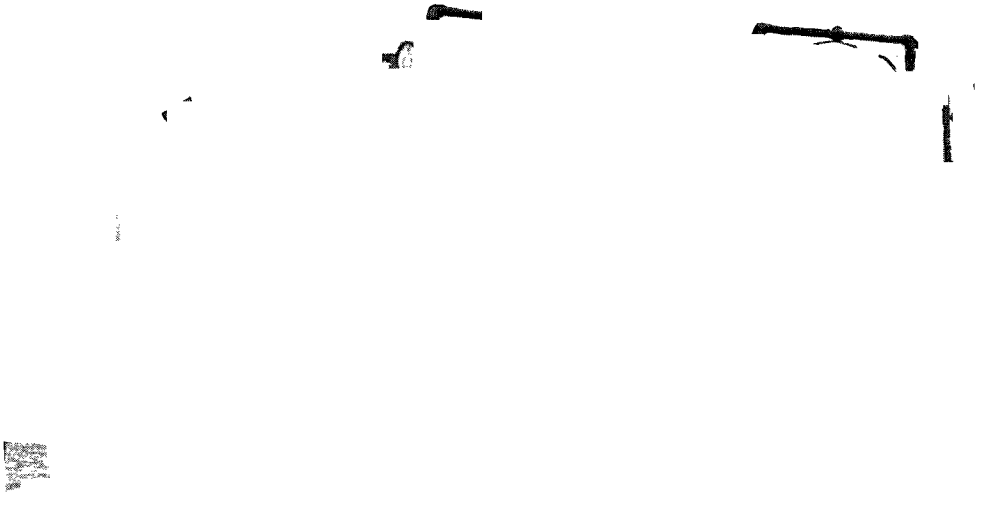
The flight officer is the only one not reading. Again he looks questioningly at us.

"Everything's okay."

AND there we stay for three hours. And there others of you will stay for three hours —if you don't develop arcoembolism or bends and have to be taken down in the lock.

There is nothing dangerous or difficult about it. It is a fine place to catch up on reading, for it is completely comfortable. But it is more than just a strange method the C. O. has thought up to keep you busy for three hours. On the results of this test run at high altitude may well depend your

Portable decompression chambers mounted on trailers can be taken right to the front-line airfields to test flying personnel for high altitude operations.



Get your sights on these questions and fire, scoring 5 for each correct answer. Ninety points is a direct hit; 80 a near miss; 70 is certain damage and 60 is close. Incidentally, send in your suggestions for quiz questions, with the correct answers. We'll give full credit for all contributions. **Answers to this month's teaser on Page 33.**

1. Tulagi is located in

a. The northern part of Japan
b. The Solomons
c. Southern Russia
d. Off the tip of Alaska

2. There are four major classifications of aerial bombs. Three are listed here. Add the fourth.

a. Demolition c. Chemical
b. Incendiary d. ?

3. At high altitudes, where the temperature is low, the speed of sound

a. Increases c. Remains the same
b. Decreases d. Disappears

4. The flight recording instrument called the "crab" is used on a

a. Helicopter c. Link Trainer
b. Glider d. AT-6

5. How many AAF planes now in production have four-bladed propellers?

a. 3 b. 1 c. 2 d. 4

6. In Air Forces slang, a cadet who is told to "grab a brace"

a. Lies down on his bunk
b. Stands at parade rest
c. Grabs a pair of suspenders
d. Pops to an exaggerated position of attention

7. The German Messerschmitt 109 F is a

a. Twin engine single-place fighter
b. Twin engine light bomber
c. Single engine, two-place fighter
d. Single engine, one-place fighter

8. When the bombardier, talking to the pilot over the intercom, says "Roger" he means

a. Message received—will reply
b. Okay or message received
c. Bombs away
d. Scram or let's get home

9. How many AAF fighter planes now in production have tricycle landing gears?

a. 1 c. 3
b. 4 d. 2

10. Westover Field is located nearest to

a. El Paso, Texas
b. Chicopee Falls, Mass.
c. Salt Lake City, Utah
d. Rome, New York

11. When greeting a lady, it is preferable for an officer to

a. Tip his cap
b. Bow from the waist
c. Give a soft salute
d. Nod a greeting

12. What are the doldrums?

a. Drums from which fuel is doled out
b. A belt of calm moist air centered near the equator
c. Low cloud hazes over central Europe
d. A belt of cold dry Arctic air

13. When an officer enters the mess hall, an enlisted man should

a. Rise
b. Continue to eat unless addressed
c. Salute
d. Say hello

14. How many General Orders are there for guard duty?

a. 9 b. 14 c. 12 d. 11

15. Emergency life rafts are inflated with

a. Carbon monoxide
b. Carbon dioxide
c. Sulphur Trioxide
d. Carbon Tetrachloride

16. The YAK-1 is

a. An Eskimo canoe used by our Alaskan forces
b. A pre-historic animal
c. A Russian fighter plane
d. A Jap dive bomber

17. The Chief of the Air Staff is

a. Maj. Gen. G. E. Stratemeyer
b. Maj. Gen. W. R. Weaver
c. Maj. Gen. B. K. Yount
d. Maj. Gen. O. P. Echols

18. Identify the plane below:

a. Mosquito bomber c. Bristol Beaufighter
b. Stormavik d. Me-109F

life, the lives of other crew members and the successful completion of your mission.

How are bends caused? Something happened to me on that flight that illustrates how bends or aeroembolism is caused.

I forgot to take my wrist watch off before entering the chamber. At 8,000 feet there was a tiny pop and then a tinkle. The crystal had blown off my watch. I have a waterproof, hence airtight, watch. After winding it that day, I screwed the stem down. It meant that the air inside the watch was at ground level atmospheric pressure. When we went up, the air outside was at a lesser pressure than the air inside the watch. As we went higher, the pressure outside became less, which meant that the air locked in the watch had a greater pressure and greater force. By the laws of physics, this air demanded that the pressure be equalized. It equalized—at the expense of my buying a new crystal. This, however, will not happen to an ordinary watch for they are not airtight.

In the human body, the gases or air adjust themselves to changes in pressure. Nitrogen is a gas which makes up about four-fifths of the atmosphere. At sea level it goes into the tissues. Since it is not used by the body, it stays there. When you go up high, the pressure of gases, including nitrogen, inside the body is greater than the outside pressure.

These gases force themselves out of the body tissues and form bubbles in much the same manner that bubbles rise to the surface when the top is removed from a bottle of pop. Sometimes these bubbles cannot get out. They become lodged in the body. It is this painful occurrence that is called aeroembolism or bends.

By some peculiar physiological quirk, some bodies can adjust themselves without any trouble to such a rapid change in altitude. Others cannot, and may develop marked symptoms as low as 26,000 feet. It is for this reason that this program is under way to find out which airmen can stand high altitudes and which cannot.

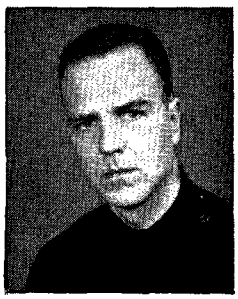
How can you avoid "bends"? As has been stated, some people have a marked intolerance for higher altitudes. Their systems do not permit the pressure to equalize in their bodies. This condition seems to be due to individual physiological differences, although some of it is obviously dependent upon age and weight.

There is little that can be done about the former except that it is worth noting that some men up to the age of thirty-five can take 38,000 feet for three hours if they are in good physical condition, while some of twenty-one cannot take 32,000 feet if they are ten to fifteen pounds overweight. The deduction is obvious.

You may not be able to take high altitude, but the chances are that you can take it if you keep yourself in good condition. It is *your* responsibility to keep yourself in that physical condition which will permit you to fulfil your missions at all times, for on you alone may some day depend the outcome of what may prove to be more than just a mission. And you cannot fail. ☆

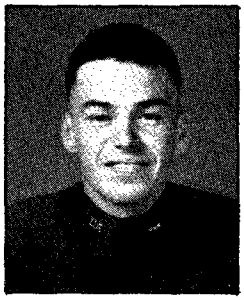
ROLL OF HONOR

. Gen. F. Bradley



Lieut. C. O. Brown

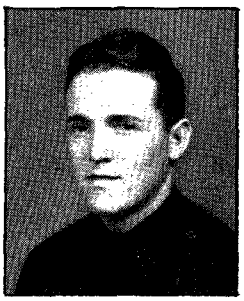
Capt. Albert S. Aiken



t. Arthur T. Rice

Lieut. D. C. Hawley

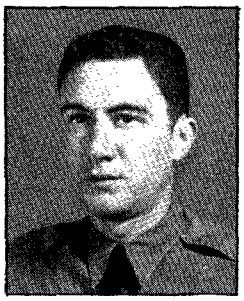
Major John K. Carr



t. G. Cherymisin

Capt. Fred Eaton, Jr.

Lieut. G. A. Simeral



ut. F. E. Timlin

Lieut. John Zarlengo

Corp. Frank L. Melo

William C. Bo
Boyle, Jr., Wa
James V. Dia
Fuller, James L.
K. Hammond,
Jaehlamen, S. J. Jones,
vin Lomax, R. E. McClure, R.
Herbert E. Mutz, J. J. O'Brien,
Donald Perry, E. M. Schaeffer,
art, Maurice A. Thomas, J. M.
Herbert W. Triplett, Richard M.
man L. Wolfe. **PRIVATES FIRST**
Barbour, W. W. Merithew, Frank Parisi, M.
E. Roberts, W. E. Sabold, William A. Takala,
VanEvery, H. M. Wheatley, Jr. **PRIVATES:**
A. Barker, Joseph N. Budde, Kenneth D.
Arnold E. Klimpel, Boyd H. Parker.

OAK LEAF CLUSTER

To Silver Star

CAPTAINS: Frederic C. Eaton, Jr., Bruce H. Bennett. **LIEUTENANTS:** Donald J. Green, Ernest L. Reid, Coleman Stripling, Paul I. Williams. **MASTER SERGEANT** Ralph J. Stiles. **TECHNICAL SERGEANT** Charles C. Schierholz. **STAFF SERGEANT** William V. Koon. **CORPORAL** James C. Underwood.

PURPLE HEART

MAJORS: Frank P. Bostrom, Ivan C. DuBois, W. A. Fairfield. **CAPTAINS:** A. L. Fangman, James G. Kandaras (Also Air Medal), R. A. Redburn, Martin R. Walsh, Thomas K. Winburn, William G. Workman. **LIEUTENANTS:** Donald E. Andersen, Edward S. Ashley, George E. Boyd, John G. Brennan, Albert M. Buck, Howard F. Cooper, Gerald T. Dix, Roy W. Evans, James A. Hilton (Also Air Medal), Arthur E. Hoffman, Jack P. Hopkins, Dave H. Hoyer, Earl R. Kingsley, John C. Lynch, Lyn Parker, Jr., Theodore I. Pascoe, James H. Reilly, Frederick C. Roberts, J. F. Segrest, Jr., F. D. Stanton, Harold M. Stearns, Robert L. Stimson, Meech Tasquah, Hugh J. Toland, William R. Walker, Jr., T. G. Wuerple*. **MASTER SERGEANTS:** Francis J. Donahue, Melvin L. Hall, L. B. Pouncey, George B. Sparks. **TECHNICAL SERGEANTS:** Elmer Anderson, George H. Bengal, Norman L. Cates, Homer E. Ferris*, Melvin F. Hooper, Samuel Langer, Melvin E. Owens, Aden L. Simons, David Suppes, Jr., William R. Wherry. **STAFF SERGEANTS:** Robert H. Baldwin, Sam K. Bourne, Tony Bruce, Charles B. Cameron, Eilert H. Cremer, W. R. Crutchfield, Salem M. Drake, George T. Dwyre, James S. Everett*, Paul B. Free*, K. W. Gatewood, John J. Gogoj, Benjamin Gordon, James E. Guthrie, Theodore V. Hobbie, Edward J. Kozloski, John W. Lynch, John J. Meehan, William W. Neal, Lincoln T. O'Connel, Forest A. Oltman, John A. Price*, P. J. Scheidt, L. B. Velarde. **SERGEANTS:** John Banco, Hurian H. Beauman*, Roy G. Brewer, Robert A. Carey, Raymond J. Collins, L. H. Cooper,

(Continued on Page 38)

With the "tri-metrogon" camera, involv
ing three ingeniously synchronized mech
anisms, a single plane can photograp
8,000 square miles of terrain per hou

camera Scouts

-INTRODUCING OUR PHOTOGRAPHY DIRECTORATE

By Captain Milton R. Krims

DIRECTORATE OF PHOTOGRAPHY

How the Air Forces bring information back alive — on celluloid — for fighting a war.

IT IS said that an army moves on its belly. And somehow it is taken for granted this army knows exactly where to go—like a hungry boy following the scent of hot doughnuts. But there are no happy scents to follow in war, no succulent sign posts; the way is too often difficult and obscure, with no one knowing exactly where it leads. If an army would go in the right direction it must have clear, sharp, knowing eyes.

We are familiar with the heroic and almost legendary figure who rides or runs far ahead of armies, sprawls on his stomach to peer furtively from behind a tree—often with one hand shading his eyes from the blinding sun—and then dashes wildly back to headquarters to make his report.

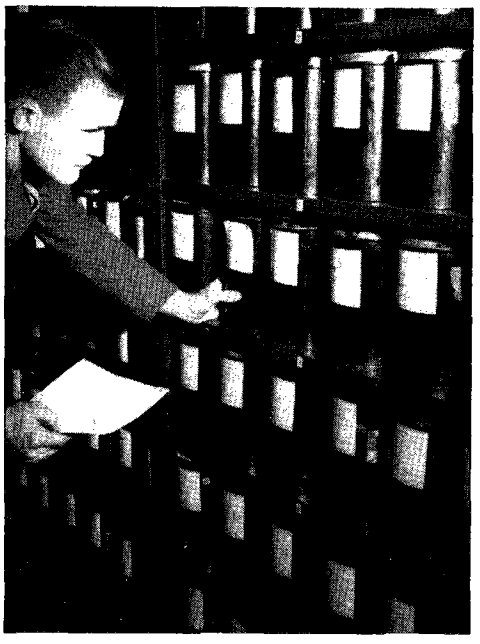
Times have changed. Scouting is no longer as simple as that. It is accomplished by airplanes and skilled pilots, by maps and charts and cameras and by technicians with the minds of scientists and the dexterity of supercraftsmen. And all because the modern scout not only sees but makes a film record of what he sees.

The Directorate of Photography, Maps and Charts actually came into being in the spring of 1942. But the First Photographic Squadron of the Army Air Forces and its future was still ahead. Its first job was nothing more or less than to chart the entire Western Hemisphere from the air.

By the old method, aerial pictures were taken with the camera pointed vertically or obliquely towards the earth. These oblique negatives were later processed by a large and complicated machine called a restitutional printer. To do the hemisphere job this way would have required more film than existed in the world, not to mention men, cameras and planes.

Minton W. Kaye was in charge of the First Photographic Squadron. He was a Major then, recently promoted and fresh from an assignment in Hawaii. But he knew photography and all those who had to do with it. He knew he must find some new method which would be economical in time, men and equipment. He also knew that the Alaskan Branch of the Geological Survey had perfected an oblique method of plotting; that is, a method by which topographical information could by mechanical means be taken off a photograph which was not pointed directly at the earth. The survey had worked out this method in Alaska because it had no air pictures and therefore no alternative. Colonel Bagley, now retired, had developed the Alaskan method. Major Kaye gathered in another Alaskan specialist, Gerald Fitzgerald, and, with the help of the First Mapping Group and others, finally emerged with the system of "tri-metrogon" charting which solved the problem.

"Tri-metrogon" simply means "wide angle, horizon to horizon". With a tri-metrogon camera you can cover eight times the area in a single flight that you could with the old style vertical photography setup.



The world in a can

The photograph from a tri-metrogon camera covers twice as many miles as you are thousands of feet high; that is, if you are at 20,000 feet, your picture covers a forty-mile area. One plane can photograph 8,000 square miles of terrain per hour. The plane travels 200 mph at 20,000 feet, and there are forty seconds between exposures.

After processing, the photographs are given to compilation units, who solve the problem of restitution by graphical means. This is a long and extremely complicated process and is done—actually—with mirrors. And not only mirrors, but pins, mechano sets, glass, string, lights and good eyes and steady hands.

The Air Forces got the charts it wanted, and also found itself with a new directorate on its rapidly growing hands—the Directorate of Photography, Maps and Charts. Minton W. Kaye naturally became its Director and in due time a full Colonel.

AND that's only the start of the story.

The growth of the Directorate of Photography, Maps and Charts has kept pace with the growth of the Army Air Forces. It has become a vast organization spread out all over the world. It has never stopped taking pictures, and, what is perhaps as important, it has never stopped looking for new ways to take them. The modern, fast moving mechanized army demands equally modern, fast action scouting. It wants information right now. Colonel Kaye and the Directorate organized to give it that information.

It would be over-simplification to say that the Directorate's work is divided into two parts—preparation and operation. Preparation in itself involves diverse and complex operation. It all grows from a simple sentence in a directive which reads: "Advises the Commanding General, Army Air Forces, his staff and the Directorates thereunder on matters pertaining to photographs, maps and charts."

Broken down into terms of hard work, it means that the Directorate studies and creates photographic and charting programs, priorities and requirements; researches the capabilities of photographic aviation and

possibilities of development; establishes tactical and technical photographic and photogrammetric doctrine.

To accomplish these varied missions, laboratories and schools and personnel and equipment are required. And the information thus gathered must be transmitted to the men who will make operational use of it. That means more laboratories and schools and personnel. Since the Directorate determines photographic policy, it must now establish facility, direct procurement and supply methods for equipment and personnel of operational units.

The personnel of the Photographic Reconnaissance Operational Training Unit of the Army Air Base at Colorado Springs numbered exactly zero less than a year ago. In fact, there just wasn't any such unit. Today some 5,000 to 6,000 men are in training and many squadrons have already been turned out for overseas duty.

Once there was only one type of camera for taking aerial pictures for mapping. Now there are three cameras ingeniously synchronized to work together, a slightly fantastic contraption that takes a quick look from horizon to horizon and pops a picture of what it sees. And that also is being improved. In this constant search for improvement nothing seems unreasonable. A map is no good unless there is some kind of control point or "fix" on the ground to identify its location. Naturally, the precise latitude and longitude of the "fix" must be determined to give aerial photographs something they can be "hung on to."

The method generally used to establish control points has been a triangulation network supplemented with traverse loops, but since it was too expensive in time, men and equipment, it was abandoned and consideration given to astronomical solutions.

THE beauty of astronomical fixes is that stations may be established separately, and are not dependent on other points (as is the case with the triangulation system). For this Colonel Kaye turned to the prismatic Astrolabe, an ingenious instrument of French origin.

The Astrolabe is nothing new, it was used by navigators as far back as Columbus' time. Then it was, in effect, simply a notched stick, which was held up toward the horizon. The lower notch was squared on the horizon, the upper on the North Star. If the North Star was below the notch, you were sailing too far south, if above, too far north.

The prismatic Astrolabe was somewhat more complex than a notched stick, and there were difficulties about it. In the first place there were practically none of them, and no more to be had. France had fallen. So an American instrument, the Equi-Angulator, was developed. It is much the same type of thing, but has higher power magnification and other refinements. It's a potent gadget—with four of them, for instance, an area as large as Brazil can be covered.

And, there was still more need for more speed. It is not possible, for instance, to take one observation at night. Astrolabe parties are flown in, camp made, the instrument set up, then a long night's watch has to be maintained, a great deal of computation done, then camp broken, and a flight made to the next station. A slow process when hundreds of fixes have to be made.

Lieutenant Oren Haglund says "so long" to the men he trained in the art of self defense as they depart for overseas duty as part of Captain Knox Manning's first motion picture unit. This is the first unit of its type to depart for a theater of operations.

So men went to work on a Zenith camera, an instrument which will point straight up to the stars to take Zenith photographs at the stations. This means that a picture may be taken at the precise moment some easily identified "fix" such as a network of roads is visible—an obvious advantage, for it will require no time at all to set the camera up and get the photograph. Thus a number of photographs may be taken in one night.

The Zenith photographs will be developed in the field to be sure they are valid, then shipped to Washington where astronomers will identify the stars and plot the exact latitude and longitude of the ground spot. So it goes, on and on, with men with wings and ribbons on their chests casually using scientific terminology profound enough to confuse even the enemy.

And finally out of all this preparation comes operation. The function of the scout is still the same. He gathers information to be used by higher authority for strategic and tactical purposes. So now the men go into the air, well trained technicians, knowing all there is to know about their equipment and the duties they must perform with it.

The Directorate gathers two kinds of information. One kind has to do with charting and wings. Here the scout takes wings, flies over both friendly and enemy terrain, observes and records the facts of war. Mapping photography is done for charting purposes. Reconnaissance photography is done for intelligence use. These photo squadrons fly the fastest planes, meet the same dangers as other squadrons. The only thing that sets them a little apart is that they have nothing to shoot with except cameras.

Then there is the Motion Picture Division. This is charged with telling the story of the Army Air Forces. The story of men and equipment. Its Combat Camera Units shoot filmic reports for the Commanding General, the staff, the several commands and for Public Relations releases to the public. The tactical and technical information thus gathered is used in the making of flying training films produced by its First Motion Picture Unit in California.

All in all, it's a big and varied job and, what is most interesting, its single overall objective is to provide information and provide it as quickly as humanly possible.

It's a big story. The rest will have to be told in subsequent issues. It must be told because there is one more factor that makes the Directorate rather unique: it feels it is in business to serve and it wants everyone to know how to put it to work. It has no secrets except from the enemy. ☆

PICTURE CREDITS

First Cover: Blackland Army Flying School, Waco, Texas. 6: U. S. Army Signal Corps. 14: British Ministry of Information. 22: First Motion Picture Unit, Culver City, Cal. 24-25: Gowen Field, Idaho. 26: Wright Field, Ohio. 31: McGraw-Hill. 34-35-36-37: AAF School of Applied Tactics, Orlando, Fla. Third and Fourth Covers: AIR FORCE Staff Photographer. All other photographs secured through official Army Air Forces sources.

Life Raft SOS

WHEN an airplane makes a crash landing at sea hereafter its crew will have a much better chance of being rescued promptly, without being forced to drift around for long periods minus food and water.

Aircraft equipped with life rafts, will carry as part of their standard equipment a portable hand generator radio set. This emergency device, complete with antenna and other accessories, will communicate a distress signal for considerable distances.

This radio set was developed in the Aircraft Radio Laboratory at Wright Field, with the Air Forces, Signal Corps and manufacturer cooperating in its production. Basically it is an improved and modified version of similar German and English equipment which has summoned help for many crews in the choppy waters of the English Channel.

Use of the emergency set, as taught at Gowen Field, Idaho, Operation Training Unit radio school, is simple, for the device is so designed that men with or without radio experience can operate it.

Suppose a crew is forced down at sea. At an altitude of 300 to 500 feet above the water, two buoyant bags of equipment are tossed out of the ship. An automatically-opening parachute carries them down. The bags, painted a vivid yellow so they can be easily discerned, contain a waterproof transmitter, a simple box kite, two deflated balloons and a hydrogen generator can.

After a crew has boarded their self-inflating life raft, they would retrieve the radio set and put it in working order.

Given a wind of seven to fifty miles per hour, an antenna coiled within the transmitter is attached to the box kite which is sent up to about 300 feet. While the kite acts as a distress signal, its main purpose is to carry the antenna aloft.

If there is no wind, the two balloons are inflated from a tube of the hydrogen generator can which forms hydrogen by being lowered slowly into salt water.

It is not necessary to know code. A hand crank on the set generates power and the instrument automatically grinds out SOS messages on 500 kilocycles, the international distress frequency. If the crash landing has been made in the North Sea, where the distress signal is AA, the operator of the set merely flips a switch to emit that message.

The set, which also has a manual sending key, will send for more than 200 miles during the day and much farther at night.

A portable radio device makes early rescue possible for survivors of forced landings at sea.

Naturally it provides a beam which will guide searching planes to the raft; once the radio compass of the rescue plane "homes" on the wave, the pilot can ride the signal right to the lost boat.

If the rescuer approaches at night the raft's crew can switch from the radio signal to a blinker light signal, which blinks out an automatic SOS.

The transmitter itself is equipped with wide webbing straps to secure it in position between the legs of the operator. Power is watched and adjusted by an indicator lamp. When the lamp is brilliantly lighted, the transmitter is yelling for help.

Since all ocean-going vessels of all nationalities are required to maintain watch on the distress frequency, the chances of rescue are greatly increased even though no warships or planes are in the vicinity. There's no receiving equipment, so the crew will just have to wait and see what happens.

Flyers familiar with this new equipment believe it will do much to eliminate the danger of drifting for days in remote sea areas, and regard it as a long step forward in assuring the safe return of distressed Army Air Forces crews.—**Captain E. L. Davis, Gowen Field, Idaho.**

Pre-Rotation of Tires

Life tests recently were completed on 300 airplane tires to determine how they are destroyed in service. For the record, not one tire failed or wore out because of frictional wear occurring when the stationary tire was forced from zero miles per hour to approximately eighty miles per hour during the fraction of a second when wheels initially touch the ground in landing.

In explanation, Materiel Center engineers at Wright Field point out that most airplane tires fail from blowouts, severe bruises and cuts, bead separation, and so forth. Those tires that do not fail from the above causes wear out at the shoulder—where the weight of the plane and effects of braking are borne. *(Continued on Next Page)*

(Continued from Preceding Page)

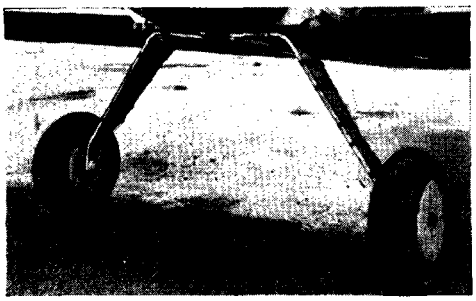
Wear from initial contact with the ground in landing occurs at the center of the tire, and this has proved to be so slight that it does not affect its service life.

For large tires, such as the eight-foot B-19 tires, pre-rotation conceivably could reduce drag forces and permit lightening of the landing gear struts. However, the weight and space requirements of most pre-rotating devices have been too great to be of practicable value.

Leaf Spring Landing Gear

A racing plane piloted by Steve Wittman, veteran racer of Oshkosh, Wisconsin, gave the Army the idea for a new type of leaf spring landing gear for PT-13 and PT-17 training planes.

The new landing gear has been drop-tested, flight-tested, and approved by the Army Air Forces Materiel Center at Wright Field, and will be installed on 25 training planes for further testing. Although, after looking at the accompanying photograph, it might be suspected that a plane using this kind of landing gear would bounce right back into the sky upon being landed, quite



Close-up of leaf spring landing gear.

the opposite is true. For when the machine hits the ground, the spring gear spreads out and each wheel serves to dampen the rebound.

Wright Field pilots who have tested the spring gear claim that it is superior in every way to landing gear used currently on planes of this type. It shows its mettle particularly in fast taxiing turns. It is softer in taxiing and less stiff when dropped in for a hard landing. There is no rebound tendency when the plane is landed on hard, dry surfaces, and even when landings are made on wet grass or ice, the rebound is negligible. In take-offs there is no apparent difference from the conventional gear installations.

The simplicity of the spring gear makes it easy to manufacture. Made from flat, non-critical steel plate stock cut to shape, drilled, and bent to form, it is cheaper to construct than the present strut and saves many hours of production time. Large-scale production is only a 60-day problem.

BB Counter

A device which automatically counts the BB's fired in a Link Trainer has been invented by M/S Melvin Wolfe, of Moore Field, Texas. (See above.)

The usual round of fire in Link Trainer shooting consists of 100 BB's, and that number must be exact in order to determine the percentage of hits scored. Heretofore, the 50,000 pellets used a day had to be counted by hand—and that's a powerful lot of counting.

Sgt. Wolfe took a solenoid from a salvaged machine gun, a vibrator motor from a Link Trainer, part of the control cable shafts from a cracked-up plane, and a couple of odd pieces from the scrap pile. He put them together, made a couple of adjustments, and the result was a BB counter which counts exactly 100 BB's, no more and no less, and drops them into a container.

The gadget consists of a tin box stilted on four springs. In the bottom of the box there's a hole just big enough to let one BB fall through at a time and under this hole, a small grease cup is suspended on a long shaft. When exactly 100 BB's fall into the cup, it turns over; the BB's drop into a container below.

Temperature-Proof Oil

Lubricating greases have won battles for the Russians and lost them for the Nazis. Intensive work on the processing of petroleum products by the oil industry in cooperation with Wright Field has made it possible to keep American planes in the air whether the temperature be 70 degrees F. below zero or 120 degrees above. It will no longer be necessary to change the oil in the hydraulic system to suit atmospheric temperatures.

Portable Arctic Shelter

To facilitate engine maintenance in sub-zero climates, a light-weight insulated "Arctic" maintenance shelter has been developed by the Miscellaneous Equipment Laboratory at Wright Field.

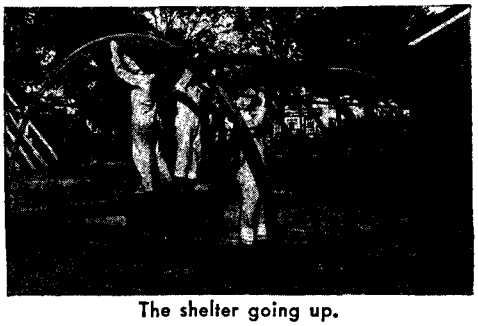
The shelter is constructed of plywood frames and specially-treated fabric covers filled with glass fiber insulating materials.

The entire unit can be flown to isolated operational bases where as few as two men can erect the shop on any hard surface, including packed snow or ice.

With the new shelter, maintenance crews at advanced bases can make repairs, check equipment and conduct major overhauls on engines under indoor conditions that are second only to permanent shop facilities.

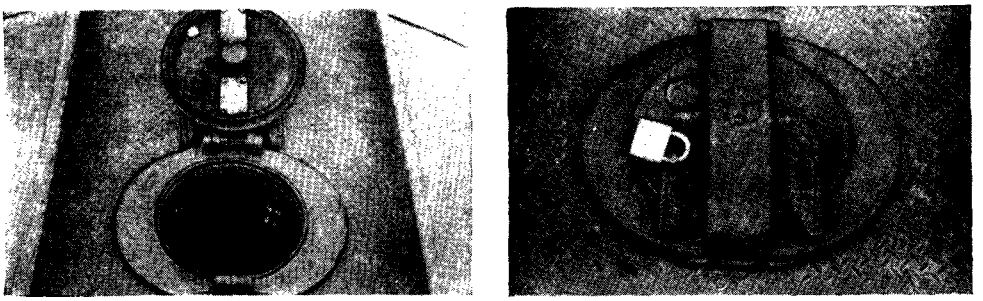
The heaviest of aircraft maintenance machines can be mounted on the insulated flooring of the shelter, which has an interior large enough to accommodate a four-man crew working on an engine.

Floor space of the shelter measures 16 by 16 feet, yet it can be packed into a space 5 by 5 by 6 feet. The rounded top tends to prevent accumulation of snow and minimizes the effect of wind on the shelter.



The shelter going up.

Above: Canvas covers the framework.
Below: Ready for occupancy.



At left is the storage hatch open; at right, closed, showing the tamper-proof lock.

Tamper-Proof Fuel Lock

The inexpensive and effective locking device pictured above makes it difficult to tamper with aviation gasoline in mobile fuel units at Pendleton Field, Oregon. Designed by Line Chief, Master Sergeant Sylvan V. Vick of Monroe, Louisiana, the lock may be installed on tank hatches quickly and at small cost. A padlock hooked through a stud riveted to the hatch cover anchors the "butterfly". The cover is held down tightly at all times as it does not unseat until the butterfly has been turned back fully.

But this isn't the first time one of M/Sgt. Vick's ideas has been put to practical use. As far back as 1937-1938, when he was employed by a manufacturer of heavy road grading equipment at Peoria, Illinois (Le Tourneau Co.), he devised a method of applying increased pressure to bulldozer blades—an idea which is helping men in the AAF clear and level airfields now in some of the remotest spots on the earth.

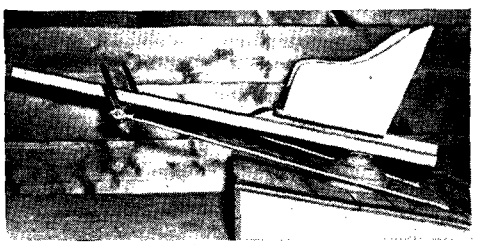
At Pendleton Field, M/Sgt. Vick has developed in his spare time a number of other mechanical improvements which have been adopted and placed in regular use. A hydraulics test bench incorporating a multiple manifold to plug in various sizes of tubing has proved a time saver. The bench likewise includes an expander-tube type hydraulic brake tester of his own design.

Before enlisting October 4, 1940, he had been a mechanic, "catskinner", shovel operator, machinist and welder, as well as shop superintendent of a bridge construction company in Portland, Oregon. The Army first sent him to one of its technical training schools for airplane mechanics.

Later his skill in finding the right way to do a job led to his selection as one of a special school group that suggested improvements in camouflage technique at Fort Dix, New Jersey. And his knowledge of just about every nut and bolt on the Mitchell B-25 resulted in an assignment travelling for the North American Aviation Company, supervising maintenance and overhaul of B-25's at a number of fields.

Rudder Reflex Indicator

Shown below is a device to develop the rudder reflexes of pilot trainees. It simulates, on the ground, the rudder characteristics of a plane in the stall position and the rudder action of a plane during a ground roll. Due to its inherent instability, the operator is required to react immediately with proper rudder action in order to keep the machine on its proper heading. The



Details of the testing device.

photograph shows the machine in its basic form, rigged to simulate a stall condition. The finished product is equipped with a fuselage, has a dummy stick installed, and is rigged for braking action.

Since little study time is given a student to develop his ground reactions in comparison with the time afforded him to develop his reactions in the air, a device was needed to help in the development of the reflexes so that the student would automatically perform the proper rudder action. After considerable experimentation, Major W. I. Fernald, 5th Army Air Force Flying Training Detachment, Hemet, California, designed what he has called the Fernald Reaction Time Indicator. The basic patent is held by Major C. C. Mosley, former employer of Major Fernald.

After sufficient practice on the machine, some students who have never been in the air before are able to execute the entire take-off without assistance. In addition to the machine's value in developing reflexes, it is also used as a means of classifying Aviation Cadet candidates. After a reasonable length of time, those candidates who are unable to control the machine are invariably very slow in reacting to phases of flight involving the use of other controls.

Bombardment Observation Trainer

Out of the Photographic Section of the Roswell Army Flying School, Roswell, New Mexico, one of the bombardier schools of the AAF Flying Training Command, has come a device which is claimed as a valuable training aid to aerial photographers who accompany planes on practice bombing missions. The gadget was fashioned from wood scrap, two pieces of tin, a flashlight, and four incandescent bulbs by Lieutenant David Dunn and Sergeant Roy Holloway after weeks of patient experimenting.

Although daytime estimation of bomb hits is usually a simple matter for the experienced spotter, night performance is sometimes comparable to flying blind and accuracy is the result of many hours of experience in the air.

Sergeant Holloway reasoned that an indoor bombing range should offer all the training advantages of the conventional outdoor type, and, in addition, aid in the improvement of the spotters' aerial operations.

Accordingly, he went about setting up a night target which would be an exact replica of the target seen by the bombing crew from aloft at night. He drilled holes in a section of wooden paneling, 52 inches square, in the form of a target-cross, and then drew lines joining "one o'clock" and "seven o'clock," "two" and "eight," and so on. Along these lines, additional holes were drilled at scaled distances from the center and marked: 300 yards at "one o'clock," 200 yards at "two o'clock," etc.

Holloway then took two oblong pieces of tin, which were shaped in the form of a trough, and attached them to the back of the paneling over the target-cross by means of tape. The tin merely acted as a shade or reflector for the light bulbs, which were inserted in the tin to illumine the target. When the bulbs were illuminated, the night target was completed.

Pieces of tissue paper were pasted over the holes drilled to scale across the face of the panel-target. The holes simulate bomb-craters. When a flashlight glows from behind the paper for a period of two-and-a-half seconds, it resembles the flash of a struck bomb.

The sergeant next constructed a movable eye-piece through which the photographer peers at the target, and visualizes it as an objective 12,000 feet below the photo patch of a bombing plane. The eye-piece may be moved forward or backward, increasing or decreasing the altitude. Since the bomb-burst holes are numbered, and a chart reveals the exact location of the hole, grading the accuracy of the observer is a matter of seconds.

ON THE LINE

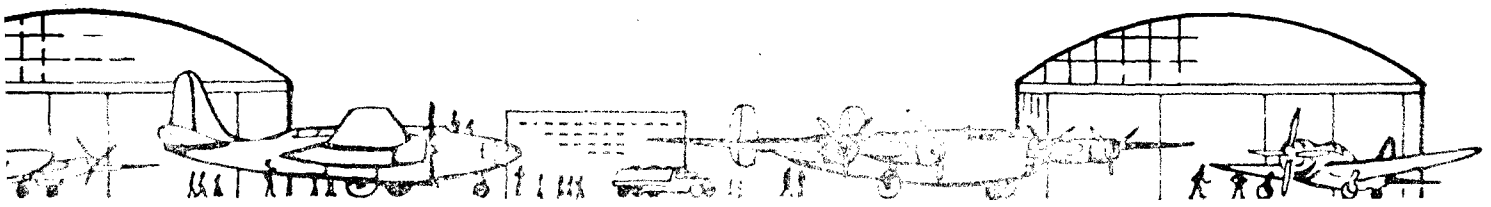
WHAT'S WRONG WITH THIS PICTURE?

Here we go again, boys!

The boners pictured here were picked and posed by (left to right) Sergeant C. P. Putman, Technical Sergeant H. W. Stitt and Corporal W. A. Ryan, of Patterson Field, Ohio.

"Mistakes like these may seem funny in a picture," said Crew Chief Stitt, "but they're mighty serious ON THE LINE. Such maintenance boners can do a lot of damage to equipment and injure personnel."

Crew Chief Stitt picked eight maintenance boners here. Do you see them all? Answers on opposite page!



A monthly roundup and exchange of hints for mechs — some old, some new — in the interest of better maintenance.

Do You Know . . .

That airplane maintenance forms are provided for your use when accomplishing any of the required periodic inspections. One master set of the applicable maintenance instruction forms "will be maintained," according to T. O. No. 00-20A, "for EACH AIRPLANE in the back of the form 41B." This includes the following forms:

Preflights and Daily Inspection
25 Hour Inspections
50 Hour Inspections
100 Hour Subsequent Inspections
At Engine Change Inspections
25 Hour After Engine Change Inspection.

A Pertinent Question . . .

One staff sergeant writes in: "Whenever I finish working on a ship, I ask myself: *'Would you fly it that way?'* If the answer is yes, I get a good night's sleep."

Dirt

It's an old saying ON THE LINE that a clean airplane is a good airplane. This applies as well to the inside of the fuselage. Loose objects such as fire extinguishers, soda pop bottles, tools, etc., can cause fouling of the controls as well as injury to personnel. Incidentally, dirt has been known to blow up and get into the pilot's eyes, making it impossible to make an immediate landing.

Conduit Knurled Nuts

Watch electrical conduit knurled nuts that may become loose at a connection. Vibration will wear the insulation from the primary, or any other hot wire, causing a short which can bring about motor, radio or instrument failure.

Mech-Fatigue . . .

You've heard of pilot fatigue but you've probably never stopped to think that long, grueling stretches on the job make you subject to MECH-FATIGUE.

Mech-fatigue—which is the mental or physical let-down from overwork or strain —can result in carelessness, forgetfulness and inaccuracy. Watch yourself on the long work stretches; ask for a break if you feel it coming on. Talk to your line chief; he'll know you're not just goldbricking.

Adequate rest, food, recreation and exercise will help you keep yourself in perfect physical condition and ward off mech-fatigue.

Have It Treated . . .

With medical service available twenty-four hours a day, why wait to have cuts, sprains, and bruises treated? Five minutes spent at the first aid station may mean the difference between a permanently stiff finger and a useful hand.

Pitot Tube Covers

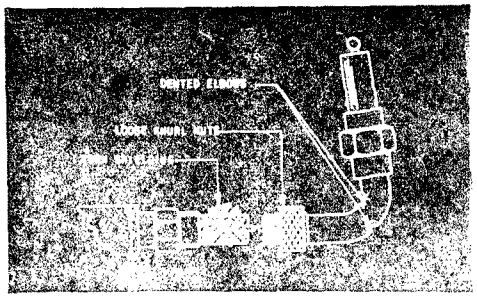
This one happened recently. A B-24 pilot starting down the runway, had gained speed and was just ready to take off when, to his amazement, a glance at the air speed indicator revealed that it registered zero. He applied the brakes, trying to stop before using up all the runway. Luckily for the pilot and his crew, he stopped in a very convenient mud puddle without much damage to the plane. . . . It seems that someone had simply forgotten to remove the pitot cover. T. O. No. 00-20-A, stresses the importance of this inspection.

Watch Yourself . .

Don't make a heavy lift with your knees straight and rigid. Strains may be avoided by bending the knees. Be sure you are physically capable of making the lift before you attempt to do so. Be sure of your footing.

Emergency Escape Equipment

Maintenance of emergency escape equipment is very important. Be sure that emergency escape doors are properly safetyfied and that safety locks are in good working condition and are not corroded. See AAF Regulation 55-2.

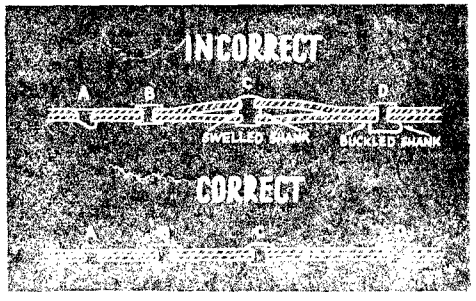


Ignition Cable

Particular attention is called to the damaged elbow in the drawing above. When tightening the elbow nut, the elbow must be held in the opposite direction to avoid squeezing the ignition cable. If thus damaged, the spark occurs at the break instead of at the spark plug. When this condition is noted, cable must be replaced.

Torn shielding causes radio interference. Minor damage can be corrected by silver soldering but if the break is bad cable should be replaced.

The knurl nut should be checked and tightened if necessary.



Riveting

INCORRECT: (A) Unsteady bucking bar; (B) Rivet driven excessively; (C) Separation of sheets; (D) Excessive shank length. These mistakes will cause failure of parts involved.

CORRECT: (A) Bucking bar held firmly; (B) Rivet driven properly; (C) Creeping and distortion of the sheet has been prevented by use of clamps; (D) The upset end of the undriven rivet measured approximately 1½ times the diameter of the rivet from the surface of the material being riveted. Reference: U. S. Army Air Corps Standards Book.

MISTAKES ON OPPOSITE PAGE

Reading from left to right

1. Be careful; that jack pump should be on the wing jack assembly. It's a double hazard on the floor. Someone may trip over it and get hurt, and the shut-off valve, if stepped on and opened, will release the pressure and allow the jack to drop.

2. That knurled safety nut on the jack should be screwed down to the proper position. That's why it's there.

3. If you'd only watch what you're doing, you'd realize that it's bad practice to use a pipe wrench on the oleo strut hex nut. Use the proper socket or box wrench which is listed in T. O. No. 00-30-45.

4. Wait a minute, you in the center! Gasoline in an open container is not permitted inside a hangar; furthermore, carbon-tetrachloride is a much safer solvent to use in the removal of oil and grease from rubber tires. And don't forget that all volatile fluids used for cleaning must be stored and used from safety type containers, according to T. O. No. 01-1-1.

5. It's bad practice to lean the axle on a tire, or anything else for that matter. If it falls, the bushing will be scarred and the axle knocked out of line. The axle should be laid on a bench or flat on the floor and protected by rags.

6. And those roller bearings shouldn't be laying on the floor. They'll collect grit and dirt and will require rewashing to prevent later malfunctioning. Bearings should be protected by rags or placed in a clean container.

7. You on the tire: You should be watching what you're doing, and you SHOULDN'T be sitting on the tire while inflating it. Believe it or not, tires can and have exploded—with serious injury to personnel.

8. And why take unnecessary chances by inflating the tire under a jacked-up plane? There's no rationing of safe hangar space yet.

ANTI-SUB COMMAND

(Continued from Page 6)

However, the Navy and the Antisubmarine Command are careful to evaluate a message before wasting manpower and equipment on what might prove to be a wild goose chase.

The Antisubmarine Command and the Navy are cautious in their evaluation of successful attacks. Pilots say that, to convince their superiors, a plane crew must bring back the U-boat captain's cap.

A squadron of the Command did comply with this rigid test, producing not only a cap, but an enemy U-boat captain himself. Somewhat bedraggled, he was nevertheless convincing evidence. The captain and some of his German crew had escaped in rubber life boats from a submarine bombed by an Antisubmarine Command plane. They floated a couple of days until rescued by American surface craft.

So effective was the bombing from the air of this U-boat, that it was only a matter of minutes before she filled and sank. The Army bomber crew, witnessing the plight of the enemy men on the surface of the water, dropped lifesaving equipment. Two days elapsed before the Germans could be rescued, near death from exposure, by Coast Guardsmen.

Experience has shown that submarine crews fear aircraft. They will take their chances maneuvering with surface craft, but duck under water if they see an airplane in time. And they generally stay under if they know airplanes are in the vicinity.

However, on rare occasions aircraft are fired upon by the guns of the U-boats who then submerge after the plane has passed overhead—if the plane hasn't already done the submerging job. Probably, that captured U-boat captain failed to avoid destruction of his craft from the air because he lacked sufficient time to dive.

THE tough aspect of submarine fighting is the flying day-after-day, in all kinds of weather and over wide stretches of cold, treacherous water. The strain of this sort of work is hard to measure. One pilot has said: "I have more than once found myself making a sudden steep bank out at sea, under the impression that I was avoiding a mountain." Another declares: "One of my friends, shortly before he went on leave, swore he saw a man riding a motorcycle 450 miles off the coast."

The uncertainty of the outcome of an attack is well illustrated by the experience of an Antisubmarine Squadron bombing crew over the Bay of Biscay. A surfaced submarine was sighted by a member of the crew of a Liberator bomber piloted by 1st Lieutenant Walter Thorne of Marietta, Ohio.

As the plane approached for the bomb run, the U-boat started to crash-dive. However, before it disappeared from view, 1st Lieutenant Brent F. Walker of Jefferson City, Mo., attacked with machine gun fire.

The approach on the first run was made from the stern of the submarine. Three depth bombs exploded approximately fifty, thirty and sixteen feet from the stern, while others straddled the conning tower.

Private R. R. Williamson of Austin, Texas, reported seeing a part of the U-boat in the explosion geyser and fired another burst of machine gun fire into it. On a second run, Lieutenant Thorne saw an oil patch, 200 yards wide, spreading from a geyser-like center.

First Lieutenant Irving T. Colburn of Chicago was bombardier. Other crew members included co-pilot James Anderson of Austin, Texas; Staff Sergeant George Fowler of Spartanburg, S. C.; Staff Sergeant Hollander of Indiana, and Technical Sergeants Engles of Hazelton, Pa., L. T. Figg of Crew, Va., and J. Briston of Evansville, Indiana. The Army Air Forces has given credit to the crew for the destruction of this enemy submarine.

In other cases, bodies from inside the submarine have been seen coming to the surface. There is little doubt in those instances that the submarine was destroyed. Often, submarine crews have been rescued from the sea.

Rescues at sea have been effected for victims of lost merchant ships through patrol activities of the Antisubmarine Command. When a storm lashed the waters off Cape Hatteras recently, the 31 members of the crew of a merchant vessel were forced to take to a single lifeboat.

An Antisubmarine Command plane on routine patrol spotted the small craft, which was bobbing helplessly in the mountainous seas. The airplane was piloted by Lieutenant Norman E. Purdy of Hamilton, Ohio, who radioed for aid. A second plane went out, piloted by Lieutenant Ford A. Trotter, Jr., of Luverne, Ala. Emergency equipment, including food, water, clothing and blankets was dropped from the second aircraft.

The Navy sent out a Catalina patrol bomber under the command of Lieutenant Commander Delos C. Wait of Eldorado, Ark., which also dropped emergency equipment. Meanwhile, the Eastern Sea Frontier Command, which had been coordinating the Army and Navy air action at the scene, now sent a fourth plane—a Coast Guard Hall patrol bomber—to scout for aid.

Lieutenant-pilot Edwin B. Ing of Elizabeth, N. J., searched the area and found, about fifteen miles away from the lifeboat, a freighter. By blinker signal he told the plight of the 31 sailors in the small boat and then led the vessel to the spot. All 31 men were rescued.

While rescues of this type are only a by-product of the primary missions of sinking submarines, yet they are an important factor in saving human lives.

Ordinarily, the average air crew untrained in spotting an object in the water will miss seeing something actually on the surface. This happens for a number of reasons. It may be because of the manner in which the surface is scanned, or because of a type of eye fatigue that fails to see what is in the field of vision, or because what is seen fails to register on the consciousness of the person making the observation.

In order to reduce to a minimum these and other factors that tended to make submarine bombing from aircraft in the early days an extremely hazardous undertaking, the Antisubmarine Command has set up a special training program. The proper method of scanning the horizon, the correct manner of dropping bombs and other instruction in tactics and technique are taught by a squadron skilled in the business of tracking down subs.

WHEN the Antisubmarine Command receives pilots, co-pilots, navigators, bombadiers, radio operators, gunners and engineers from Army Air Force Schools, they are immediately given this additional training. From this schooling a new type of combat crew is created which is highly skilled in "giving the business" to enemy U-boats.

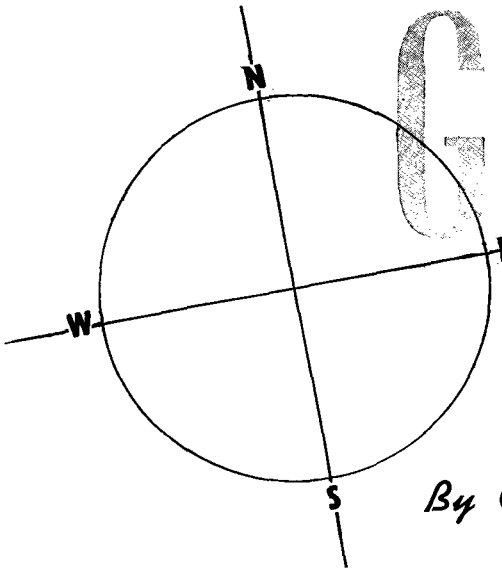
The German Navy has declared that it is turning out submarines faster than the sea and air forces of the United Nations can destroy them. However, as new air crews are trained and turned out for battle, the destruction rate of U-boats will undoubtedly have the Axis singing a different tune.

Submarine warfare may be at a turning point. The Antisubmarine Command, in coordination with the Navy and Allied aircraft, is beginning to take the offensive. In addition, the campaigns in Africa and Russia may force U-boats to accept the defensive because of the impelling need for the enemy to interfere with the supply lines. Enemy submarines may no longer be free to go marauding after merchant shipping whenever it is within the range of underwater craft. They may be forced to concentrate their efforts on interference with convoys to Russia, Africa and England. This is an advantage to the Allies—they know where to expect the enemy.

The effect of Antisubmarine Command and Navy operations, at the moment, has been to eliminate enemy U-boats from American coast areas. Thus, the loss of coastal ships and crews due to enemy action has been reduced almost to the zero point.

Close cooperation has been carried on with the British Coastal Command which has the same functions as the Army Air Forces Antisubmarine Command. In a survey published by the New York Times of the two years of operations, the Coastal Command report stated that it escorted 4,947 merchant convoys, attacked 587 U-boats and flew some 55,000,000 miles.

While the record of the Antisubmarine Command does not yet approach that of the sub-sinking component of the Royal Air Force, millions of miles have already been flown and numerous U-boats have been attacked in the short period since its inception. ☆



Guide for Global War

II - Map Projections

By Captain F. I. Burnham

MAPS AND REPRODUCTION UNIT, A-2

IF a pilot could fly high enough and had glasses of sufficient power, he would see the earth's horizon as an arc of a circle.

The portraying of land and water forms on this huge globe has been a problem of major concern to the cartographer for centuries. Airmen observe an indication of this problem when they look down from a plane. Below, the earth's pattern is in proper proportion, but toward the horizon objects become more and more distorted.

If our maps could be drawn on spheres or globes, or, in the case of a small area, even on a segment of a globe, we could then produce maps or charts in their proper relation and proportionate size without difficulty. Unfortunately, however, we must necessarily resort to the use of flat maps to show the spherical surface of the earth.

The problems involved in effecting this transition should be thoroughly understood by the airman. Not only is it well for flyers to know the historical development of the charts they have to work with, but also it is always possible that navigational charts and maps may be lost on a mission. In such a case, knowledge of the fundamentals of map projections will enable a pilot or navigator to make independent judgment concerning the value of local charts which he may be forced to use for the successful completion of the mission. By general usage, the globe has been divided into sections called degrees. First, we have an imaginary line circling the globe equidistant between the two poles, known as the equator. Then, each of the resulting globe halves is divided by ninety other lines parallel to the equator. The lines represent parallels or latitudes.

Basic knowledge for every airman on the methods used to chart the earth.

The globe next is divided into 360 degrees normal to the equator—180 degrees east and 180 degrees west—by lines representing meridians or longitudes. The prime meridian or point of longitude now in general acceptance is Greenwich (London).

GEOGRAPHERS and cartographers in years gone by used a grid system, starting at the western edge of the known world and numbering the grid in one direction only. (A projection or grid is an orderly system of parallels and meridians on which a map can be plotted.) On most maps an island of the Canary group known as Ferro was the starting point. Some European maps still use Ferro for the prime meridian.

In determining longitude from foreign maps it is necessary to determine the location of the prime meridian since there are many maps published that use a prime meridian other than Greenwich. Generally, the odd meridians are the capitals of countries, as in the case of the Paris meridian used in many maps. In the early days of our republic, our maps were published with the meridian of Washington as the prime.

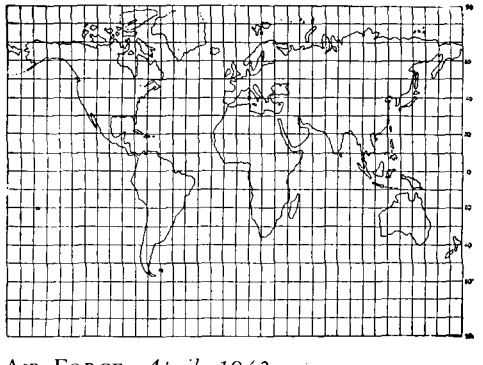
The problem of plotting the characteristics of this earth-globe on a plane surface lies in projecting the relationships of this imaginary grid on the sphere to a like grid on a plane with the least amount of distortion.

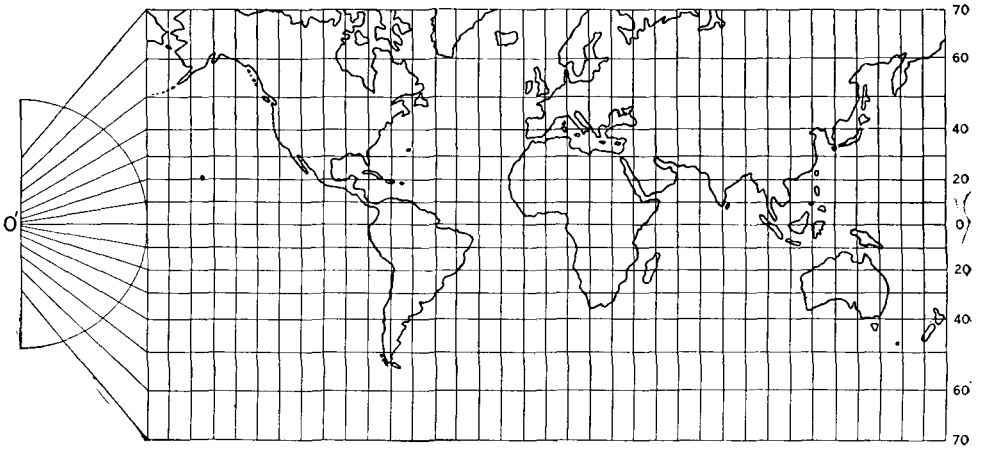
Projection systems may be divided into three general classifications: cylindrical, conical and azimuthal.

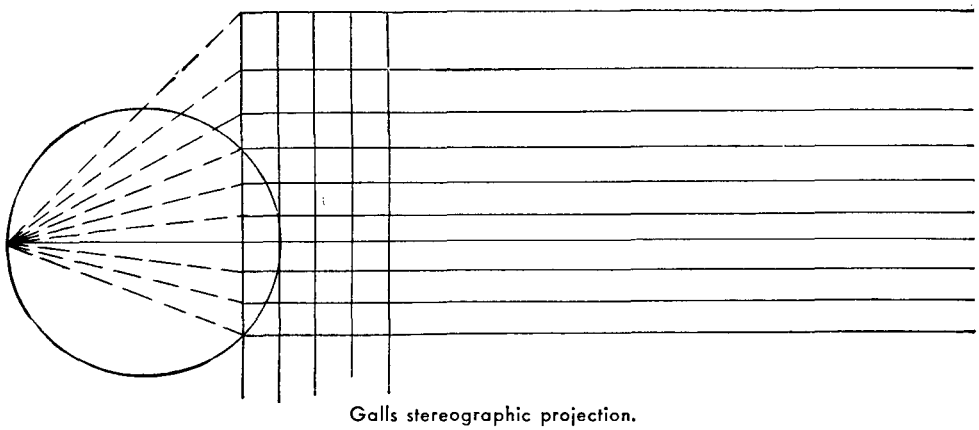
The cylindrical projection is the simplest of the three. It shows the globe as it if were plotted on a cylinder and then flattened out. The cylindrical class may be illustrated by the simplest of all projections, in which the grid is a rectangle with all parallels and meridians spread equally and are represented as straight lines.

One of the best examples of the cylindrical projection is the one devised by Mercator in 1569 and which still bears his name. Like the rectangular projection for

Below is shown a map of the World in cylindrical projection, and at the right is Mercator's version, one of the most familiar of all charts in use today.







Galls stereographic projection.

a world map, the meridians are spaced off true to scale at the equator but in latitude the distance increases from the equator. The error in measurement of distance also is exaggerated. The scale of the Mercator map at sixty degrees latitude is two times that at the equator. As the distance increases away from the equator—say, to the eighty-degree parallel—the scale is increased to six times that of the equator. It is obvious, therefore, that the poles are unplottable on this type of map.

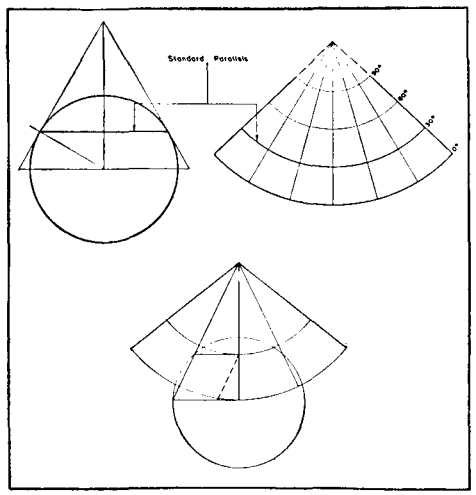
An example of the misconceptions possible from this type of projection is illustrated in the belief of many people that Greenland is about as large as South America. On an equal area map, wherein Greenland is shown in its proper relation, it is about the size of Alaska.

A MERCATOR chart is used primarily in plotting courses for navigational purposes. It is one of the most familiar of all charts in use today. Practically all the coastal waters of all lands have been shown on this type of map for many years for use by our merchant marine, navy and private boat owners. With the new importance of air travel, much, if not all, of the land area is being mapped on this type of chart.

Galls stereographic projection also comes within the cylindrical class. This projection is comparable to the Mercator except that distortions are not so pronounced in the higher latitudes. This is due to the projection being constructed by assuming that the cylinder is only as large as the 45th parallels. These parallels being true to scale, those north and south are increasingly exaggerated, and the scale toward the equator is reduced.

Projections of the conical class, like the cylindrical, are devised in such a way that it is possible to develop the plane by "unrolling" it. Only in this case the developed cone will have curved lines of latitude when unrolled and generally straight lines of longitude.

The conic projection is formed by projecting the surface of the globe upon a cone tangent to the chosen latitude. Exaggeration is apparent in both directions from the tangent parallel. An improvement may be noted in a conic projection with two tangent parallels, in which case a portion of the globe must necessarily be eliminated.



At top is a simple conic projection, and below is a conic projection with two standard parallels.

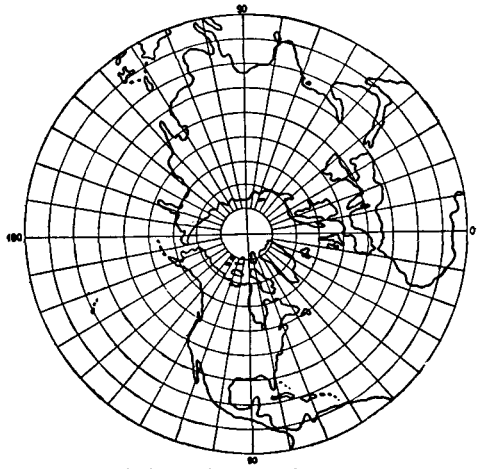
By using a combination of cones, a so-called polyconic projection is arrived at, with less distortion in scale. As in the Galls projection, the scale distortion is exaggerated above and below the standard parallels and is slightly compressed between them.

Conic and polyconic maps have their particular uses in the political maps of small areas and portions of the earth's surface. A good example would be a map of Asia with the least amount of distortion throughout the area. A choice of the conic projection with two standard parallels at 12-58 degrees will fill this requirement. Maps on a polyconic projection are usually set maps of an area at a scale that is impractical to show on one or two joining sheets. They are generally compiled and drawn as individual sheets or maps independently of any other sheet or map adjacent to or part of the completed set. The U. S. Geological Survey topographic sheets are plotted on the polyconic projection.

THE azimuthal class includes projections on a simple plane. Three of the important azimuthal projections are based on perspective, or on the different positions of the eye in relation to the plane upon which the global network is to be developed. In the gnomonic projection the focal point is in the center of the globe. For a stereographic projection, the perspective lies in the antipode, while the focus for the orthographic projection has infinite distance, the projection lines being parallel.

Two other important azimuthal projections, equidistant and equal area, are developed by arithmetical processes.

Probably the best example of the azimuthal charts are shown in the polar projection in which it is desired to show the areas around the poles—or the orthographic maps to show the earth as a whole with the appearance of its being a globe.

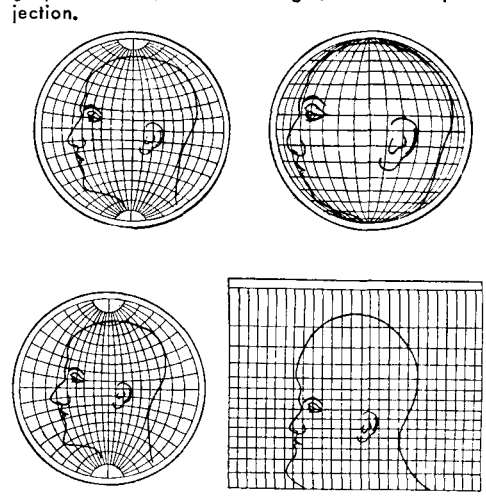


Azimuthal equidistant polar projection.

In explaining the foregoing examples of types and kinds of projections only the principal, and generally, the simpler forms have been used. With these fundamental types as a base, there have been hundreds of different variations of projections invented or designed—some practical and some freaks that could not be used except under exceptional circumstances.

Let us look at some of the exaggerations that are an inherent part of all projections. If we draw a man's head on a globular projection and then carefully plot this head on other projections we see some amusing, if not revealing distortions. This does not mean that the projection on which the head was originally drawn is the best but shows that the distortion is real and not fancied. If the head were drawn on any other projection the results would be equally amusing. The illustration below should show you what we mean. ☆

Below are examples of distortions inherent in all projections. Top left is a head drawn on a globular projection; top right is the same head plotted on an orthographic projection; bottom left, a stereographic version, and bottom right, a Mercator projection.



COMPRESSIBILITY

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD

Analyzing wave formations in relation to their effects on high speed flight.

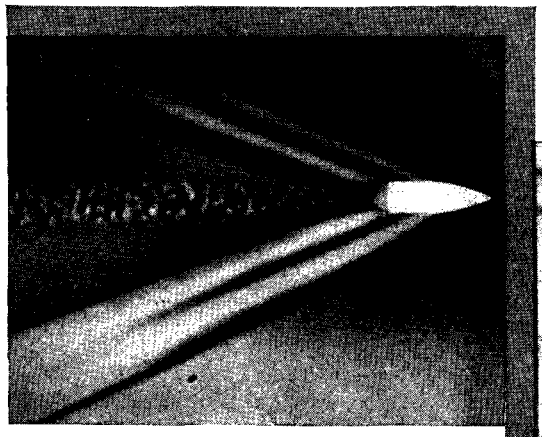
BEATING compressibility would be much easier if we knew more about it and its effect on airplanes. Our aeronautical information, to date, peters out just short of the speeds and the conditions where compressibility becomes vitally important.

It is true that fluid mechanics, physics and mathematics all can furnish a great deal of helpful information on the nature of pressure waves or surface waves in a fluid, but this information has yet to be applied specifically to aircraft problems. As a result, there is at present a big gap in our knowledge, filled largely with ignorance or guessing on the subject. Much of design is educated guessing anyway, so this is perfectly justified for the moment, but it doesn't help the pilot or engineer a great deal. He inevitably winds up with a hopeless sort of feeling when faced with all the problems now lumped under "compressibility".

It is apparent that beating this phenomenon will be a long struggle, and it is doubtful that any simple solution will permit immediate progress into the "supersonic" region, or even into the region of speed closely approaching that of sound.

In military terms, the first phase of the compressibility struggle will be the reduction of outposts one by one, moving the limits of the region in which we can safely operate farther and farther toward the major obstacle which is now located close to the speed of sound (i.e. speeds approximating 500 to 700 mph.). We are now in that step by step phase. Yet, there are examples of "raids" in the form of high speed dives across the barrier into the supersonic region. These "raids", however are still of an exploratory nature and they give little promise of either safe or continued operation in that region until a great deal more knowledge of the region's character has been obtained.

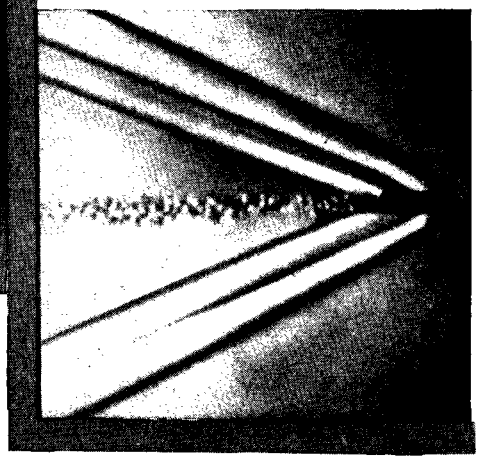
There appear to be two basic compressibility effects applicable to aircraft. The first develops because the air has to accelerate, speed-up and slow down again to get around objects moving through it. This speeding up of the air particles relative to those farther away and undisturbed goes hand in hand with the reduction in pressure from which we get the major portion of our lift force. This speed-up is a very real factor and adds to local velocities over the skin; these velocities may actually be anywhere from 1¼ to 2 times the average air speed. This means that in some spots on the aircraft speeds are reached which are very close to that of sound, although the airplane itself may be moving at a very much lower average velocity. Thus, the beginnings of compressibility become apparent at Mach numbers of .5, which is 50 percent the speed of sound, and the worst effects are apparently impossible to delay beyond about 85 percent of the speed of sound, or Mach numbers of .85.



The second compressibility effect applying to aircraft is the typical super-sonic condition in which "bow waves" are actually formed because the initial point of the disturbance (i.e. the entering edge of a wing, nose of a bullet, nose of an airplane or even a break in a contour like the windshield or air scoop) is moving faster than the compression wave which it creates. Then, instead of a smooth fairly gentle wave-front or a succession of wave-fronts moving out head with low intensity, capable of being absorbed by the air particles, we have the object literally tearing through the wave-front and creating a Vee shaped wedge of added pressure with no warning proceeding. This, of course, is the familiar Vee shaped "bow wave" on boats in water or on bullets moving at very high speeds. It can be illustrated by dragging a stick through the water, first at speeds lower than the slight ripples that radiate from it, and then by moving the stick faster.

It is difficult to describe or visualize a "shock wave" forming on an airplane, particularly when it occurs apparently well back on the surface, and apparently without having anything to do with any nose condition. This can be due to the local speeding up of the air over the surface so that when "compressibility speeds" are reached there is no real entering edge. When this occurs there isn't a "bow wave" as such, but there is certainly a disturbance. The disturbance has been called "compressibility burble", which may describe the situation better than the term "shock wave".

These Schlieren photographs show (at left) the flow produced by a sharp-nosed projectile as compared with that (below) produced by a blunt-nosed projectile—both proceeding at a supersonic velocity.



One way of visualizing this wave standing out at quite a steep angle from the surface is to imagine a screen or grating having fairly close mesh near the surface and a wider mesh as it gets farther away. Obviously, the more violent the effect, the closer the mesh and the farther it extends from the source of trouble. The shock wave, or compressibility burble, apparently affects the air through which it passes about the way a screen would. It drags along a certain amount of air and causes relatively turbulent flow behind. There is a great deal of energy lost in heating up the air and disturbing it as well as in dragging some of it along.

It is obvious that with the approach of these compressibility effects the drag will

rise sharply. In fact, the only data obtained to date on airplanes would indicate that drag values go out of sight at some speed slightly above 80 percent that of sound. Running out of airplane knowledge, we can jump to bullet data, and here it is found that drag characteristics have been determined for much higher speeds.

In bullets, for instance, the drag at a velocity of between 80 to 90 percent that of sound starts up in the same fashion as in aircraft. It is possible, however, with modification of nose shapes, to control this rise so it not only levels off at a drag co-efficient about twice that when it flew out of hand, but the drag co-efficient actually drops back as speeds are raised to about three times that of sound; and the drag co-efficient eventually reaches values not very much more than when it started its sudden climb. The drag co-efficient multiplied by the functions of speed and size in the normal manner give the actual drag in pounds, which obviously increases as the speed increases. We can design for the actual drag and provide power on a reasonable basis, provided the co-efficient doesn't fly out of hand and leave us faced with unlimited drag and power requirements at some stage along the way.

Since we all tend to believe only what we see, wave formation and travel in air seem too abstract to be real. Perhaps we can revert to another type of wave formation about which we know a good deal more and which, in addition, we can see. The surface waves on water for instance, have considerable similarity to the waves about which we are concerned in airplanes.

IF you have ever noticed the water level change in a canal when a boat goes through, it is easy to see that water has to flow past the boat at a very rapid rate in order to fill up the hole caused by the plunger effect of the boat moving between the canal banks. The force that pushes the water back into place is obviously gravity. That is, the boat simply lifts up a hill of water ahead of it, and, when this hill is steep enough, the water runs back between the boat and the canal banks fast enough to match the boat's speed and fill out the hole. It is fairly obvious that a stable condition will exist where the height of the hill is just enough to maintain a steady flow past the boat. Thus, the faster the boat moves, the faster the water has to run and the steeper the hill has to be. One can see the local speeding up of the water by the side, and, if the boat moves at a higher speed, the water will have to run at a faster rate. In other words, the water will have to pick up more acceleration and lose it again in order to get by the boat in the shorter period of time available. If the boat is wider or more blunt nosed it is also apparent that the water has to run faster, too, and needs a steeper hill or a bigger wave than it does for a slim, sharp boat at the same speed. If the boat is operated in open water, the wave effect is again the same, although perhaps less obvious since the canal banks are now replaced by the indefinite mass of water.

The tendency for water to arrive at a uniform level provides an elastic force that varies as the water is raised or lowered. The disturbance of the water level could be considered actually a difference in "pressure" level since gravity or the weight of the water is creating the "pressure" which causes the flow.

Imagine, for the moment, a situation where the particles of a fluid are small elastic golf balls. Moving an object in the center of a mass of golf balls, we could expect that the elasticity of the balls acting together would accommodate for the pressure changes necessary to keep a certain pressure level along the surface of the object. In other words, instead of using gravity as the force providing the hill which causes the flow of the fluid, we would have a pressure hill created where the difference in pressure would cause the same sort of flow.

THE situation is not very different from that of the boat in the canal. That is, at low speeds the change in pressure along the surface and the differences in pressure between the region close to the airplane and that some distance from it is sufficient to maintain smooth flow—to give and take as necessary to fit the passage of the plane. The greater the curvature of the airplane wing, or fuselage, whatever it may be, the greater the speed-up necessary to get around and, consequently, the lower the pressure at the surface at that point.

Since this pressure hill depends upon how fast particles close to the object have to move, it is obvious that moving the object very rapidly will produce considerable speed-up, even though the displacement or curvature is relatively small. Here again, a steep pressure hill may be created by reason of the high speed of the object regardless of how gentle its curves. As far as the golf balls are concerned, this is all very well provided the required change in pressure and motion is slow enough so that they can squeeze up and stretch out and speed up or slow down and pass this load on to their fellows in the time available. It is fairly obvious that there is some limiting condition where the time is so short or the blow so hard that the little particles close to the object run out of elastic ability, and, taking up only a part of the load, pass most of it on as a shock to the next layer, which in turn acts like a lot of ball bearings and pass on the major shock. This continues so that the impulse travels on out for some distance as almost a complete shock to each successive layer.

Since the speed at which this shock travels is a function of the elastic ability of the particles of the fluid, it should be possible to determine its value by knowing something of its elastic properties. We find, actually, that the speed at which some such wave or impulse would travel (for instance, the speed of a sound wave) can be calculated actually in terms of the elasticity of the material with which we are concerned. Thus, the speed of sound in air, roughly 760 mph. at ground level, represents an elastic limit for air, beyond which any requirement for change in the air particles is obviously accompanied by a shock impulse with its attendant wave pattern and travel. In passing, it appears that one can almost guess that the colder the air or the golf balls get, the less will be their elasticity and therefore the lower will be the speed at which this shock will travel.

As an object goes through the air, shoving it around, the bigger the displacement, and the lower the speed at which a critical condition is reached where the change required of an individual particle becomes faster than its ability to accommodate and transmit this change smoothly to the surrounding air.

IN other words, the steeper the pressure hill which we try to maintain, the lower the speed which we can fly and still maintain flow and smooth contact with the surface and within the elastic limits of the air.

Obviously, at bullet speeds well above that of sound, regardless of pressure hills or pressure gradients, there will be an entrance shock which will vary in intensity only with the size of the nose or the sharpness of the nose. We would therefore expect that in order to keep down the area of the shock, the leading edge should be as sharp as possible.

It will thus be seen that the amount and rate of displacement, the amount of local speed-up and the critical speed at which some shock or compressibility effect takes place, are all inextricably tied up. There are obviously two remedies for the situation: one, reducing the pressure hill slope required so that the speed may be higher before reaching the critical point; and the second, actually designing to fit the wave characteristics. The first postpones but does not remedy the condition, although it may also reduce the intensity of the trouble when it comes.

In boat design, the wave drag of a hull is not only a function of the speed and the weight of water, tied up with the gravity hill, but also one of length of the boat. In other words, the boat must fit the wave pattern which it creates. For this reason there will be a number of speeds which a given length or size of hull of a given shape will fit the complex wave structure to give lower drags than at the speeds in between; if the speed increases for a given length, the drag finally goes up to staggering values.

In other words, even when we can design to fit the wave pattern we reach a critical speed for any given size of boat beyond which it is practically impossible to drive the hull. If a small boat is towed behind a large steamer which has a much higher critical speed, the little boat may be swamped or may become completely unstable or actually plunge under water simply because of its inability to fit the waves it creates. If, however, instead of using a hull

which obtains its support by displacement, we use a hull which upon reaching a certain speed climbs out of the water and planes, a complete new field is opened where waves are formed, but they have much less effect on the boat's performance. The transition, however, it not necessarily smooth, as anyone knows who has ridden in a racing hydroplane or even a flying boat getting up on the step and coming back down.

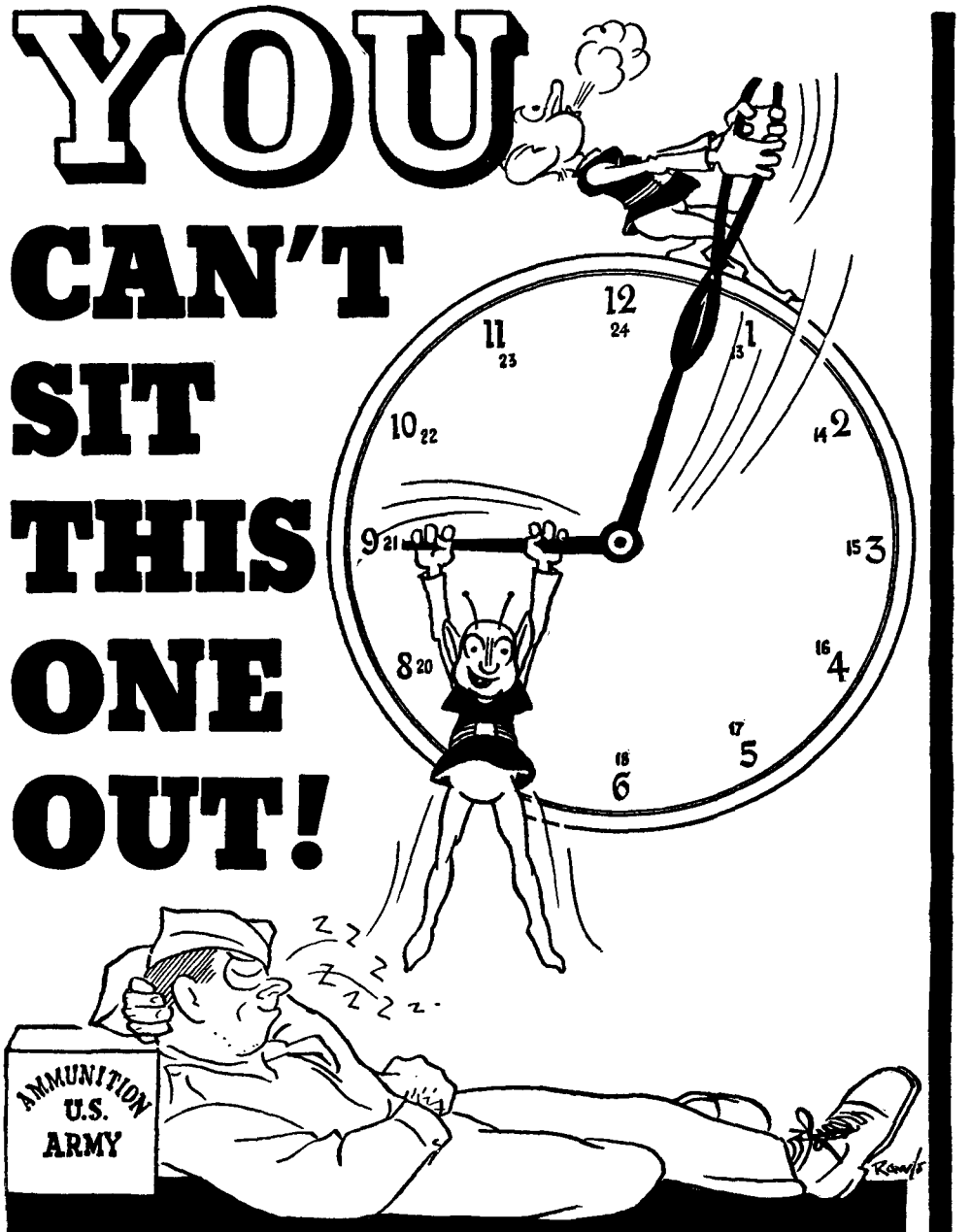
Perhaps there is some clue to aeronautical problems in this, now that we are reaching speeds where waves are formed. We are vitally concerned with reducing the intensity of such waves, but we have not yet started to design for actual wave conditions. It is probable that we can design aircraft for wave conditions in which we either fit the aircraft to the waves, or in which we make waves and then build aircraft which will operate without being too badly affected by such waves.

Applying all this to the present airplane, it can be readily seen that today's problem is one of avoiding steep pressure gradients or pressure hills so that the limiting velocities for wave formation are as high as possible. Sharp entrances and thin sections may not be the answer since the transition from one point to another along the surface may be too abrupt for good characteristics, and obviously a sharp point is good only for exact head-on motion. A moderately rounded entrance will give the best compromise, but the curvature immediately back of the entrance must have a very gradual change in curvature. During the transition period, at speeds close to but below that of sound, there will be little to choose from in the build-up of drag between various entrances and curvatures, but if the air is displaced too roughly the effects will be felt earlier. At speeds definitely around that of sound or above, the effect of easy entrances and gentle changes is very pronounced. ☆

This is the third in a series of articles on compressibility. In a later issue, the phenomenon as it applies to aircraft will be discussed.

ANSWERS
to Quiz on Page 14

1. (b.) The Solomons. 2. (d.) Fragmentation. 3. (b.) The speed of sound, which is 1,090 feet per second standard air, decreases with a drop in temperature. 4. (c.) Link Trainer. 5. (c.) Two planes, the B-26 and the P-47. 6. (d.) Pops to an exaggerated position of attention. 7. (d.) Single engine, one-place fighter. 8. (b.) Okay or message received. 9 (d.) Two planes, the P-38 and the P-39. 10 (b.) Chicopee Falls, Mass. 11. (c.) Give a soft salute. 12. (b.) A belt of calm moist air centered near the equator. 13. (b.) Continue to eat unless addressed. 14. (d.) Eleven. 15. (b.) Carbon dioxide. 16. (c.) A Russian fighter plane. 17. (a.) Maj. Gen. G. E. Stratemeyer. Maj. Gen. Weaver is head of the Technical Training Command, Maj. Gen. Yount, The Flying Training Command and Maj. Gen. Echols, The Materiel Command. 18. (c.) Bristol Beaufighter.



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Never was time so important a factor. Every minute saved and used works for us FOR VICTORY; every minute lost or wasted works for the enemy.

Whatever your job in the Air Forces may be, get the most in and the most out of every day. Make every minute count.

24 HOURS A DAY ... are as long as you make them!

STREAMLINING AAF TRAINING

By Captain Purnell H. Gould

SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

MOST officers and enlisted men of the Army Air Forces have used in one form or another the services of TAD (Training Aids Directorate), which is part of the new School of Applied Tactics at Orlando, Florida. But it is quite likely that many do not know the extent of the job this organization is doing under the Air Forces' policy of streamlining its training.

In a global war it's learn and live.

Good soldiers must be students in this war which is being fought on more far-flung battle fronts than any previous struggle and with equipment employed in ways often only dreamed of heretofore. This is true in all Army ranks from general to private and in all branches, but nowhere more than in the Army Air Forces.

All who wear the wings and propeller of the Air Forces spend a large part of their time in school. Students and even instructors must learn a lot in a very little time. To help them is the major job of TAD.

TAD is responsible for coordination and approval of the field and technical manuals and other training literature used as texts, for training films, film strips, training posters, visual instructional material, recognition material, and synthetic devices required by organizations of the Air Forces.

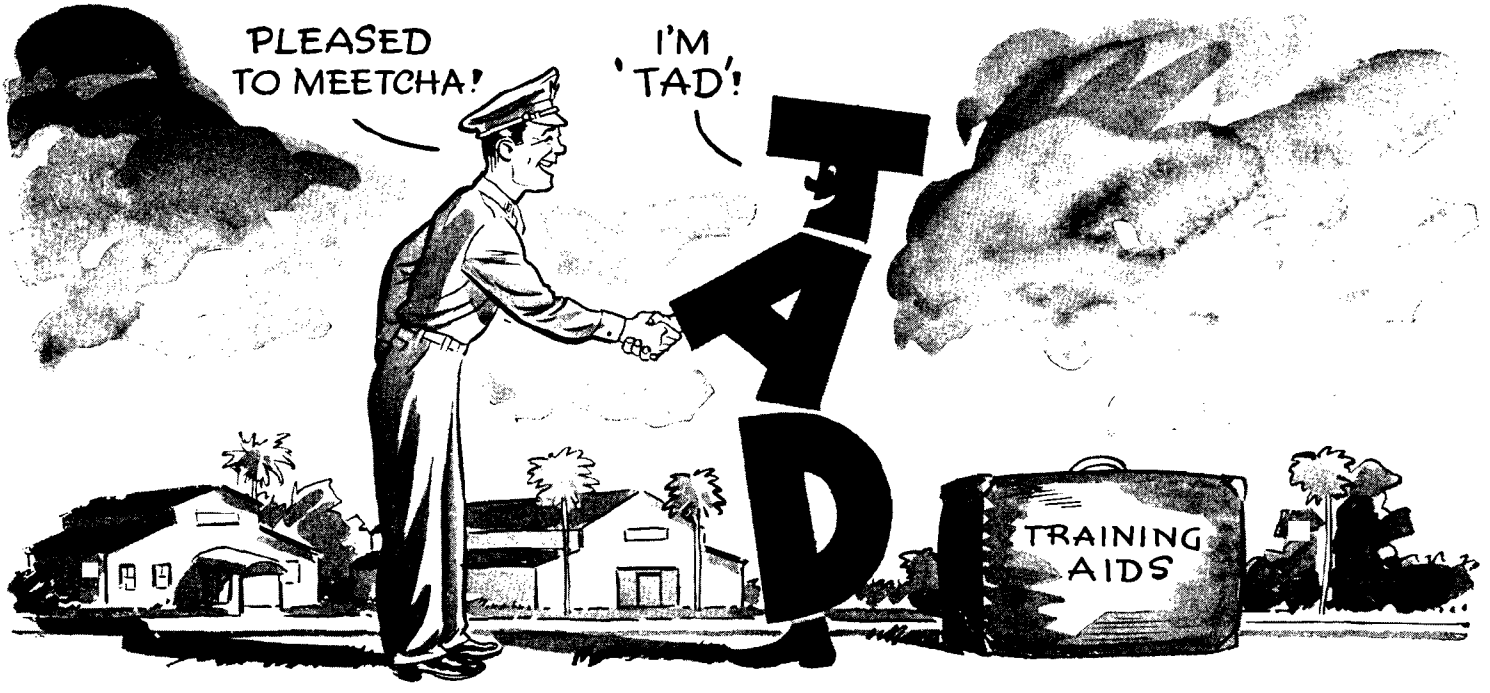
Naturally, TAD doesn't initiate and produce all this material itself. Decentralization in the Air Forces has been approved so that each command may develop its own training aids if it can and wishes to do so. But AAF Regulation No. 50-19 provides that TAD will approve and coordinate the development, production, distribution and use of all training aids, and will eliminate duplication of effort in their production among Air Force organizations.

Combat efficiency, the ultimate test of all armies and of their field units, is largely determined by training. In a war which will not wait, practical aids to speed up the training process are vital. These aids range from the simplest gadgets to the most complex mechanical devices, from brief training circulars to detailed technical manuals, from film strips of a few frames to training films of several reels. Available aids are listed in Field Manual 21-6 and in catalogues distributed by TAD. Many of the most valuable and interesting training aids have been placed in classified categories and, hence, cannot be described here.

To supply such aids, TAD has been staffed by experienced officer and civilian personnel. TAD officers who came from civilian life were writers, film production chiefs, newspapermen, artists, engineers, lawyers, educators, research experts, and others skilled in allied fields. In addition, there was a nucleus of training literature officers who came from the Air Corps Tactical School and the Directorate of Individual Training.

It is of incidental interest that TAD has been the continuing thread connecting the present School of Applied Tactics with the earlier tactical schools at Maxwell Field and Langley Field in the years following World War I.

TAD is now operating with several divisions, among which are Training Films & Film Strips, Recognition, Synthetic Training Devices, Training Literature, and Research and Library.



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(Continued on Next Page)

To facilitate the production and distribution of training aids, TAD recently sent liaison officers to the Headquarters of the Flying Training Command, Technical Training Command, Air Service Command, Material Command, and the four Air Forces in the continental United States.

The procedure to follow in obtaining training aids already prepared or in initiating new projects varies with the types of aids desired. The methods, listed according to types, follow:

Recognition Materials

Army Air Forces activities within the continental United States desiring recognition materials, should communicate directly with the Commandant, Army Air Forces School of Applied Tactics, attention: Training Aids Directorate. Inquiries concerning materials supplied automatically should be directed as above. Projectors, lens, slides, screens and printed material for flash recognition courses are being distributed to trained instructors. Also available are sets of plastic and cardboard models of friendly and enemy aircraft, and sets of silhouette posters.

Synthetic Training Devices

Requests for synthetic training devices already developed, or copies of the new Army Air Forces Synthetic Device Catalogue should be referred to:

Commandant, Army Air Forces School of Applied Tactics, Orlando, Florida. Attention: Training Aids Directorate.

Developments may be undertaken locally for minor projects. Projects requiring extensive mechanical and technical development will be referred by TAD to the Materiel Command or other agencies.

Training Films and Film Strips

Instructors requiring Training Films and Film Strips will find titles listed in the Army Air Forces Training Film and Film Catalogue published in February, 1943. Training film libraries are maintained throughout the Army Air Forces.

To initiate new Training Film and Film Strip Projects, request should be submitted to TAD, AAFSAT, through the Directorate's liaison officers. Enough information should be given with the suggested title to permit comparison with materials already in preparation, to avoid duplications.

Training Literature

Requests for new training literature, or revision of any existing training literature (War Department publications), should be submitted to TAD, Army Air Forces School of Applied Tactics, through the directorate's liaison offices. To expedite action, it is desirable that a rough draft of the new training literature proposed, or the revision suggested, accompany the request.

War Department publications can be obtained through the usual distribution channels from the Adjutant General's Office. Troop School course materials and extension courses are requested directly from TAD, AAFSAT. Information on other Air Forces' Training Literature may also be procured from this office.

SEEING MORE IN LESS TIME

Through the camera's eye at Orlando comes an effective technique for teaching aircraft recognition. At right is equipment used by instructors employing the new flash method.

By COLONEL LAWRENCE J. CARR
SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

THE best trained pilots and gunners flying the best planes and firing the best guns will not win air battles or support ground troops or defend our installations against attack unless their efforts are used against the enemy.

This war has taught us that many valuable aircraft and the lives of fine pilots have been lost because there has been too much tendency to shoot at anything and everything which comes within the sights of air and anti-aircraft guns, and to worry later about what was hit. Thus, the need for instant and accurate recognition ability among our pilots, gunners, bombardiers, navigators and much of our A-2 personnel.

Until recently there had not been in the Air Forces an interesting and effective system of teaching recognition. There were numerous methods used, but they were mostly haphazard and uninteresting. Now a standardized system has been approved by our Commanding General and is being initiated throughout the Army Air Forces.

A school for instructors has been operating at the Army Air Forces School of Applied Tactics, Orlando, Florida, and graduates of this course have been sent to installations of the Air Forces. Their mission is to teach the instructors who will teach students in this country and personnel now on duty in the theaters of operations.

The Army Air Forces Method of Recognition Training now being used has been devised in conjunction with the United States Navy and personnel of the British Army. It is a definite, precise and stimulating method of aircraft recognition. Original steps in developing it were taken by the United States Navy in conjunction with the Psychology Department of Ohio State University headed by Dr. Samuel Renshaw. Dr. Renshaw had been conducting many experiments in the study of perception of form. His method was developed originally to increase the rate of reading, and Dr. Renshaw, realizing the importance of his research to the Armed Forces, offered his system to the United States Navy. The Navy made a thorough investigation of the Renshaw System to the extent of trying it out in pre-flight schools. They made an actual check on the effectiveness of the training by having students from the Renshaw training classes identify planes flying in various positions and altitudes. The training was found to be more than 80 percent effective and was adopted as the Navy recognition system. The Army Air Forces has taken the Navy course, incorporated suggestions by the British and applied certain practical considerations into the adoption of the present system.

The objectives of the new course of instruction are: first, to identify aircraft, surface craft and ground vehicles quickly and accurately; second, to count quickly the number of objects in a field of view to an accuracy of close approximation; and third, to improve the general effectiveness of vision.

IT must be emphasized that this training is for the development of a special skill, and that this skill reaches beyond purely informational type of identification training. The latter teaches some identification by the use of photographs and silhouettes, but gives the student insufficient skill in recognition.

The act of spotting and distinguishing between enemy or friendly objects is no longer referred to as identification, which might be loosely described as putting together in one's mind the various parts of an object to discover its identity. This spotting and distinguishing is known as recog-

nition—that form of memory in which the subject instinctively feels that a present object has been known before. Of course, identification is a vital part of recognition training, but knowledge of identification characteristics without the visual alertness to use it is of little value. The Army Air Forces program recognizes this and directs attention to the general improvement of visual acuity; that is, ability to see more effectively in shorter time.

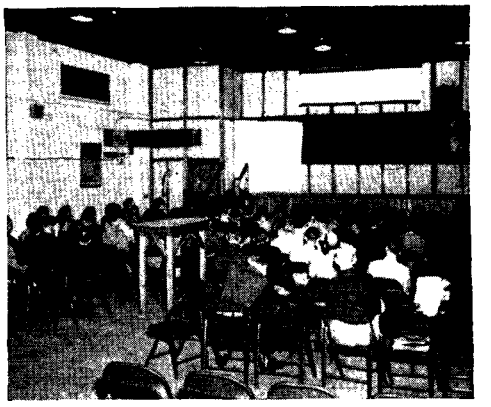
The first objective of the course, the recognition of aircraft and other items, is accomplished through the use of projected images flashed on the screen at split second intervals, varying from three seconds to $\frac{1}{75}$th of a second, depending on the object presented and the progress of the class. This forces the student to see the image as a whole rather than as a series of parts to be analyzed individually. Stress is constantly placed on viewing objects as unified, integrated entities. In the case of each item, the rapid recognition training is preceded by a short instructional period in which the identification characteristics of each item (plane, ship or tank) are presented by a verbal introduction following a standardized procedure and under definite set conditions.

The second objective of the course, quickly estimating a number of objects, is accomplished by the use of projected images showing the objects in varying numbers and concentrations. These are also flashed on a screen at split-second intervals, forcing the student to estimate the number of objects shown. This ability is definitely a skill and can be developed only through continual practice.

The third objective, improvement of the general effectiveness of vision, is the basis of the entire course. It creates in the student an alertness born of ability and confidence. Practice in seeing digits is used to increase the span of vision. It has been found that training in seeing timed exposures under set conditions produces greater results than continued exposures. In other words, you can actually see more in less time. The set condition is the preparation of the student for the appearance of the image, which produces a psychological effort on his part to see accurately and quickly. Hereafter this reaction will be automatic.

THIS method of teaching is very effective in keeping interest. Recognition becomes a game and a contest. Students take pride in increased ability to recognize types at high speed. In fact, during the classes at the School of Applied Tactics, students were found to be making bets on their ability to spot planes at $\frac{1}{100}$th of a second. They were found also to be very eager to operate the projector while their fellow students did the spotting. These were the same students who a few weeks before felt maligned when informed of their assignment to identification which to their mind was a dull subject. This flash method of recognition, by eliminating the boredom attached to previous methods of teaching, will be welcomed by instructors, students and operational heads alike.

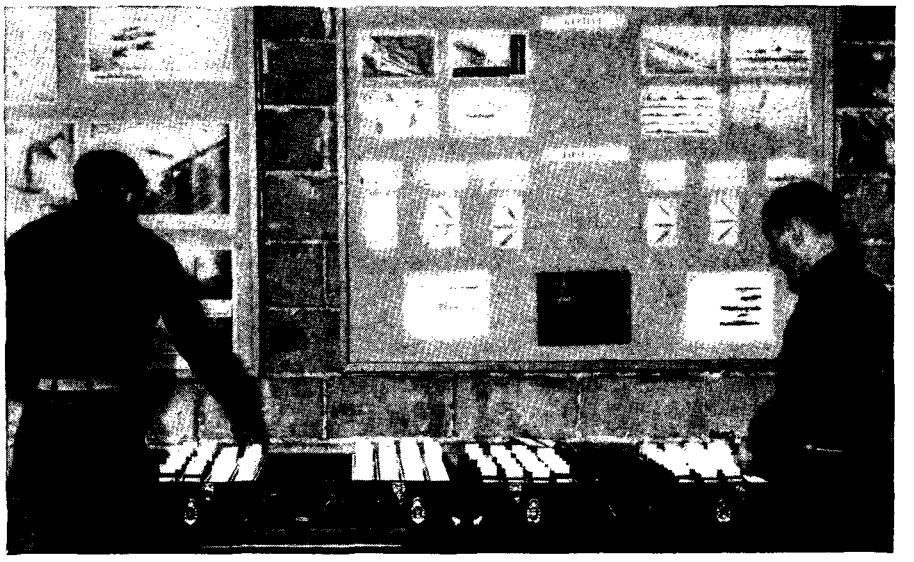
The Air Forces Method is not a short cut to recognition but a means of acquiring greater proficiency in recognition if properly carried out. The more time that can be devoted to recognition training under this method, the more proficient will be the student. Any time that can be allotted to recognition training, no matter how short, can be utilized; but the number of objects learned and the proficiency acquired will depend upon the time available for training.



Instructors learning to instruct.

There is no substitute for study, and in order to recognize aircraft a student must be thoroughly acquainted with each type. To supplement slides and all visual presentations, models, posters and manuals will be distributed. A recognition manual prepared in conjunction with the Navy covering aircraft, ships and ground vehicles, is now on the press. This manual will contain photographs and silhouettes of aircraft in flight covering the operational types of friendly and enemy aircraft, together with a brief description of pertinent facts on each plane. This recognition manual, which will be kept current along with all other equipment necessary for the teaching of this course, will be coordinated by the Training Aids Directorate, a part of the Army Air Forces School of Applied Tactics, Orlando, Florida. ☆

Each slot holds the photo negative of a warplane.



Whatizit . . . at 1/100th of a second?

ENOUGH TO GO AROUND...

● Sure, there are enough copies of AIR FORCE to go around—plenty for home and abroad—providing you make it a point to PASS YOUR COPY ON as soon as you've read it.

● Get this service journal to as many men as possible. Each copy shared in your squadron means another copy for the men at foreign stations.

KEEP THIS COPY MOVING!

BATTLE REPORTS

(Continued from Page 5)

roughly four ship elements, all elements flying ships in trail. I got shot at one "Oscar" but did not observe results; pulled up to left, saw one P-38 going down with three Japs on his tail. I came down on them, fired at last "Oscar", firing from 300 yards until I went over him. Side of fuselage behind his cockpit blew away.

When I pulled up after second "Oscar" in this group, fired short burst from 300 yards and broke away because another ship on my tail. I pulled up to the right and as I climbed, got shot at flight of three passing overhead from range of 150 yards. Results unobserved. Fell off on left wing and dove on two below so I changed to lead ship, fired long burst from 200 yards, followed him as he dove. He dove into water- -no smoke, no fragments.

I was out of ammunition so came home. Landed 1230, got new ship, returned; no sightings, returned to field. Landed 1315.

"SPUN INTO WATER . . ."

To —— on intercept, identified four B-26s to —— and arrived 1155, 18,000 feet to 15,000 feet. Saw aircraft to left, chased, identified as P-40s. Back to ——, circled, saw aircraft over short at ——. Three Zeros 5,000 feet. My flight position. Zeros broke formation, right ship peeled off to right, center ship rolled, left ship peeled off to left and down; I followed left ship in turning dive. I fired long continuous burst at range of about 500 yards closing in to 50 yards. Zeros left tail assembly came off as he pulled out of dive, and he spun into water one-half mile offshore. I pulled up, couldn't find my flight so joined up with another flight. Patrolled; flight ordered home 1255, landed 1320. No damage to my plane; combat lasted from 1210 to 1215.

"OBSERVED AN EXPLOSION . . ."

Arrived Buna 1210, 18,000 feet. Saw three Japs about two miles south Buna, altitude unknown. Flight made circling dive to right, approached "Oscars" from their right near quarter. I did not fire on first diving pass, but I pulled out just below level of "Oscars" and fired at one ship just below me and 300 yards ahead. I got in five short bursts. He turned to right and as I passed he went into a fifty degree dive and disappeared. I turned to right and climbed to evade another "Oscar" which was diving at me. After this, I saw no more enemy ships within range. I circled, started after two aircraft which turned out to be P-40s; chased two more, also P-40s, and then came home alone after Wewoka ordered all fighters home. Left Buna 1200, landed 1330. Combat lasted from 1215 to 1245. I observed an explosion at the place the "Oscar" I fired at was diving toward about half way between the ocean and the west end of the Old Buna Strip, and request investigation to confirm a probable victory. ☆

Roll of Honor

(Continued from Page 19)

Robert G. Crouse, James M. Davenport, Mathias E. Donart, Claude J. Fraley, Joseph A. Gerchow, Clifton W. Groeiz, Clark D. Hagan, Loys C. Hedglin, Duncan Hunter, Thomas Irwin, Felix J. Lukosus, Pell R. Mann, James S. Minnich, Roth J. Narramore, Thomas J. Price, N. H. Salles, John Sloboda, H. E. Swinney, John M. Westhaver. **CORPORALS:** Frank R. Basa, Harold W. Borgelt, Robert P. Buss*, Frank G. Chaplick, Hubert W. Crowell*, James T. English, John J. Felder, Carl W. Fuller, Edward W. Harbaugh, Frank L. Melo, F. D. Montgomery, George H. Nelson, Roy T. Pope, Hodges K. Rigdon, S. L. Taylor, Henry L. Walters, Charles P. Zuercher. **PRIVATES FIRST CLASS:** William G. Creech*, Noel E. Durbin, Virgil A. Green, Frederick R. Jones, Ewald A. Koch, W. G. McInnis, H. C. Rainey, N. J. Salloum, W. Silverwatch, Kenneth E. Strong, A. T. Travaline, A. N. Zeock, Jr. **PRIVATES:** George O. Bushey, Spencer L. Davis, James E. Dinagen, Kenneth A. Fuller, Cleason S. Hamm, Phelps W. King, George G. Leslie*.

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* Posthumous.

Notes from the Air Surgeon's Office:

How to Keep Well in the MIDDLE EASTERN THEATER

Brigadier General David N. W. Grant

THE AIR SURGEON

THE following article is the fourth of a series on health conditions in the various theaters of operations.—THE EDITOR.

THE LEVANT, frequently called "The Near East" or "Middle East", is made up of the Moslem countries of Southwestern Asia that border, for the most part, on the Eastern Mediterranean Sea, the Red Sea, and the Persian Gulf. Although it is one of the oldest inhabited regions of the world, it is still a primitive land when judged by American standards. There are several modern cities along the Mediterranean quite similar to American cities, but the great majority of the towns and villages are exactly as they were in Biblical times.

The inhabited areas are found where the most water is available, such as along the eastern Mediterranean seaboard, in the river valleys and in the Lebanon Mountains. The greater part of the area is arid desert land, not great sandy wastes like the Sahara in Africa but flinty, harsh, monotonous desert, covered only with a thin scrubby vegetation.

The fact that the majority of the people live along water courses indicates the important role that water plays in their lives. However, they have little regard for the purity of water. American troops, who have been taught the importance of chlorinating or boiling water before using it, will be shocked to see natives take water for drinking purposes from open ditches running through the middle of the streets. Except for water treated under the supervision of Army personnel, the water in this area must always be considered potentially contaminated with various organisms capable of causing such diseases as typhoid fever, dysentery, schistosomiasis and, perhaps, cholera.

The principal health problems for troops in this area will have to do with the procurement and the use of water. All personnel going to the Levant should know one or two emergency methods of purifying drinking water (FM 21-10).

A man can get along on one quart of water a day for four or five days without any serious consequences if he knows how to husband it. There are a few tricks that will help conserve water when the amount is limited. Drink water only in small amounts and drink it slowly, for when it is consumed rapidly it is lost in the form of excessive perspiration. Small sips swished around in the mouth will alleviate the first craving for water. Chewing gum will also suppress the desire to drink. However, chewing tobacco or smoking have the opposite effect. Unless absolutely necessary, do not allow yourself to become so warm that you perspire profusely.

DURING the summer months the climate throughout this entire area, with the exception of mountain regions, is torrid. Sun stroke and heat exhaustion will therefore be common, unless special precautions are taken to avert them. Every man should know the early signs of these conditions, for it is easy to prevent them if recognized early.

Impending sun stroke is signaled by headaches, dizziness, irritability, dry, hot skin, and the seeing of objects such as red and purple spots before the eyes. Sun stroke victims run a high fever and unless immediate steps are taken to reduce the fever death may occur. The victim should be placed in the shade when possible, his clothes removed, and water given him slowly in small quantities. Sponge the body with water, but do not dry it, for evaporation is a means of cooling. These people should always be taken to a medical officer as rapidly as possible.

Muscular cramps and pale, moist, cool skin are signs of heat exhaustion. The victim becomes dizzy and not infrequently vomits; his pulse is weak; the pupils of his eyes dilate, and his respiration is shallow. Men suffering from heat exhaustion are in need of salt, which should be given in large quantities dissolved in small amounts of fluid, such as water, tea or coffee.

One of the most important disease problems in the Levant is malaria. Although a great part of the country is desert, malaria accounts for a large proportion of all deaths. Malaria-carrying mosquitoes are found wherever there is water, along the sea coasts, in the river valleys, about the lakes, and even at desert oases and waterholes. In parts of Palestine attempts have been made to eradicate mosquitoes. However, throughout the Levant troops should always be aware of the existing danger and govern themselves accordingly. Stay indoors after dark, or if you must go out at night, wear long trousers tucked into boots or leggins, and long sleeved shirts. Use mosquito repellents, headnets, gloves and mosquito boots. If buildings are not well screened be sure that you always sleep under a mosquito net. Avoid native towns where infected inhabitants act as reservoirs of the disease. These villages are usually infested with mosquitoes.

Although yellow fever has never occurred in this area, the yellow fever mosquito is very common and transmits Dengue, or Breakbone fever to man. Dengue is not a fatal disease but is very incapacitating and painful. The presence of this dangerous mosquito is of considerable importance. Strict regulations with regards to Air Corps fumigation and vaccination of all personnel are a result of its prevalence.

Except for the European communities of Palestine and the few Westernized Moslems, the majority of the people have little interest in personal cleanliness. Many of them have scabies and are infested with lice. Because typhus fever and louse-borne relapsing fever are not uncommon, especially during the winter months, it is important to avoid native homes, dirty natives in bazaars, association with individuals who may be infested with lice. Shawls, rugs and clothing, purchased at native bazaars, or

picked up in native homes must be considered as lice bearing.

Due to the scarcity of water, it may be difficult to bathe frequently. However, regular bathing, if no more than a sponge bath, is essential. The skin folds, between the toes, in the crotch, and armpits must be kept clean in order to avoid fungus infections, such as dhobie itch and athlete's foot. After bathing, all parts of the body should be thoroughly dried and dusted with powder, such as the army issue foot powder, and clean dry clothing put on when possible. Do not use another person's towel or allow him to use yours.

Bathe whenever you can, but remember that the streams, irrigation ditches and ponds along the coasts and great river valleys are contaminated with the flukes—blood worms—that cause schistosomiasis, a very serious disease of the bladder and bowel. It is not safe to swim or even wade in water that contains these flukes. Be sure that water has been examined by Medical Department personnel and declared safe before swimming, bathing or wading. Sea bathing close to shore, where there are no sharks, but away from the outlets of rivers, is safe, as is water that has been placed in confined spaces and allowed to stand for from 48 to 72 hours.

TAKE a page from the old cavalrymen's rule book and shave only in the evening for the sun and wind burn a freshly-shaven face.

Flies will be very obnoxious pests in all of the Moslem countries. Few precautions are taken to see that human excrement and garbage—fly-breeding material—are properly disposed of. Not infrequently streets, and even homes, are soiled. This will be immediately evident to all newcomers, for the stench that is found in most Moslem towns is one not to be forgotten. The fact that flies can transmit typhoid fever, bacillary, dysentery and cholera, makes them doubly important. The first two diseases are always present in the Levant, and just because a native can drink water from a ditch that acts both as a water main and a sewer, without particular harm to himself, does not mean that you can. Your typhoid fever shots protect you to a reasonable degree against this disease, but the number of bacteria that might be taken in in one small sip of polluted water might be capable of overcoming your immunity. Then, too, it protects you only against typhoid and not against the other intestinal diseases. There is little cholera in the Levant at the present time. However, the constant immigration of Moslem pilgrims to Mecca from those parts of the world where cholera is endemic makes it a potential threat.

The natives also have the unsanitary customs of fertilizing fruit and vegetable gardens with human waste, and of irrigating and washing fruits and vegetables with sewage water. This, of course, means that these foods can be contaminated with dangerous bacteria. To be sure they are safe, they should be dipped in boiling water for a few minutes before being peeled. Potassium permanganate solution is not satisfactory unless the fruit or vegetable is allowed to soak in it for a minimum of four or five hours. All foods, other than thick-skinned fruits, should be thoroughly cooked. The best safeguard is to eat only at the Army post, even when on leave, or in European restaurants that have been inspected and approved by an American medical officer. By all means, do not buy food from a street vendor.

Milk should always be boiled, for pasteurization is only employed in the modern Jewish communities and a great majority of the dairy animals have tuberculosis and undulant fever. Because food spoils rapidly in this area, it is necessary to carry such staple food as concentrated rations, canned fruit juices, crackers and thick-skinned fruits on an operational flight.

Sand fly fever is a disease very much like dhengue in that it is rarely fatal but very painful. The troublesome little fly that causes this disease is found throughout the Levant. There are many ticks in this region that carry the tick-borne type of relapsing fever. During the last war a large epidemic of tick-borne relapsing fever appeared amongst people who had been living in caves, a frequent habitat of ticks. Some ticks in this area also carry a disease somewhat similar to but milder than our own Rocky Mountain fever — Fieve-boutenneuse. When operating in tick-infested country the body should be gone over thoroughly at least four times a day to be sure that no ticks have been picked up. A tick should never be yanked off, but should be removed with forceps or, if they are not available, by wrapping a piece of paper or cloth about the tick before gently pulling it off. A drop of kerosene on a tick will make him release his hold promptly, or, if nothing better is available, you can prod him with a lighted cigarette butt.

There are many dangerous snakes in this area, such as the black cobra, and pit vipers. To avoid being bitten, examine clothing and shoes before getting dressed, for on cool nights snakes like to get in warm places. Always be careful to look in cupboards, drawers, and other dark places before reaching into them with your hand. Before getting out of bed at night turn on the flashlight to make sure that there are no snakes on the floor. Wear boots when required to walk in snake infested areas and avoid careless touching of trees and shrubs. Do not lie down in the grass until you are sure that there are no snakes about.

IF bitten by a snake, immediately apply a tourniquet above the bite. Do not become excited, and, above all, do not take any alcoholic drinks. A snake-bite patient should not be allowed to exert himself but should be removed to a medical officer as rapidly as possible. If a medical officer is not available, whether or not the bite is on a part of the body where a tourniquet can be used, a cross incision, one-half by one-half inch, should be made over each fang mark and preferably one to connect the two fang punctures. The cut must be deep enough, one-fourth to one-half inch, to insure free bleeding. Suction must then be applied for short intervals for at least one-half hour. This may be applied by the mouth, or by heating a bottle and placing its mouth tightly over the wound. The cooling of the bottle will produce considerable suction (FM 21-10). If possible, kill the snake and take it to the medical officer for inspection, so that he will know what anti-venom to use.

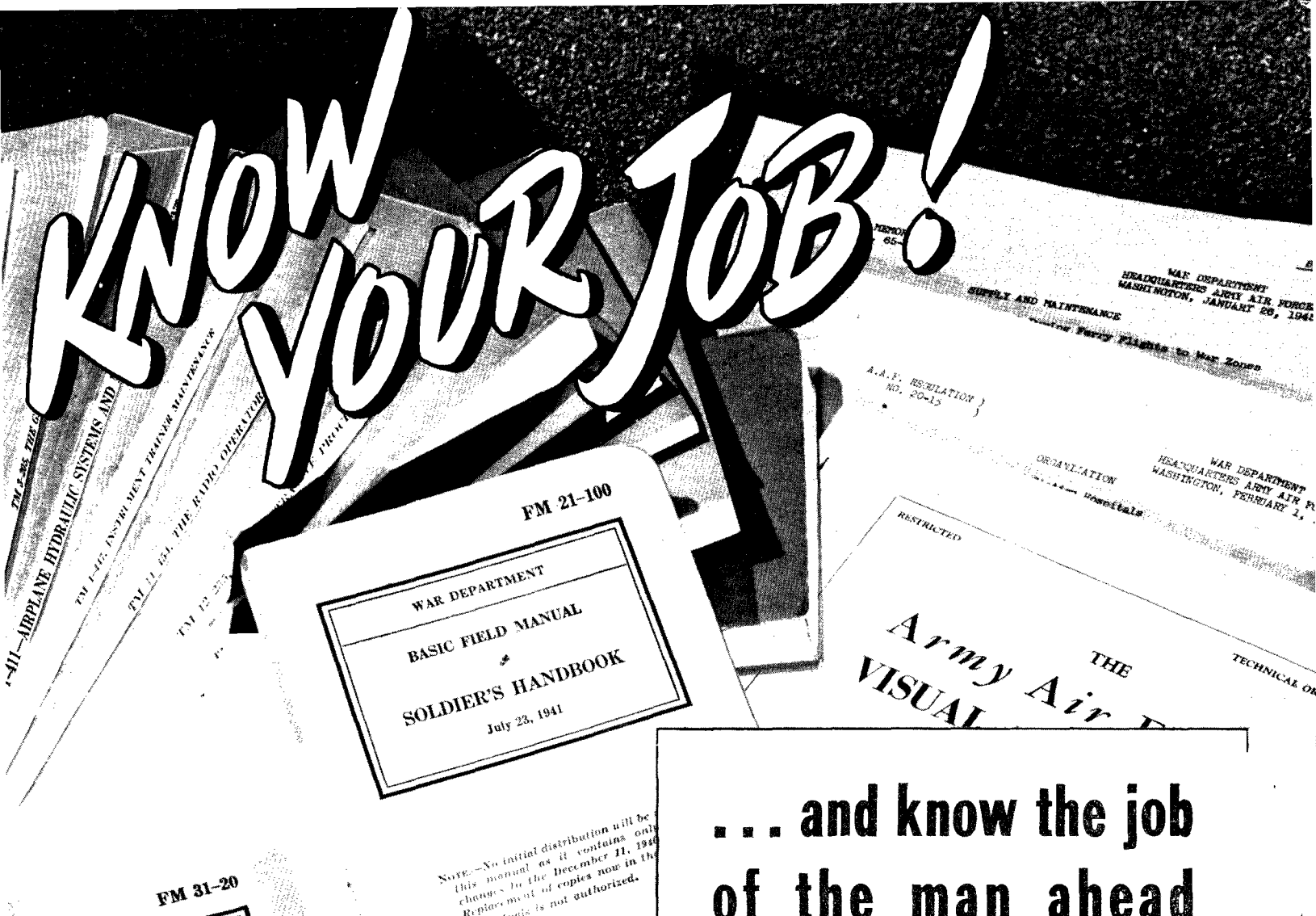
The differences between ground and air temperatures during the summer months, when temperatures of 100 degrees or more are frequently reported on the ground, while temperatures of 40 or 50 degrees occur at relatively low altitudes, make an additional problem for the flyer. Unless he is careful to arrange his flying equipment so that varying degrees of warmth may be added as he ascends, he will become chilled and may develop a cold or even pneumonia. Precautions must be taken to avoid sunburn, for in this latitude serious burns may be acquired after relatively short exposure. The glare of reflected light from the desert and mechanical irritation produced by wind and blowing sand makes it necessary for all personnel to wear protective goggles.

If forced to travel on foot across the desert avoid doing so during the heat of the day, but travel only at night or in the early morning and late afternoon. Avoid unnecessary steps before setting out for a new objective. Be sure you are properly oriented and that your course follows the easiest route. Travel light, take only such things as water, food, compass and gun, first-aid kit, sun glasses, a knife and some cloth, such as a piece of parachute silk, to be used as a sun shade during the heat of the day.

Minor wounds, such as cuts and abrasions, become infected easily and not infrequently develop into seriously disabling injuries so that immediate first aid treatment should be applied to all cuts, burns, abrasions and insect bites—no matter how small. Desert sores and other painful skin ulcers will be avoided if proper attention is given to all minor injuries.

Venereal diseases are common throughout this area, especially in the towns along the sea coast and in larger cities.

Usually, professional prostitutes live in segregated districts. However, all women who can be "picked up" must be considered in the same category as professional prostitutes, and furthermore, they will all be infected with one or more of the common venereal diseases: syphilis, gonorrhea and chancroid. The customs of the country and the religious beliefs of the Moslems forbids the association of their women with members of the Christian faiths. To violate these customs is to invite the most severe type of reprisal from the Moslem men—even to the point of emasculation of the offender. ☆



. . . and know the job of the man ahead of you!

Making good as a soldier is no different from making good in civil life. The rule is the same and that is—know your own job and be ready to step into the job of the man ahead of you. Promotion is going to be very rapid in this Army. Be ready for it. You will have little time to learn the duties of a noncommissioned officer after you become one. You will be expected to know those duties and show that you know them. At a moment's notice you may have to take charge of your squad as a corporal—and in a critical hour. In the same way when you are a sergeant you cannot tell under what conditions and at what hour you may have to take the place of your lieutenant. You want to know what is expected of you and be ready to do it.

—*FM 21-100*

We Who Are Leaving Say...

don't tell when we're going, where or why–

IF YOU TALK–

WE MAY DIE!

AIR FORCE

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

MAY 81

MAY 1943

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Contents

DEPARTMENTS

AIR FORCE

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

May Brief

IN SPRING many an airman's fancy turns to the North Atlantic Route. We can't call it a young man's fancy, for chances are the spring thaw means more to the old-timers. So this issue we give you straight-from-the-shoulder advice on hopping the North Atlantic from veterans who have crossed the big pond many times.

These men are civilian pilots of the Air Transport Command who cut their eye teeth at Army and Navy flying schools many years ago, piled up thousands of miles with the commercial airlines before the war, and now shuttle big DC-4s and Stratoliners all over the globe.

Our article deals in the lessons they've learned from the "hard knocks" school of ocean flying, presented in what amounts to a round-table discussion on the subject written by Captain Robert B. Hotz, also of the Air Transport Command, and formerly of the AIR FORCE staff. The article appears on Page 6.

THE NEW ORGANIZATION of the Army Air Forces is covered in this issue, first in a statement about its basic principles, on Page 2, by Major General George E. Stratemeyer, Chief of the Air Staff, and in a revised organization chart of the Air Forces on Pages 20-21. The chart carries the names of key personnel as of March 29, effective date of the reorganization.

Speaking of the reorganization, the April issue, prepared before its completion, carried an article explaining the functions of the Directorate of Photography. Under the reorganization, it ceases to be known as a directorate; its functions now fall in with the units headed by Assistant Chiefs of Staff for Training, and for Operations, Commitments and Requirements, respectively. We have tried to catch up with the reorganization in the May issue. But if you spot something that doesn't jibe exactly with the new setup, we hope you'll understand.

SNOW, SAND AND SARONGS is just another way of referring to the arctic, desert and tropics, and it is the name selected for our newest department, introduced this issue. Snow, Sand and Sarongs is prepared by the Arctic, Desert and Tropic Information Center, Eglin Field, Florida, and contains miscellaneous bits of practical information on conditions in non-temperate zones. Suggestions, contributions and requests from the field will help greatly in its preparation each month.

U-BOAT HUNTING is featured in an article on Page 4 which sums up the tactics being employed by our Antisubmarine Command in aerial warfare against the subs. Author of the article is Captain Harold B. Ingersoll of the A-2 section of the Command. Accompanying pictures illustrate the action which takes place from the sighting to the sinking of a U-boat by depth charges.

WITH HIS FINAL ARTICLE on compressibility, which will be found on Page 12, Colonel Ben S. Kelsey sums up present knowledge about this perplexing topic and lifts the veil on tomorrow's possible developments in aircraft design. Clouded as the problems of compressibility admittedly are, progress is being and will continue to be made in overcoming its effects, the Colonel concludes.

PRECISION BOMBING is graphically illustrated in a series of aerial photographs on Pages 9, 10 and 11. The photos were all taken from our heavy bombers during attacks on three objectives in North Africa. Of special interest is the picture study of the pasting given the enemy airdrome at Tripoli before it fell to the Allies. Five pictures, arranged in sequence, show: the approach to the target at Tripoli, bombs away, the first hits, blasting the airdrome and its equipment, and finally the departure of the attackers, after causing heavy destruction.

"ME LONG-LONG", in the lingo of Pidgin English, means "I don't understand". And if you don't understand Pidgin we recommend a glance at the article on Page 29 which tells you about this useful language, practiced in the best native circles, and how the Special Services Division is teaching it. In addition, we present a brief glossary of Pidgin English terms in the hope that it will make "you savvy", or understand.

AS NEW DESIGNS and new tactics send our airmen up higher and higher, the question of oxygen and oxygen equipment becomes increasingly important. The front cover picture close-up of a combat crewman wearing the Type A-10 Demand Oxygen Mask is the work of Staff Photographer Sergeant Roger Coster. Next month we have scheduled a feature which will include a statement by Brig. General David N. W. Grant, The Air Surgeon, on the proper use of oxygen equipment, as well as some Do's and Don'ts on the subject and a series of picture illustrations.

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CROSS COUNTRY

MAY 8 1943

Reviewing the Bismarck Sea victory, and other developments of the month within the Army Air Forces

A NUMBER of Superman stories seem to have grown out of the Bismarck Sea victory early in March.

When the boys knocked off the Jap convoy near New Guinea, a number of people were left scratching their heads. Even the first press reports from the Southwest Pacific summed it up as "incredible".

It was a landmark in the history of military aviation. But the Bismarck Sea victory was no miracle. When you analyze the engagement and the preparations leading up to it, you're convinced of that.

Good fortune played a prominent role. No one will deny it. "Half luck, half practice and rehearsal" was the way Lieut. General George C. Kenney, Commanding General of Allied Air Forces in the Southwest Pacific, described the annihilation of the convoy, with its thousands of troops and tons of equipment.

But a study of the action indicates two chief factors responsible for the success:

1. Thorough diagnosis of the enemy's plans and intentions, which was formulated well in advance from numerous sources of information, including excellent air reconnaissance of the entire scope of the enemy's movement and possible sea lanes.

2. Precise execution of a well-planned and coordinated medium- and low-altitude bombing attack, with fighter cover and with repeated attacks on enemy refueling bases on land near the scene of action.

The Bismarck Sea job took about 48 hours in all from the time the convoy was first sighted on the evening of March 2, until there was nothing left of it on the evening of March 4. A total of 20 missions was run. Approximately 35 percent of the bombs dropped hit home. Of the 20 missions, 17 were run on March 3. That was the red letter day.

The Japanese managed to maintain from 20 to 30 fighters over their convoy but our P-38s flying cover prevented them from effectively interfering with the action of our bombers.

Level bombing at medium altitude by B-17s and B-25s was followed closely by low, mast-high bombing by A-20s and B-25s, both of which covered their approach by strafing the decks of their targets. Additional protection was afforded through simultaneous deck-strafing by RAAF-manned Beaufighters. Attacking bombers alternately strafed barges and life rafts during the engagement.

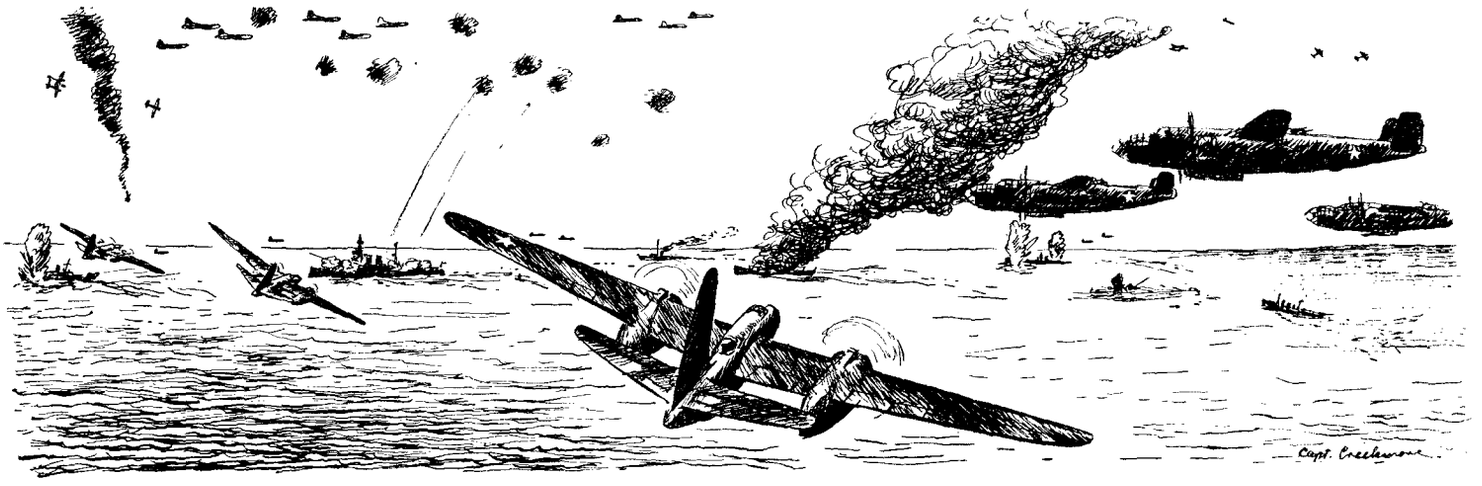
A flight of nine B-17s began the assault on the evening of March 2. The initial attack proved successful despite interception by about 18 Zeros and by intense, accurate anti-aircraft fire from the vessels of the convoy. One-thousand-pound bombs were dropped from altitudes ranging from 8,000 to 14,000 feet. Two direct hits were scored on a medium-sized merchant ship, which was left sinking; damaging near-misses were scored on an 8,000-ton and a 4,000-ton vessel, one of which came to a complete stop. One Zero was shot down and another probably destroyed. Five B-17s were damaged that day.

By the following day (March 3) the convoy was proceeding through the Vitiaz Strait between New Britain and New Guinea. Our planes then began pouring it on in weather marked by well-broken clouds and scattered showers. Here's the way the missions ran that day:

Twelve A-20s moved in low with 500-pound delayed-action bombs. They executed skip-bombing from mast-high altitude, scoring 12 hits on six ships which immediately caught fire, one of them exploding.

Four B-17s, flying at from 6,500 to 7,500 feet, then scored four near-misses with 1,000-pounders. They were intercepted by 15 fighters, five of which were destroyed. One B-17 was shot down, the only bomber lost in the entire engagement.

Twelve B-25s, flying mast-high, scored 14 hits on 10 ships with skip-bombing tech-



nique. One destroyer was sunk and another left sinking. One cargo ship was sent to the bottom, and another cargo ship and a troop transport were left sinking. In addition, a destroyer, two cargo ships and a transport were left burning fiercely. Ten enemy fighters attempted to intercept the B-25s but were ineffective.

Seven B-17s then attacked from between 6,000 and 9,000 feet, scoring direct hits on two 6,000-ton cargo ships. Seven of from 15 to 18 fighters intercepted by our bombers were destroyed, another probably shot down.

Next followed a wave of six B-17s which sank a 4,000-ton cargo ship with two direct hits and two near-misses, and set a second cargo ship afire with one hit and a near-miss. Five intercepting fighters were shot down, another probably.

Thirteen B-25s, some flying at 200 feet and others at about 5,500 feet, scored two direct hits and one near-miss on a 3,000-ton ship which exploded; two direct hits and four near-misses on a 5,000-ton cargo ship which was left burning; one hit amidship on a merchant vessel and one hit and three near-misses on a large transport, with resulting fire and explosions.

Six B-25s sank a 6,000-ton cargo ship, bombing from between 3,000 and 6,000 feet, and scored several near-misses on another.

Eight B-17s, in three flights at about 7,000 feet, left a 5,000-ton cargo vessel sinking with two direct hits, scored one hit and two near-misses on a destroyer previously crippled by B-25s. The destroyer was left burning. Twenty enemy fighters intercepted the B-17s. Four were shot down and a fifth was believed destroyed.

Five B-17s scored one hit and five near-misses on a destroyer and three near-misses on a 5,000-ton cargo vessel; fire and explosions followed. Three of 20 intercepting fighters were shot down. One B-17 was damaged.

One B-17 on a lone mission scored fire-setting hits on a destroyer from 7,000 feet.

Ten B-25s, flying mast-high, scored four hits on a destroyer which exploded and was left sinking, four hits on another destroyer which was set afire and was left probably sinking, and one hit on burning transport.

Five RAAF A-20s scored two direct hits and ten near-misses on a destroyer from about 2,000 feet.

Nine B-25s, some at low altitude and others at about 5,000 feet, scored six direct hits on two destroyers.

Five B-25s stopped a destroyer with four direct hits from 5,500 feet.

Meanwhile, 16 P-38s flying cover destroyed ten enemy fighters and damaged three others. Three P-38s failed to return to their base.

P-40s and RAAF A-20s attacked the Jap airdrome at nearby Lae, the P-40s dive-bombing. Other P-40s bombed Lae. Of 16 intercepting enemy fighters, six were destroyed and three probably destroyed. All P-40s returned.

At the same time, RAAF Hudsons bombed and strafed the Jap base at Dobo, and Dutch B-25s fired a fuel dump.

On March 4, one B-17 on reconnaissance scored two hits and two near-misses on a crippled destroyer, leaving it sinking. The lone bomber was attacked by 20 enemy fighters but returned safely after shooting down four of the intercepters.

Later reconnaissance that day revealed only one Jap ship left afloat—a destroyer. It was finished off by a flight of nine B-25s, which were opposed by one lone machine gun left in operation on the destroyer.

The Jap convoy had been annihilated.

Any number of estimates can be made concerning the significance of a victory like the Bismarck Sea job, but it's almost impossible to produce comprehensive conclusions while the battle of the Pacific is still going on. Quite likely, that will have to wait for the history books.

What we can't forget right now is the potential saving in Allied materiel and manpower by the destruction of the Jap convoy at sea *before* the force it represented could be brought to bear against our ground forces on New Guinea.

You can call that air support of ground troops, if you wish, or label it air power. But the fact is that 48 hours after Japanese troops and equipment were proceeding full speed ahead for land action against the Allies, those same Jap troops and equipment had been rubbed out by our planes before ever touching land.

Wearing of Parachutes

"In all flights of Army aircraft, with three exceptions, the pilot in command will ascertain and be responsible for insuring that:

"*Prior to Flight:* (1) A parachute is available, assigned and satisfactorily fitted for each person making the flight. (2) The assigned parachute is conveniently located to the normal position of the occupant to whom it is assigned and its location is known to that individual. (3) Occupants are familiar with the operation of the parachute equipment. (4) Occupants have knowledge of the operation of emergency

Theory and Practice of the Army Air Forces Reorganization

By **MAJOR GENERAL G. E. STRATEMEYER**
Chief of the Air Staff

A new organization for the Army Air Forces became effective at 0001 o'clock March 29, 1943. It is essential that all concerned understand the basic principles governing this revised organization in order that each individual may play his proper part. It is therefore appropriate to restate certain fundamentals.

Staff and Command Relationship

The Army Air Forces consists of Headquarters, Army Air Forces and the various commands and air forces. Headquarters, Army Air Forces, functions in Washington and consists of the officers shown above the command level on the master organization chart.

Army Air Forces operations are conducted by the several commands and air forces which, generally speaking, function outside of Washington.

Headquarters will tell the commands and air forces *what* to do but not *how* to do it.

The basic principles of this reorganization are:

1. Decentralization to the field of all purely operating functions.
2. Realignment of the Headquarters Staff, with reduced personnel, to formulate overall plans, policies, and programs for execution by the field.
3. Concentration within particular Headquarters staff offices of primary interest, in the problems of the several commands and air forces.

Role of the Commands and Air Forces

Under the new organization, Headquarters, Army Air Forces will:

1. Establish plans and policies for the conduct of operations in the field.
2. Produce and revise as occasion requires an integrated program for performance of the Army Air Forces mission.
3. Exercise broad supervision over the commands and air forces to eliminate duplication, resolve conflict, and insure compliance with directives.

The commands and air forces translate into action the policies, plans, and programs established by Headquarters. This requires:

1. Making decisions as to how to carry out staff directives.
2. Taking appropriate action to comply with all such directives.
3. Referring problems of policy, plans, and programs to the Commanding General, Army Air Forces, for decision.
4. Preparing reports for submission to Headquarters as required.

No organization with as complex a task as the Army Air Forces can remain static. Experience will indicate the need for adjustments in the functions set forth in the organization charts involved. As such adjustments are called for they will be made and the appropriate chart modified accordingly.

The new organizational chart of the Army Air Forces appears on Pages 20 and 21.

exits and their locations, and when deemed advisable each occupant will be assigned a particular exit for use in case of emergency. (5) An emergency signal and 'abandon ship' procedure are known and understood by all occupants.

"During Flight: Parachutes or the harness, in the case of detachable chutes, are worn by all occupants of aircraft; except that crew members, at the discretion of the pilot, may unbuckle straps and remove same temporarily for necessary movements within the airplane." (AAF Reg. No. 60-5, March 3, 1943).

The exceptions: (1) Commercial types of aircraft procured "off the shelf" by the Air Forces in which provisions have not been made for the wearing of parachutes. In this case, instructions will be issued in the Technical Orders covering such aircraft, prescribing the means for compliance with this regulation. If parachutes listed in TO 13-5-17 for use in liaison type aircraft are uncomfortable for certain individuals, the type parachute to be worn will be prescribed by the CO concerned, who also decides whether any parachute will be worn in types L-2, L-3, L-4, L-5 and L-6 series airplanes. (2) Except as may be specifically directed by the Commanding General of the Air Transport Command, the provisions of this Regulation shall not be applicable to multimotored transport type aircraft operated by the Air Transport Command over regularly established air routes. (3) This Regulation is not applicable to the pilots of aircraft transporting airborne troops.

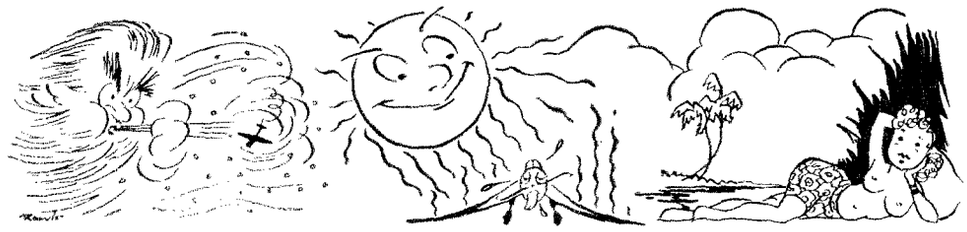
Plane Designation Changes

The letter "R" (Restricted) will prefix the designation of combat airplanes of type, model and series which, for any reason, are no longer considered by Headquarters to be entirely suitable to perform their primary combat mission. Examples: the B-10 becomes the RB-10; the B-25A becomes the RB-25A. Combat planes will be placed in this restricted class only by the authority of Headquarters; those so classified will be listed in appropriate technical orders by authority of Headquarters. The new classification should not be confused with the status of the airplane, "Operational" or "Not Operational" as defined in AAF Regulations Nos. 15-110 and 15-111.

The letter "U" (Utility) will prefix the designation of transport and cargo planes ("C") normally providing capacity for eight persons (including pilot) or less, or for cargo weighing 1,400 pounds or less. Examples: the C-35 becomes the UC-35; the C-72 the UC-72. All types, models, and series falling within that definition which accrue to the active inventory of the Air Forces in the future will be designated "UC" without further reference to Headquarters. Planes so classified will be listed in appropriate technical orders.

Airplane designations which have been previously prefixed by "X", "Y" or "Z" will continue to be prefixed by these letters.

Source: AAF Reg. No 65-44. —The Editor.



SNOW, SAND AND SARONG S

Missionaries have had a profound effect on natives all over the world—an effect which is peculiarly benefiting our flyers, especially in the South Pacific. Scores of crash survivors in New Guinea, the Solomons, and Northern Australia owe their lives to native friendliness. Religious medallions carried by flyers are recognized and serve as a passkey to aid. In the Solomons, the words "Tie Loto" mean "church people"—and a flyer using the word "Loto" will be welcomed and treated as a friend.

In some parts of New Guinea there are giant spiders whose webs, when baited, catch small fish whose fins become entangled and are held fast.

Sunburn can cost the life of a flyer forced down in tropical zones without sufficient clothing or cover. Even the most barren beach or desert can offer some protection. Scoop a hole in the sand, bury yourself in it, and cover your face with brush. Jungle leaves can be turned into clothing for protection. Lay low during the heat of the day. Do your traveling at night.

Grass is used to warm frostbitten feet in the Arctic. Senna grass, used for centuries by Eskimos and Laplanders, is packed into oversize shoes or boots. Its tough, absorptive qualities keep the feet warm.

Razor blades for close shaves! Pilots who have survived forced landings in the New Guinea jungle say that if you give a native an ordinary safety razor blade, you're treated royally. (Razor blades are carried regularly by pilots operating in this theater.) Australian stick tobacco, like cut-plug, is another "Open Sesame" to native assistance.

In the African Desert, salt chotts (salt beds), although resembling American desert salt flats which are frequently used for emergency landings, should not be used for landing purposes. The dry bed of these chotts is usually only a two- or three-inch crust, covering a vast quagmire which will drag down any aircraft or vehicle. "Don't be sucked in, boys!"

Difficulties encountered in making successful landings in Arctic and desert regions are attributed to deceptive reflection on snow and sand-colored surfaces which distort depth perception. The tendency is to level off high and plop anywhere from 10 feet to 50 feet to the ground. Pilots are advised to orient themselves by shadows and other reference points on the terrain.

If you're forced down in a jungle area containing no water, make your way to the coast. You'll be able to get water near the beach. Scrape the sand at the high-tide mark. Water will seep up. It may be brackish, but will be relatively free from salt and fit to drink and sustain life. Be sure not to dig too deep—you'll run into salt water. By experimenting, you'll find the best place to scoop for water.

Air personnel, destined for service in Arctic regions, had best look to the firm anchoring of their teeth fillings and inlays before heading north. In extremely cold climates, the metal contracts in low temperatures and fillings pop right out of teeth.

Tips on the treatment of North African Moslems: Don't offer pork to a Moslem. Don't smoke, spit, or loiter in front of a mosque. Don't slap a Moslem on the back. Don't speak to, stare at, or touch a Moslem woman. Try to speak Arabic—the Moslems like it. Pass your cigarettes out freely—they make friends.

Dr. William Beebe tells us that "There is more danger of attack from the 'rattlers' and 'copperheads' on the Palisades opposite New York City than there is of being bitten in a tropical forest or jungle by a cobra or a viper, providing you are able to walk or move about and thrash the undergrowth with a stick."

The Arctic, Desert and Tropic information center welcomes contributions from all Army personnel possessing knowledge of the non-temperate theaters of operation. Submit to Arctic, Desert and Tropic Information Center, Eglin Field, Florida. ☆

Here are actual combat photographs made during two separate but identical air attacks on submarines. The best pictures were chosen for the following sequence which shows how an aerial attack on an enemy submarine takes place from the time the sub is sighted by the attacking plane until the U-boat is sunk.

SIGHTED: The crew of a patrolling plane sights a U-boat and attacks. Speed is vital; a submarine can crash-drive in 30 seconds.

THE RUN: Diving over the submarine, machine guns raking

Fighting FROM THE SKY

By Captain Harold B. Ingersoll

A-2 Section, Antisubmarine Command

THE Antisubmarine Command of the Army Air Forces has been assigned the job of seeking out and destroying enemy submarines wherever they may be found. However, most men in the Army Air Force probably are not acquainted with the fact that a special technique is required to combat submarines from the air.

A combat crew with bombardment training for land-based targets under its belt must be further trained in the special technique of U-boat warfare. To develop this technique, the Antisubmarine Command has established a special training school.

The training program includes recognition of types of enemy submarines, approach and attack procedure, identification of points of vulnerability to gunners and bombardiers and instruction in related subjects pertaining to the particular duty to be performed. Navigators, in particular, must know special techniques employed in overwater navigation.

Types of aircraft used by the Command in antisubmarine warfare include the B-17 and B-24 heavy bombers, B-25, B-18 and B-34 medium bombers, and the A-20 and A-29 light bombers.

The antisubmarine bomber takes off normally prepared to be in the air continuously from six to eight hours. As the ship roars out to sea, the crew takes up battle stations assigned, all eyes, however, not losing sight of the primary mission. To make antisubmarine warfare more efficient, engineers have developed special equipment for tracking down submarines not sighted visually.

A definite zone of responsibility is assigned each mission and it is the job of the combat crew to patrol the zone so that no object on the surface will miss detection. On a routine flight, ships, debris and other objects may be sighted in the water. All must be carefully scrutinized to determine the importance of the sightings which will later be evaluated in an intelligence report.

In the early days of submarine hunting an airplane would occasionally fly low over a swirl in the water, release depth charges and then circle back to find that an innocent whale—not a Nazi U-boat—was the victim of the attack. To avoid future errors in evaluation, combat crews are trained to distinguish types of swirls.

When an enemy submarine is actually sighted, different approaches for attack are made depending on the circumstances.

If the submarine is sighted five or six miles distant and it is apparent that it is already crash-diving, then the most direct approach possible is made. Depth charges are released on the visible target or on an estimated projected line of motion as determined by the area showing on the surface where the submarine submerged.

However, when the plane's approach from the distance is unknown to the U-boat, then the aircraft will seek the nearest clouds in order to maneuver into the most advantageous position for attack. As soon as a favorable position is reached, the plane noses down at an angle so that it will fly over the submarine at proper bombing altitude.

It is customary to release depth charges from extremely low altitudes. Gun fire of the plane is usually directed at the conning tower or at the submarine deck guns, if, as in rare instances, they are brought into play.

Many different situations may arise in the two or three minutes in which the attack is underway. If the skill of the pilot and crew results in an ideal approach, the pilot makes the customary low level bomb-run. However, the submarine may have crash-dived. In this case, a swirl, or turbulence, on the surface of the water is the only guide for the pilot and bombardier. The bombardier must be able to estimate the approximate location of the sub under water.

Quick action by the plane is imperative

the deck, the plane makes run. Note spray rising from bullets.

EVASION: A depth charge has been dropped. The submarine tries to evade it by turning sharply, as plane continues to strafe.

EXPLOSION: The sub is hidden by the blast of the depth charge but the U-boat's wake can be seen leading up to the explosion.

New techniques in aerial warfare have been developed to combat the U-boat menace.

when a U-boat crash-dives because a submarine can descend beyond depth charge range in a very short time.

But the attack is not over by any means. A marker is dropped on the water and the exact location of the U-boat submergence is noted by the navigator. The plane continues to patrol a wide area in a radius from the point of the crash-dive. This is done because the number of hours a U-boat can stay under water and the distance it can travel under water are relatively limited when compared to the aerial coverage of an antisubmarine squadron in distance and hours. The area of the sighting will be kept under continuous surveillance depending upon the evaluation placed upon this sighting.

ATTACKS will often result in disabling the U-boat to the extent that it cannot submerge, but remains on the surface. This affords the plane an opportunity for a second attack which to an experienced crew is like shooting fish in the well known barrel.

If exit through the conning tower is still possible, the submarine crew may attempt to man its guns as a defense against a second attack. Likewise, when a submarine is surprised while surfaced to charge its batteries and a crash dive is not immediately possible, guns may be fired at the plane.

Such gunfire is usually quickly silenced by the return fire of the plane. By the time the aircraft comes back for another attack, the U-boat may have submerged to avoid further encounter with the aircraft. Of course, the U-boat may not have had any choice in the matter of submerging if the first depth charges scored either direct hits or near misses, near enough to cause a sinking.

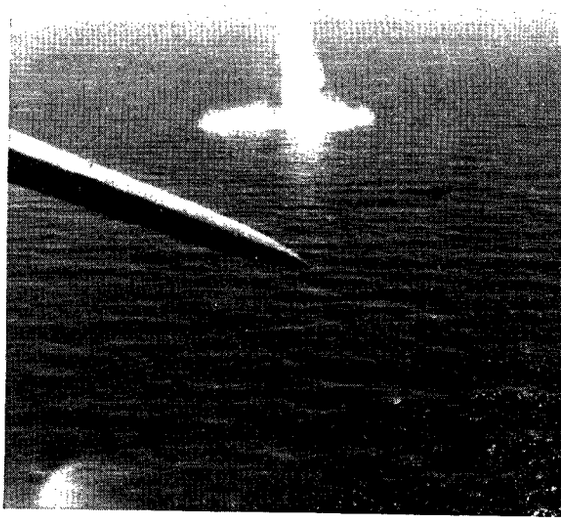
Attacks by planes are not limited to daylight. Night attacks have been successful. The possibility of surprise is even greater than in daytime because a submarine will surface under cover of darkness to perform the highly necessary job of recharging its batteries. Searchlights or flares from the aircraft spotlight the target in ideal fashion.

As in bombing raids conducted over ground targets, attacks at sea are assessed according to the results shown on the pictures taken at the scene of the action plus the mathematical analysis of all elements concerning the attack. When searching the area after an attack reveals debris, such as pieces of wood from what is supposedly the inner part of a U-boat, that is not necessarily an indication that severe damage has been inflicted because enemy submarines have been known to shoot debris and even oil to the surface in order to deceive attackers.

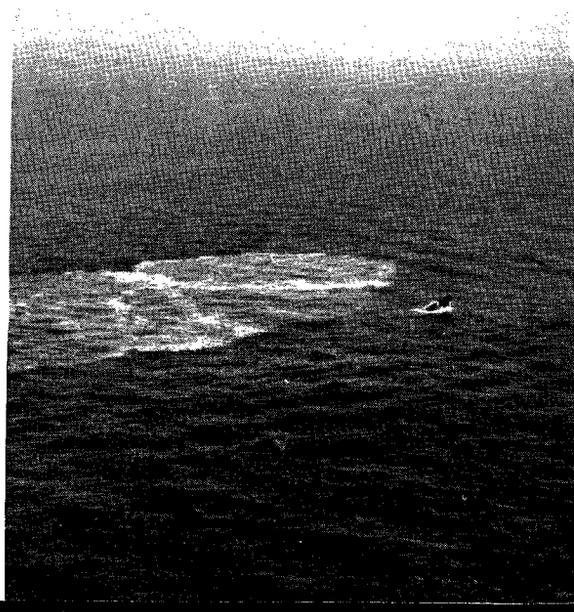
However, when debris, oil and the bodies of the submarine crew come to the surface, then the results can be ascertained as a kill. It is probable that a submarine may have been sunk when only debris and oil come to the surface. But because no definite proof is evident, the Army and Navy chalk up such an encounter as "probably damaged".

The use of planes in antisubmarine warfare has resulted in important tactical advantages for the Allies. Planes force U-boats to stay under water where their ability to destroy is greatly reduced. In addition, the longer the submarine is forced to stay under water, the less time it has for recharging its batteries on the surface.

Morale of enemy crews suffer from repeated crash-divings when planes are sighted. U-boat crews fear aircraft because of the death and destruction resulting from a surprise attack. Surprise is the kind of medicine that the sub has always relished dishing out and to get some of its own medicine is not particularly relishing to the U-boat crew. ☆



THE KILL: A portion of the submarine, barely visible, projects from the water as the full force of the explosion spends itself, subsides. Passing low over the attack area, (below) the plane's crew gets this picture of the sub settling, part of it piercing the surface.



NORTH ATLANTIC

Illustrated by
Captain Raymond Creekmore

By Captain Robert B. Hotz
AIR TRANSPORT COMMAND

CHRISTMAS mail has filtered through to the most remote airdromes along the North Atlantic hop. The boys at some of the stops are beginning to dig out of the winter snows. Wing Headquarters in Maine reports the temperature almost above zero. The signs are unmistakable. The North Atlantic route is thawing out.

If you are interested in a few tips that may make your big jump across the pond a little smoother, pull up a chair in the briefing office where some of the veterans gather to thumb new route guides, check radio changes and do their hangar flying.

These particular veterans are civilian pilots of the Air Transport Command. They all learned to fly in Army and Navy schools, most of them in the dim, distant pre-Randolph days. All of them put in thousands of hours pushing DC-3s around the domestic airways before joining the command. Since then they have made from ten to twelve round trips apiece across the North Atlantic and shuttled Douglas C-54s and Boeing Stratoliners to Africa and India. All of them have been in trouble at some time or other over the waves and all of them have pulled out of it.

The North Atlantic is a well organized air route. RAF cooperation is good. There are facilities to take care of almost every problem encountered by aircraft — from radio navigation aids to protection against enemy activity.

The system will work if you know how to use it intelligently. It will make a routine crossing comparatively simple. If you run into trouble it will save your neck and your airplane if you give it a chance. Pay strict attention to your briefing officers.

Don't be fooled by the H.P.'s who come back from one eastbound crossing and hold forth in the BOQ on what a cinch it is to fly the North Atlantic.

You can gain from the experience of men like Larry Trimble, who made some of the first crossings in the Boeing Stratoliners and now has a dozen round trips to his credit. Once, Larry was barging along at 800 feet under a 1,500 foot ceiling somewhere west of Scotland. It was late afternoon.

"We sighted a big liner about 25 miles away with a bone in her teeth," Trimble relates. "About four miles to the port was a camouflaged escort vessel—a destroyer or light cruiser. We passed within several miles of them and altered our course. As we drew almost opposite the escort I saw a series of flashes from her front deck. It looked almost like the challenge signal of the hour. We answered and kept on going.

"Suddenly we noticed two big columns of spray rise from the sea ahead. The next minute the plane rocked violently from a burst of flak around us. What we thought were signal flashes were the guns of the escort's forward battery ranging us with solid shot. When they opened up with flak they had us bracketed perfectly. The next salvo would have torn us apart.

"We jammed on full power and dove down to water level, dodging and working away from the ships. I felt like a duck over a pond on the opening day of the season. We used all the recognition signals in the book but they fired about fifty rounds at us. Luckily we were going away fast and they never came close again. Two hours later, while we were cruising between cloud layers at 4,000 feet, more flak began bursting off the left wing. We got out of there in a hurry, too. I have never been curious about a convoy since."

Gunners were more accurate on the Stratoliner piloted by Stanley Stanton. Somewhere south of Greenland, Stanton's plane was plying through broken clouds and scud at about 1,500 feet. As the plane emerged into a clear opening, a surface vessel below opened up with .50 caliber and 20-mm. anti-aircraft guns. A chain of .50 caliber slugs lashed across the tail fin and elevators. A 20-mm. explosive shell ripped a big gash in the metal skin at the base of the fin near the rudder control cables. Stanton pulled up into the overcast before further damage was done.

Another veteran, Earl Fleet, found himself in a Stratoliner over British warships one day.

He ordered the radio operator to fire the Colors of the Day. The operator discovered that the Very pistol they were carrying wouldn't fit the plane's flare chute. Finally the pistol was fired through the open cabin door. A flareback resulted, setting the rag wrapping of the pistol on fire and burning the operator. Meanwhile, the boys in the cockpit were spending some uncomfortable seconds waiting for the Colors of the Day

fireworks to burst. Moral: Stay away from convoys and ship concentrations. Make certain that all your signalling equipment is in order and that your crew knows how to use it. Flak gunners aboard ship have orders to shoot first and ask questions later in case of doubt on the identity of aircraft. Your identification signals may not always be read by surface vessels. Avoid the possibility by giving convoys and ship concentrations a wide berth.

Always make positive identification to the RAF Fighter Control through procedures outlined by your briefing officers. You are an unidentified aircraft if you don't, and you get no consideration. Don't let an overcast give you a false sense of security. You can be shot down in a cloud while on instruments.

REMEMBER that flying the North Atlantic is a precision operation. You have to hit what you aim at. Most of your alternate fields outside a relatively small area in England and Scotland are in Eire (neutral) Norway (enemy) and France (enemy). One of the enemy's favorite tricks is to help you along to a landing at these alternates. Radio navigation facilities are good along the North Atlantic routes but the farther east you travel the more they are susceptible to enemy jamming.

Larry Trimble gives you a good idea of what can happen if you doze over your radio. He made one eastbound crossing in the midst of heavy traffic. The weather forecast was good and he avoided a front by laying a rhumb line course based on the forecast. His course took him through layers of clouds most of the way. He flew eleven hours on instruments without a star shot above or a drift reading below. In the morning he descended to sea level. There the navigator took a double drift reading. He found they had a terrific south wind indicating that they had been blown considerably north of their planned course. He asked for a QDM and quickly got a bearing that indicated he was south of his destination. Trimble stuck to his drift data and flew south for thirty minutes. He asked for another QDM. It came back in a flash. Perfect service, but the bearing indicated he should fly even more of a northerly course to his field. He became suspicious and challenged the DF station. There was no answer. Then he was certain it was an enemy station sending false bearings to lure him north over the top of Scotland toward Norway. He continued to fly south. In another half hour he began to pick up faint signals from the beacon that would bring him into his destination. He asked for another QDM and got a bearing even farther north than the other two. Shortly afterward he picked up a warning from an English station: "Don't use radio bearings. Enemy transmission."

Several planes in the flight the night before were finally pulled in by authentic QDM bearings. Others landed all over England. Two were missing.

"The North Atlantic is a war zone—you can't forget that," cautions Trimble. "You must appreciate the ingenuity of the enemy and act accordingly. You can't leave any loose ends in your operations. You'll wind up in a prison camp or a rubber raft if you do."

When you hear a high pitched scream, a band blaring Yankee Doodle or a voice counting in German on the stations you are trying to work, switch to another one immediately. Don't accept radio bearing without authenticating them by challenge. Your briefing officer will tell you how to do it. Study your list of alternate radio facilities before you take off. It may be too late for study when you find the enemy is jamming the stations you planned to use.

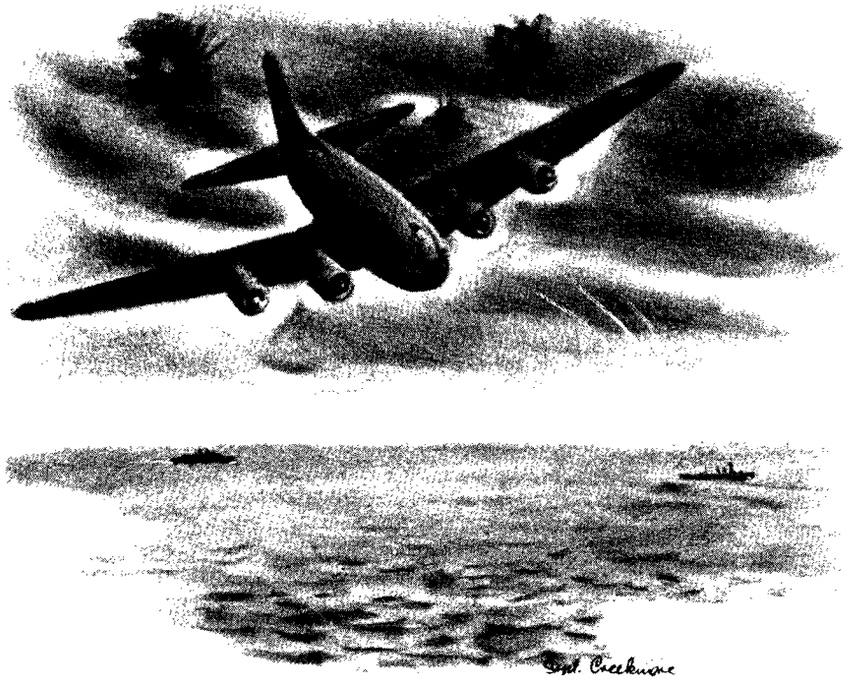
Even on the best days over the North Atlantic you will always run into some weather. A major front and several secondary fronts are the minimum for a crossing and often you will hit two or three big fronts. Weather reporting facilities are good along most portions of the route but forecasts are far from perfect.

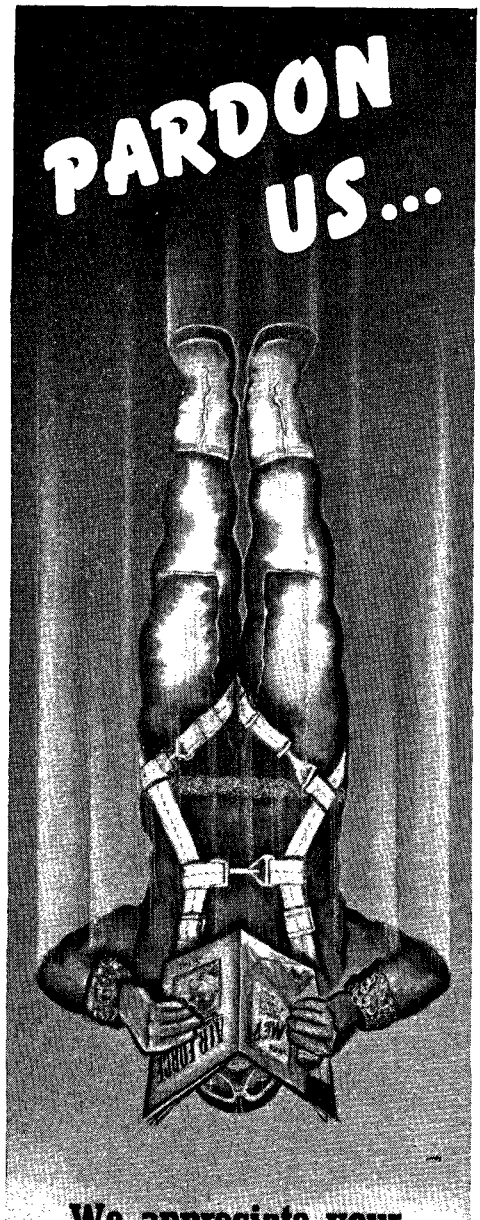
Take the case of Don Terry and Lawrence Chiappino who made one of their numerous eastbound crossings in C-54s on the same night last fall. The forecast showed a high centering around one point on the route. Chiappino flew the direct route to England. Terry decided to go farther north via Iceland to take advantage of the supposed good weather in that area. Chiappino had a good crossing, encountering only a mild front with rain, some turbulence and icing conditions at 3,000 feet. He emerged into a broken overcast on the other side of the front and was able to get good star shots for celestial fixes. The icing level went up to 6,000 feet.

On his northward track, Terry ran into a swiftly growing cold front uncharted in the forecast. He hit freezing rain down to 400 feet, and severe turbulence. Terry managed to beat the front into his planned stop. The front moved in with freezing rain to the ground before he was ready to take-off for England. He was able to get away only because of a temperature inversion from 200 to 500 feet. On his westbound trip beyond the point of no return, Terry encountered an occluded front not forecast, which forced him down below 400 feet to lose a heavy ice load picked up during the first ten minutes in icing conditions. His wing and prop de-icers functioned well but an inch and a half of solid ice formed on the windshields beyond reach of the wipers. Turbulence became so severe that both Terry and his co-pilot had to exert pressure on the controls. For two hours the C-54 ploughed along between 250 and 400 feet with temperatures from 29 to 33 degrees Fahrenheit. There was a heavy sea running below. Salt spray splashed across the cockpit windshields and over the window in the navigators compartment. For two and a half hours the C-54 pitched, rolled and careened through severe turbulence with ice less than 100 feet above and the tops of the cold salt waves less 200 feet below.

"It was too tight a squeeze," says Terry. "For two and a half hours I thought I was making my last flight. It was the worst experience in my twenty years of flying."

The C-54 finally emerged into heavy cumulus clouds with only mild turbulence and light icing conditions. Terry topped the





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cumulus at 12,500 feet and completed the trip without further incident.

"You have to plan your flight according to the weather forecast," adds Chiappino, "but you must check weather in flight against the forecast. There are terrific wind shifts and icing level changes in cold fronts over the North Atlantic. If you don't check actual weather against the forecast you are heading for trouble.

"Watch changes in cloud formations, turbulence and temperature to spot the beginning of frontal conditions. Then you can find out where the front actually is and plan for the wind shift and conditions ahead. You may have to change your plan several times because of weather but unless you have an original plan on which to base your changes you can get wound up in a hurry."

Fred Richardson warns against allowing lack of clouds to fool you about the presence of a front. "Secondary fronts often lose their cloud formation after they get out to sea," he explains. "All you get are a temperature change and a wind shift. Sometimes you can spot the wind-shift line along the waves below without a cloud in the sky."

"Ice is one of the biggest problems over the North Atlantic," comments Chiappino. "You can find ice somewhere during every crossing. The worst icing conditions generally lie in a layer about 15,000 feet thick. Often it gets right down to water level. If his plane can't top the upper icing level, a day of rest will be beneficial for any pilot.

"If the lower icing level is a couple of thousand feet above the sea level," he adds "you have to figure the possibilities of it coming down or ascending according to the forecast. Plan to top the ice and use star shots to check your course or stay below and rely on drift readings to figure your track. Ice can build up fast over the North Atlantic —as much as an inch in 60 seconds. If the weather is good, a crossing can be made under 1,500 feet. If it isn't, it would be tough to be below an icing level closing down to the wave tops."

"Generally, the weather gets better during eastbound flights and worse as you near home on the westbound trip," says Richardson. "You don't have to worry too much about weather at your eastern terminals."

"Don't be in a hurry to land. Remember that all the airdromes in the British Isles are well camouflaged. Make sure you are landing on a runway before you sit down.

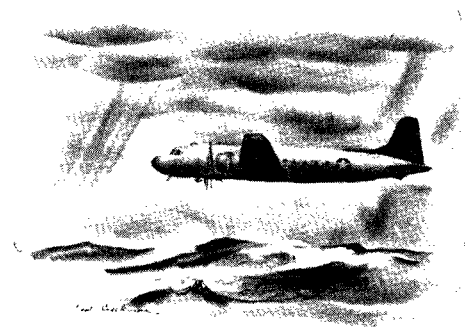
"The weather is never bad everywhere in England and Scotland. If your reports indicate that the west coast of the British Isles is going sour it is generally a sign that the eastern coast is open and vice versa. The whole island is never socked in at the same time. It pays to plan alternates accordingly."

"That's not true of the western terminals," adds Trimble. "I learned that lesson the hard way. We were westbound in a Stratoliner without radio contact due to skip for 11 hours before we made a landfall. The forecast called for perfect weather. Fifty miles from our western terminal we got a weather report of a 100 foot ceiling there with a 1,500 foot top. We had a definite alternate picked out but had been bucking headwinds all the way across, so decided to go down for a look. We were about 100 feet over the field when the tower called and said visibility had closed to 75 feet. We finally made our alternate but it wasn't fun.

"Another flight coming in behind us had been flying at higher altitudes in stiffer winds and had even less gas than we did. He finally made it in to another alternate under a 100 foot ceiling with his gas going fast. If we both hadn't had a lot of experience with the fields where we finally sat down there would have been real trouble."

"You can't always depend on your radio even if the Jerries aren't jamming," reminds Ross Weaver. "Aurora Borealis does some fine natural jamming. Weather conditions often produce a skip zone in which no radio signals can be received. Rugged terrain makes all but the over-the-water legs unreliable. Look out for false cones of silence in the same territory."

"Never carry less gas than you can squeeze aboard," cautions Trimble. "Those extra gallons can be the most precious cargo in the world sometimes. Personally make sure the gas you ordered is actually in the airplane before every take-off. I remember what happened to one pilot who didn't. He was taking a B-17 from a jump-off field in South America. Two and a half hours



out the field got a frantic radio call. He was out of gas and going down. A checkup revealed that he had forgotten to check on the servicing of his plane. He assumed it had been gassed. It wasn't. The plane and crew vanished in the South Atlantic. It hardly seems possible to make a mistake like that but there is a quarter of a million dollars of airplane and nine men missing to prove it can happen.

"Another pilot ferrying PBY's across fell victim to the same error. At the last minute he was ordered to ferry a different airplane. He climbed in with his crew and took off without checking to see whether the new ship had been gassed. It hadn't. He was lucky that time. He sighted a tanker while sputtering on his last gallons and landed beside it on a fairly calm sea. The tanker happened to be carrying high octane gas. He refueled, took off and made it to the Azores.

"I heard about the same pilot again just the other day. They found him in Africa, directly on course to his destination. He was plastered 4,000 feet up on the side of a 6,000 foot ridge." ☆

Precision BOMBING DOES THE JOB

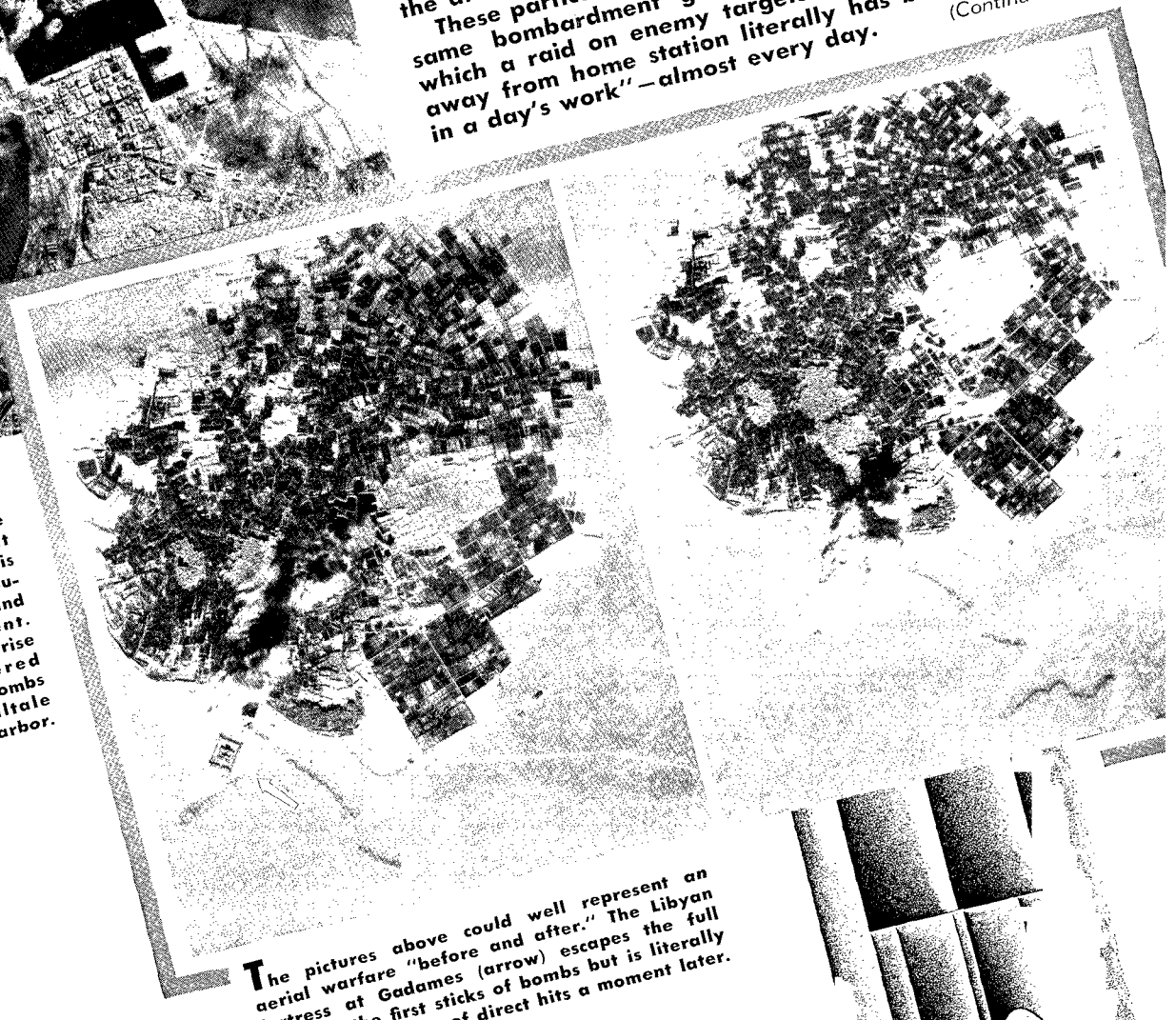
In the smashing drive of the British Eighth Army across North Africa and in Allied assaults on the Afrika Korps' stubborn Tunisian defenses, precision bombing by our Air Forces has played a vital role. It has paved the way for advancing land armies by crippling enemy defenses. It has smashed Axis reinforcement ports along the Mediterranean coast. It has shattered enemy airdromes with tons of high explosives.

On this page and on the two following pages AIR FORCE presents a pictorial study of attacks on three important objectives in the North African theater. These photographs were taken with cameras aboard the attacking bombers.

These particular missions were carried out by the same bombardment group, employing B-17s, to which a raid on enemy targets hundreds of miles away from home station literally has become "all in a day's work"—almost every day.

(Continued)

Direct bomb hits from B17s flying at 24,000 feet blast the Tunisian seaport at Sfax where the Axis had unloaded thousands of troops and tons of equipment. Smoke and debris rise from the battered docks as other bombs leave their telltale bursts in the harbor.



The pictures above could well represent an aerial warfare "before and after." The Libyan fortress at Gadames (arrow) escapes the full effect of the first sticks of bombs but is literally erased by a series of direct hits a moment later.

RAINING BOMBS ON

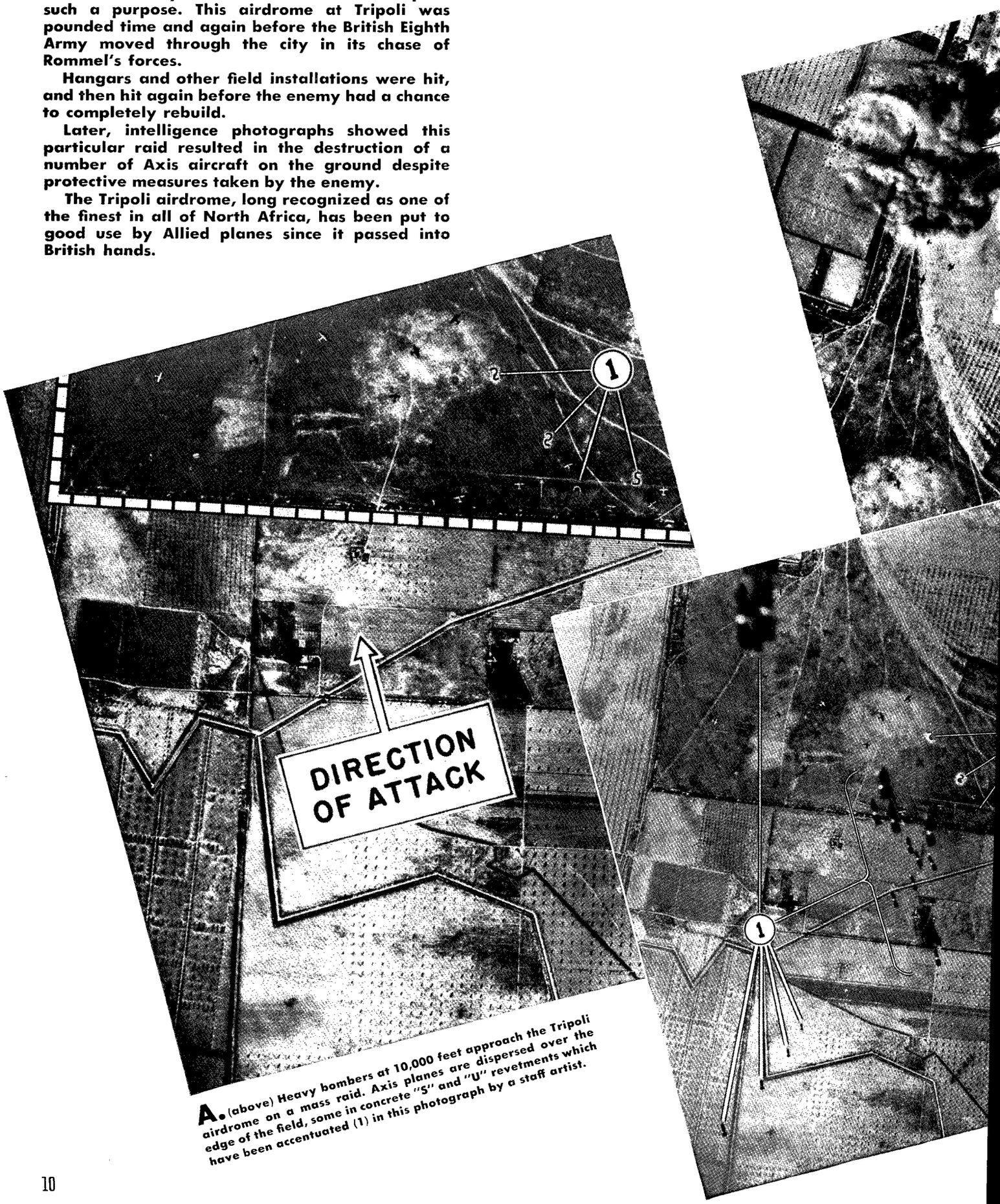
One sure way of avoiding excessive fighter opposition during an offensive, of preventing poundings from enemy bombers, is to knock out the enemy's airfields.

The series of photographs on these two pages tells the dramatic story of what happens when American heavy bombers set out to accomplish such a purpose. This airdrome at Tripoli was pounded time and again before the British Eighth Army moved through the city in its chase of Rommel's forces.

Hangars and other field installations were hit, and then hit again before the enemy had a chance to completely rebuild.

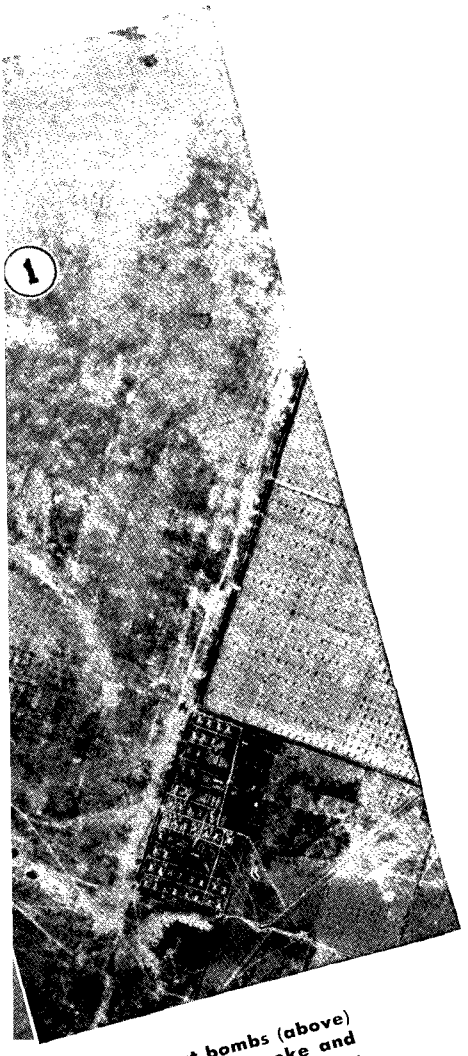
Later, intelligence photographs showed this particular raid resulted in the destruction of a number of Axis aircraft on the ground despite protective measures taken by the enemy.

The Tripoli airdrome, long recognized as one of the finest in all of North Africa, has been put to good use by Allied planes since it passed into British hands.

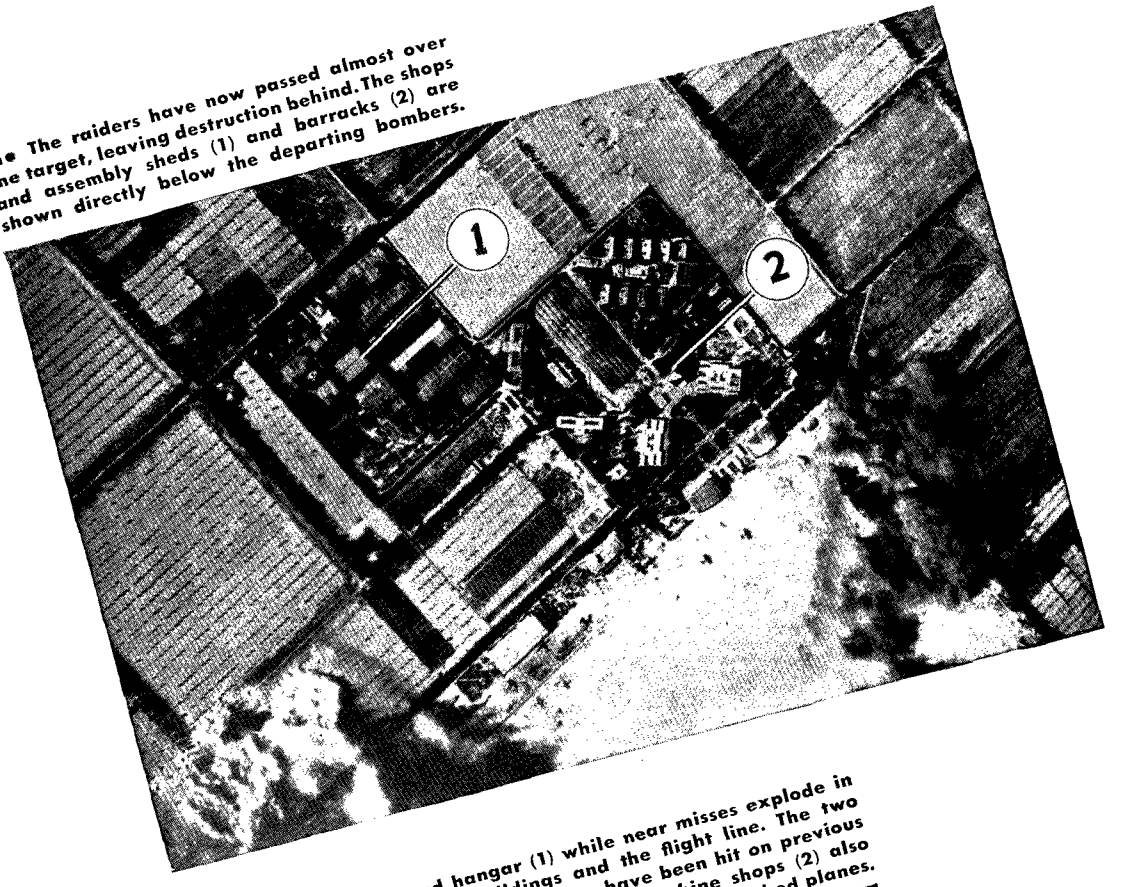


A. (above) Heavy bombers at 10,000 feet approach the Tripoli airdrome on a mass raid. Axis planes are dispersed over the edge of the field, some in concrete "S" and "U" revetments which have been accentuated (1) in this photograph by a staff artist.

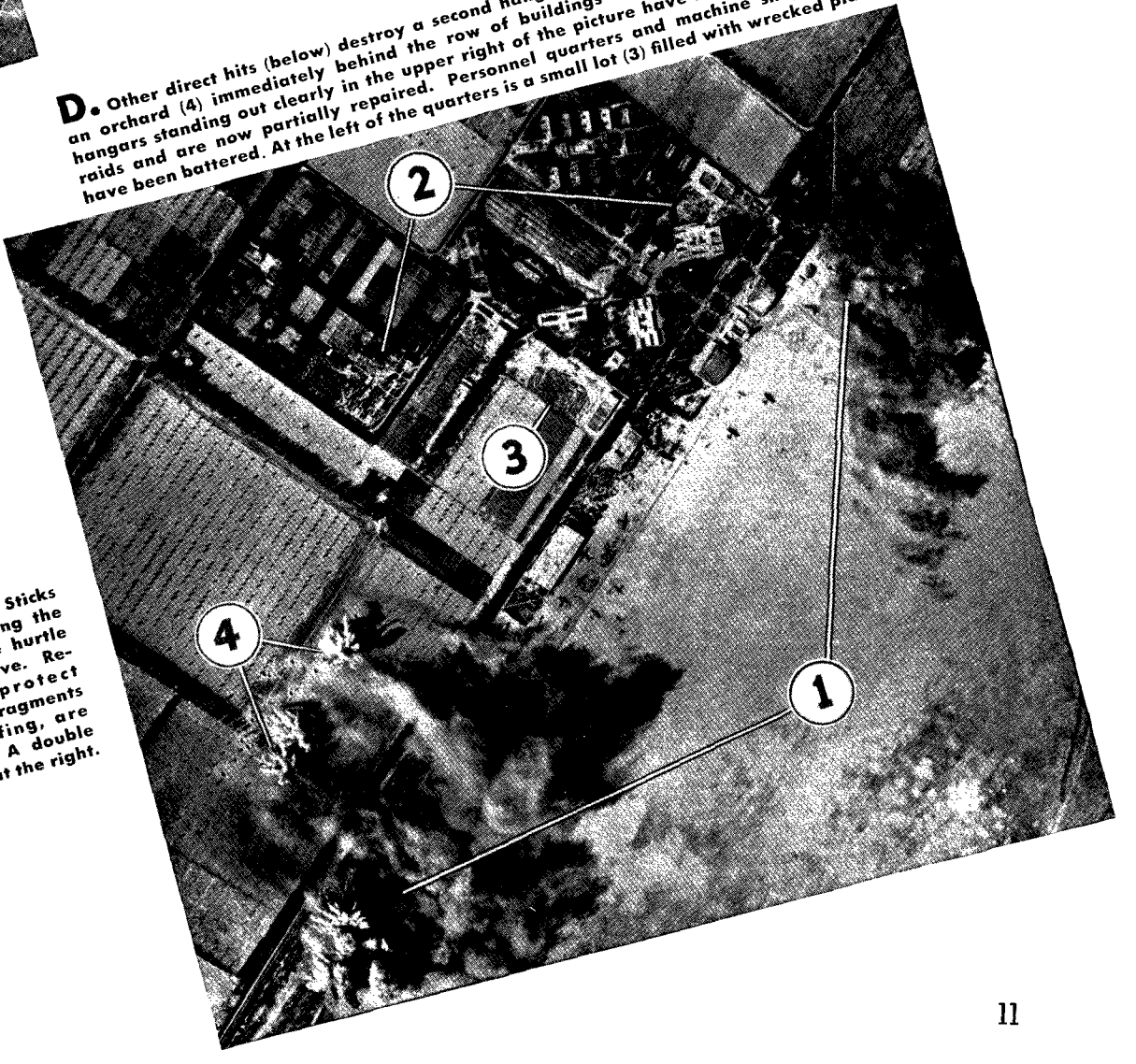
TRIPOLI AIRDROME FROM 10,000 FEET



C. The first bombs (above) find their mark. Smoke and dust billow from a hangar and other structures (1) as a result of direct hits. Fighters and bombers are among the enemy planes scattered over the field and along the tree-lined edges of the airdrome.



E. The raiders have now passed almost over the target, leaving destruction behind. The shops and assembly sheds (1) and barracks (2) are shown directly below the departing bombers.



D. Other direct hits (below) destroy a second hangar (1) while near misses explode in an orchard (4) immediately behind the row of buildings and the flight line. The two hangars standing out clearly in the upper right of the picture have been hit on previous raids and are now partially repaired. Personnel quarters and machine shops (2) also have been battered. At the left of the quarters is a small lot (3) filled with wrecked planes.

B. Bombs away (left). Sticks of bombs (1) extending the length of the picture hurtle toward their objective. Revetments, which protect planes from bomb fragments and ground strafing, are shown again (2). A double "U" may be seen at the right.

COMPRESSIBILITY

IV — Its Influence on Tomorrow's Planes

By Colonel Ben S. Kelsey

PRODUCTION DIVISION, WRIGHT FIELD, OHIO

EARLY in the game, when local compressibility effects were first appreciated, it seemed that the rapid build-up in drag of a number of small items, such as windshield corners, air scoops, fillets, and so forth, might very well build up drag to such an extent that they would in themselves definitely put a top limit on speed.

It would appear now, however, that some of these local compressibility effects have actually gone through the transition stage and may be operating out in a range corresponding to the type of airflow which we expect from bullets, where drag co-efficients can again be measured and held to higher but reasonable limits. If this were not so, we would some time ago have reached a fairly uniform dive performance for all airplanes. Actually, diving speeds seem to be going on up in a fairly steady manner. In the same way, airplane speeds would have shown a dropping-off in progression from year to year, and this is not apparent.

We are obviously in trouble on all present airplanes to some degree when we approach very high speeds, and the terminal velocities in dives are definitely retarded by compressibility effects. But there seems to be no absolute wall, which had been expected some time in the past.

Aside from the wake behind local compressibility effects, which may affect other parts of the airplane or which may add up one with another to produce alarmingly large effects, the biggest problem is that connected with lift; and, secondly, as another phase, control.

Lift on an airplane wing as it is now known depends upon giving the air a downward shove as the wing goes by. This means that the air has to accelerate to flow aft over the top of the wing and has to accelerate forward on the bottom. This again is tied up with curvature, displacement, and the speed of passage of the wing.

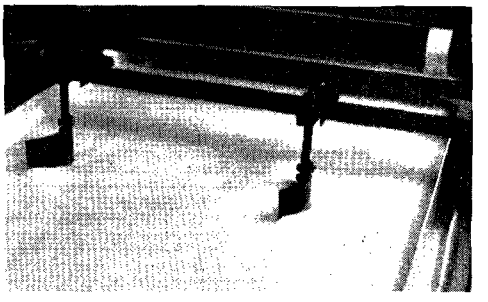
As would be expected, there is an early and marked change in the characteristic of lift and pressure distribution over the top of the wing, since the greatest curvature and speed-up occurs here. The inability of the little air particles to maintain smooth contact with the wing, and their tendency to set up waves, produces a condition not very different from the normal stall at low speeds, since at high angles of the wing the particles are unable to accelerate fast enough to get out of the way and back into line to follow the wing surface. This might be likened to a cam on the cam shaft of an engine on which the valve spring is the elastic force corresponding to the elasticity of the fluid particles. For a given steepness of cam there is a limited speed for the cam shaft, beyond which the cam follower will not maintain contact with the cam but will bounce or cause excessive impact loads.

If the speed is low, the cam can be made steeper, but it is still possible to build such a steep cam that the same effect results as though the more gentle cam were run at much higher speeds. Although there is no apparent "shock wave" at the lower speeds and high angles, the effect on lift of the breakdown of smooth flow is much the same. The airplane, in effect, stalls and goes through much the same change in moments and forces due to excessive speeds as it does due to excessive angle.

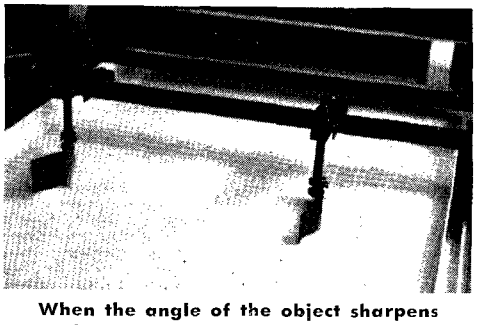
Since the conventional wing maintains its sharpest curvatures up close to the nose, one would expect a breakdown to occur here first. This actually occurs, with quite a drop in the suction obtained over the forward portion of the upper surface. As speeds increase, the suction increases farther back on the wing and decreases up forward until a fairly average value is obtained over most of the upper surface, also, the wing stubs its toe and gets high positive pressure on the top of the exact leading edge.

The change on the lower surface, as would be expected, is less pronounced but does change in character. The positive pressures move forward in what amounts to a planing effect. Apparently the inertia imparted to the little particles causes a kind of separation farther back which, at very high speeds, may amount actually to suction on the aft half of the bottom surface. The overall result is that the total lift drops off very rapidly for any given angle as speeds of 80 to 90 per cent of the speed of sound are reached. Also, the redistribution of the loading gives a diving tendency.

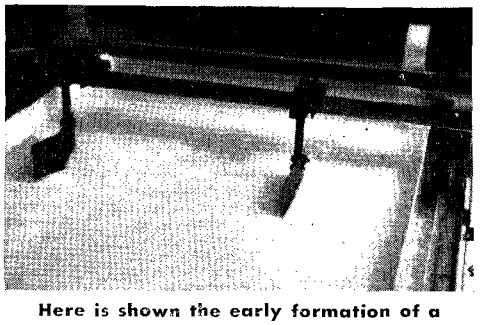
Going again to bullet design, boat hull design, and the general considerations already discussed in this series of articles, it is evident that thick wings with very rounded surfaces just after the leading edge are going to be the worst offenders and produce the results sooner. Wing forms are now available which help a little bit in delaying or reducing the intensity of these effects. Their maximum depth will be somewhat farther back than the wings to which we have been accustomed. The exact lead-



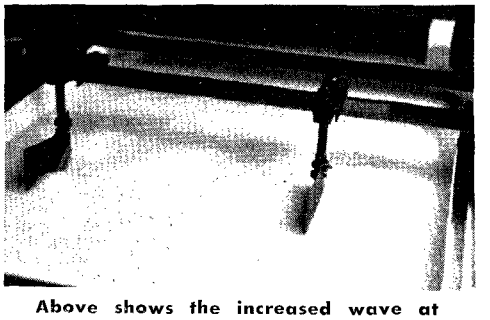
Above is shown the increase in wave formations with increasing displacement.



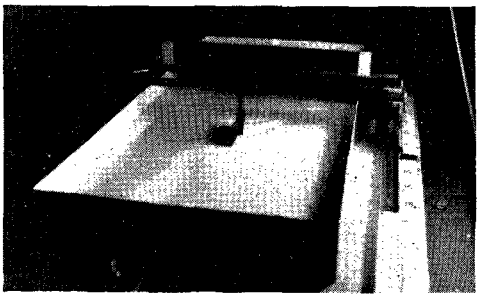
When the angle of the object sharpens at the same speed, the waves increase.



Here is shown the early formation of a wave at a discontinuity in the surface.



Above shows the increased wave at higher speeds compared with the preceding photograph. Below, waves form at the bump on the top of the liquid.



ing edge will be rounded but of fairly small radius, with very gentle curves from there back. It is, of course, possible to use a very thin wing with a sharp nose designed to operate under some particular conditions where the effect may be considerably reduced. But the over-all efficiency of such a wing would probably be fairly low.

Obviously, any discontinuity in a surface which has a pressure gradient over it will add another bump to the pressure hill, with the result that a compressibility effect may occur at that bump. This is not very different from putting a small ski jump in the middle of a hill. Since most of our control surfaces control their lift by bending the surface, they in themselves are apt to be guilty of early compressibility effects if any large displacement of the controls is required or used. Such effects may be concentrated at the point where the bump or bend occurs.

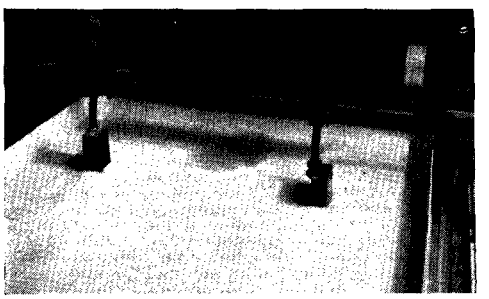
By considering the discussion ahead, it should be possible for a pilot or engineer to make some fairly good guesses, even on the basis of our present limited knowledge, as to the suitability of an airplane for high speed and interpret, to some extent, the proper operating technique. Thick wings and wings with blunt leading edges ahead of the front spar will, in all probability, produce very marked and probably sudden changes in lift and trim.

Whenever two bumps or bulges occur at the same distance aft on the airplane, and close enough together so that the local relative speeds and pressure hills are added, we can expect a bad spot. Any sudden discontinuities in the line, such as a sharp intersection of the windshield with the fuselage, or a sharp break between the windshield and the rest of the canopy, or an unfaired junction of a scoop or a control surface, will in all likelihood produce a local wave. It is true that its effect may be limited largely to making noise. Control surfaces with bad discontinuities may be expected to produce erratic characteristics at high speeds. As the wave effects have not been fitted to the surface, which is still an impossibility, there is no telling exactly what the change in forces may be which the pilot feels. This effect, particularly on balanced control surfaces, is separate from any over-all change in trim on the airplane. Obviously, the more scoops and the more obstructions or bumps on the whole airplane, the greater the probability of compressibility effects, with particular reference to increases in drag.

To date, compressibility effects have tended to provide terminal velocities either in level flight or in dives, which in itself has tended to prevent the attainment of speeds where the more violent forms might be expected. One perfectly legitimate approach to the situation is simply to provide additional braking effects to prevent running over into supersonic regions.

Luckily, these supersonic regions are still somewhat above level flights obtainable and are sufficiently far away to permit relatively unrestricted use of airplanes, even in combat. This obviously is not the permanent cure for the trouble. If the individual items going into compressibility effects are carefully modified, it is possible to move the critical speeds of each up to a point corresponding to what might be termed the over-all critical speed of the airplane.

There are several ways of tackling tomorrow's problem. One is to work on the control of the pressure distribution over the airplane by shape design and thus, by controlling the pressure hills, influence the waves and forces. There is some promise, already in evidence, of the ability to control the pressure distribution around the wing, by use of auxiliary gadgets so as to counteract some of the lift and moment effects. Anticipating that there must be wave formations of some sort at supersonic speeds, it will be necessary to fit the waves and the airplanes together, minimizing and predetermining the wave formation, perhaps even fitting the dimensions and curves of the plane and its parts to the wave and speed expected.



Illustrating a blunt windshield with a corner at the junction of the canopy, compared to one that is better faired.

Obviously, one of the most serious situations is that the conventional airplane drags a lot of its essential structure and control elements behind the portions making initial entry, with the result that in the event of wave formations, or "compressibility burble", some of these parts may be wading through turbulent air that would put the Niagara Rapids to shame. Consequently, the geometrical arrangement of the parts may be determined as much by compressibility as any of the factors now in effect. Control and lift may be obtained by supplementary apparatus which control pressure distribution around a basic body, rather than by changing attitudes or using remote lifting surfaces as we do today.

THE biggest problem of all has been neatly ducked so far. That is, how do we get the thrust to drag airplanes at these speeds? In dives, the weight of the airplane helps out considerably, particularly for dense, clean airplanes. In level flight, however, power has to be converted into thrust. And since the conventional propeller adds its rotational speed to the forward speed, its blades, which "lift" just as a wing does, are more subject to compressibility than is the airplane as a whole. To date, the propeller has been a remarkably efficient means of obtaining thrust, almost as good as though geared to the air, but we can't afford big losses in efficiency.

Perhaps as we find out more about the variations in forces at supersonic speeds, it may still be possible to utilize the same general propeller principle. Jet effects, rockets, and so forth, offer considerable promise and there is, of course, the possibility that the propeller or some equivalent device might be either fitted into the wave pattern of the over-all airplane or used in a low speed airstream in some way so that the efficiency of the component parts is not reduced as radically as it is at present.

There is, of course, another serious consideration: that is, at high speed the actual air forces, themselves in pounds, become very large, with the result that the structural design of vehicles to operate at such speeds is no simple problem in itself. This, however, would be fairly straightforward if we only knew what the loads were.

The most serious difficulty probably is that we can't see air! Consequently, we can't see what it wants to do or what it refuses to do. Furthermore, it is not particularly safe to explore this region in full-scale flight—the penalties for mistakes are infinitely greater than at slower speeds, not only because of the short time available for a pilot's reactions but in the actual forces and accelerations involved.

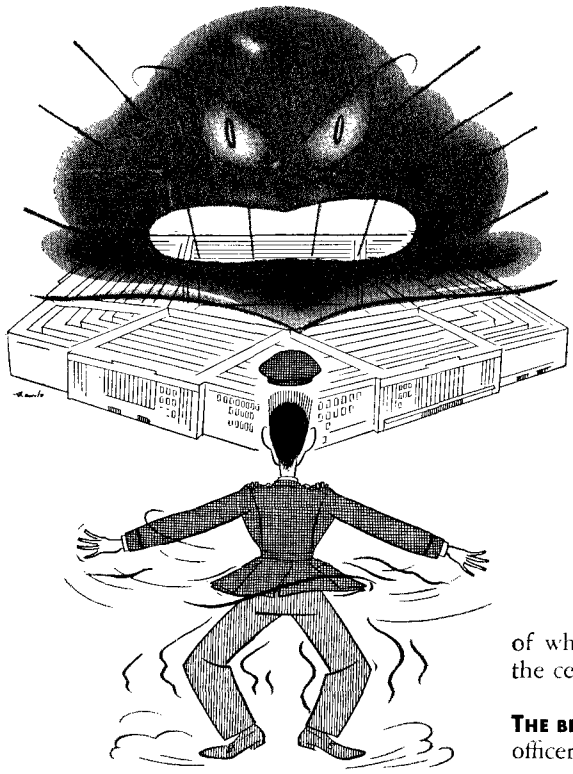
Putting it simply, the human body needs the protection of the aerodynamic hull, and the flight path has to be under good control to reach bullet speeds. According to the stories of race-boat drivers who have been pitched out on water at speeds of 60 mph. or more, water feels like concrete. On the same basis, getting hit by a blast of 700 mph. air would probably feel like getting hit with so much soft pine, so that stepping out in a parachute isn't the simple emergency procedure that it is at low speed.

It is not that supersonic speeds are unattainable, but simply that we are now closely approaching a transition range from one kind of air reaction to another.

We know so very little about either the transition range or the range beyond that it is difficult now to put in exact form either the shape of future vehicles or to put into words the exact conditions which will exist.

It should be remembered that our present speeds were "impossible" ten years ago. It certainly is not very safe at the present time to operate willy-nilly in the transition range or in the high speed range. There have been and will continue to be a number of inadvertent ventures into this region and a great number of careful explorations. Such explorations will have their hazards. Undoubtedly, a great many brave pilots will be lost during the process of such exploration. The whole region of "high speed" will be apparent only when literally thousands of research projects, physical and mathematical analyses, and flight explorations have been correlated.

"High speed" is a challenge that will be beaten, but because we are only on the threshold we are apt to be over-impressed by the magnitude of the obstacles. As we get by them one by one, and as our knowledge increases, we shall look back to our present compressibility troubles and wonder what all the fuss was about. ☆



CAMP WASHINGTON d.C.

By Captain George Bradshaw

HEADQUARTERS WITH A CAPITAL H: Of the million-plus men in the Army Air Forces probably not more than 10,000 have passed through Headquarters in Washington.

What's Washington like? What goes on at Headquarters? How does life differ from that at your own post out there on the desert or down in the swamps?

You're familiar with a flight line and hangars and barracks and dust and a PX and possibly one colonel. Well, Washington isn't so very different from that. It's just more so. More buildings and PX's and colonels. Especially colonels. In fact, in Washington even a two-star general won't scare you after a couple of meetings. He's too likely to smile and ask you how things are going.

Anyway, there are a number of Guides to This and Guides to That for the edification of a soldier, but no one has come up with a military Guide to Washington. The reason is obvious. You can outline the rudimentary problems to be expected in quiet spots like Africa and Australia and Britain and the rest —how to cope with the jungle; fundamentals of British slang; flight characteristics of the kangaroo; how not to talk to Moslem women. But Washington—well, here are a few notes on the town and on life in it.

THE TARGET: Washington is a little old southern city, grown out of size for the duration at least, situated in the District of Columbia—a 70-square mile plot wedged in between Maryland and Virginia. Washington is some 22 flying hours from Tokyo and 14 flying hours from Berlin. It is hot in summer, crowded all year round, and intense, if you know what we mean. Because of what goes on there many people call it the center of the world today.

THE BIG HOUSE: No matter what brings an officer to Washington, unless it's a furlough, sooner or later he will find himself in the Pentagon Building. This is the new and already famous monster which houses the War Department, and is set on a muddy rise across the river in Arlington, Virginia. It is the largest office building in the world and properly so, to accommodate the largest business in the world.

An architectural Mr. Five by Five, the Pentagon is five sided, five storied and actually five buildings, one set inside the other. It has sixteen and a half miles of corridors, and eventually will hold some 40,000 workers. With a couple of days of orientation, after you have learned what "ring" and "corridor" and "bay" mean, you can, by using a little common sense, find almost anyone you want.

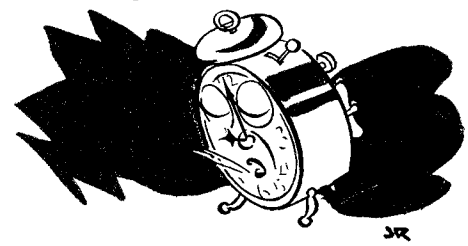
Each floor of the Pentagon is painted a different color. The second is green, the third is pink, and so forth, so you can tell at a glance where you stand. Such officers who, despite the tests, managed to slip their color-blindness past the surgeons are in a spot. They will have to be guided by the large numerals which are plastered on every conceivable open space.

The Corps of Engineers did the construction job. They moved more than 5,000,000 cubic yards of earth in grading and poured almost 500,000 cubic yards of concrete. Everything in the Pentagon runs big: 1,500 electric clocks, 650 water founts, 21,000 desks, 140,000 chairs, 200 latrines, 700 janitors and charwomen.

It's a big place, but for all practical purposes an Air Forces officer can transact almost all his business on the third and fourth floors, with an occasional mission to the fifth. There the War Birds sit and deliver.

CHOW LINE: You can say that everybody who works in the Pentagon has lunch there. It takes too long and you have to go too far for outside food. So, within the building there are seven cafeterias and two dining rooms. Forty-five thousand meals are served daily. For 40 cents you can get soup, meat, two vegetables, bread and butter, dessert, and a drink. And very fair food it is. In addition to the cafeterias there are six beverage bars, serving 12,000 people daily, where you can get drinks, sandwiches, apples, and so on. Figures on the amount of food consumed daily are colossal — about 30,000 quarts of milk will serve as an example. More than 750 employees are engaged in preparing and serving food.

OFF WE GO INTO THE WILD BLUE YONDER DEPT.: In winter an officer working in the Pentagon Building might conceivably spend six days a week without seeing daylight. If he lives at some distance—say a half hour's riding time —he gets up while it is still dark, arrives before the sun, works all day in one of the rings having no outside windows, has his lunch in the artificially lighted cafeteria, and goes home when it is already night. He gets two Sundays out of three off, and on those he is apt to wear dark glasses.



LATRINE RUMORS: During the first few weeks of occupancy, there were, naturally, numberless stories of lost persons who had failed disastrously to master simple navigation problems in the maze of rings, corridors, ramps, and bays in the Pentagon Building.

Quite hackneyed by now is the report on the fellow who entered the building a Western Union messenger and after 17 days came out a lieutenant colonel. The reverse is that of the officer who went in a lieutenant colonel and, caught in a rash of breakings, came out a Western Union boy.

Life is hurried, hectic and sometimes like this around Headquarters.

Then there is the one about the woman who went running down a ramp and tried to get past the guard without an identification pass. She said it was upstairs and she had no time to go and get it. He refused to let her out.

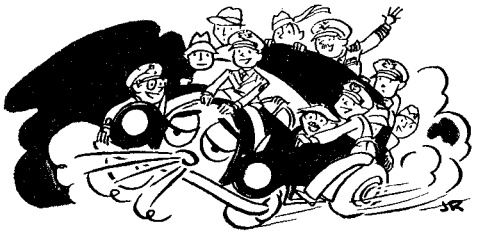
"You can't keep me," she cried, "I'm going to have a baby."

That still didn't move the guard.

"You'll have to have your card," he said, and then he proceeded to read her a small lecture. "You shouldn't have come in here in that condition," he said.

To this the woman replied, with some feeling, "I didn't."

Troop Movements: If you get a seat in a Washington bus or street car, you're just plain lucky. Staggered hours or not, everybody goes and comes from work at approximately the same time; only veterans of New York subway rush hours will feel at home in the pushing and shoving.



For a city its size, Washington has a very large number of taxis. The only trouble is, they are always full. On a rainy day or night you might as well pull up your pants and walk; you haven't a prayer. Doubling up is a universally practiced custom. Almost no taxi leaves Union Station any more without a full load, each passenger likely enough bound for a different destination. And each passenger pays full fare when he alights.

In connection with the Big House, 30,000 people come and go every day. About half of them use buses, the others private cars.

Visiting firemen take taxis to and fro. But not the old timers. It's six-bits at least to any downtown point.

Night Missions: In Washington, facilities for a hot time are not unlimited. Neither are women companions. There is the regulation number of bars, there are dancing floors in some of the hotels, and a moderate number of night clubs. There is no great spot of chic and glory like the Stork or the Camellia Room or Mocambo, but if circumstances require you to dance a bit and enjoy refreshments, you can always find a place. It will be crowded and pretty expensive, but that is situation normal.

Yet, the chances of your being kept awake by revelry by night or keeping someone else awake are not too bright in Washington. By midnight the streets are deserted and most of the joints shut up.

Soldiers and secretaries who have to get up at six-thirty and fight for breakfast, fight for a bus seat and then work all day require more shut eye than jive. Of course, there are always a few hardy souls who can be found somewhere drinking them up, but the average lieutenant falls exhausted into bed and longs for the peaceful days when he was a carefree corporal—if he ever was one.

Washington Mess: You won't be in Washington long before you hear the story of a man who went into a hotel dining room, sat down, carefully studied the menu, and then said to the waiter, "I'll have the three-dollar dinner." Wearily the waiter replied, "On white or rye?"

Food isn't easy to come by in Washington. There practically isn't such a thing as an empty restaurant. That applies to all price groups; if you're going to pay 45 cents or four dollars and a half, you're going to have to wait in line. When you do get a seat the service won't be electric; the waitresses are tired and often the food is, too. But you won't starve and the fare is probably a little more varied than it is in Stalingrad, to take a case.

Eating has become more of a routine matter than in the spring and summer of '42. Then everybody was new to the situation, and if they went into a crowded restaurant they left and tried another, and then another.

Now everybody waits at the first. You get fed sooner that way.

On the whole, Washington is a cafeteria town. At one time or another practically everyone serves himself. If there is a famous section of town in which to eat, it is down along the wharves, where a number of good seafood places stand.

Fox Holes along the Potomac: Where do you sleep? This is the $64 question. There are a hundred answers, none of which satisfy.

An enlisted man assigned to Washington may be attached to Bolling Field or Fort Myer. If so, he has no problem and lives much the same as he would anywhere else. But some of the boys are put on detached service and allowed to scramble for themselves. That means they must compete with the civilian population which, generally speaking, has more dough to spend. And let it be said here and now, the civilian population doesn't step aside for the military. They've seen too many uniforms to be impressed by them; it's every man for himself. But after a long hunt a man can find a boarding house, apartment, small hotel or some kind of reasonable accommodation. It will take time, and he probably won't be satisfied, and it will cost the limit he can afford, but he'll have a bed.

An officer in Washington is up against the same problem. If he's lucky he may get a dark room in a hotel for which he must pay at least four bucks a day. If he has reasonable assurance that he is to stay in the town, he may find a small apartment and collect a bed, a chair and a table. Or he may crowd up with a couple of friends and live in one of the numberless warrens which exist all over town.

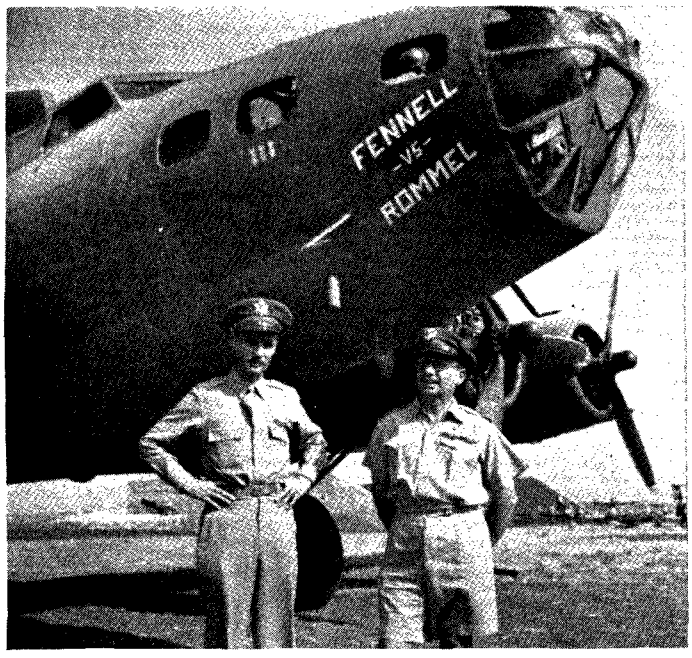
These are odd buildings which are called apartment houses and which from the outside put up a pretty good front. Inside you find bare corridors, decrepit elevators and sparsely furnished rooms, but they still cost plenty. They may, however, tend to be a lot of fun to live in, because it must be remembered that the civilian population contains a number of young females called "secretaries" who also must have a place to sleep, and who often double and triple up in such quarters.

It is reported that several introductions have been effected between the girls and boys, and on occasion soft drinks have been consumed in company. This is only hearsay, of course.

A visiting officer may have the luck to get a bed at the V.O.Q. at Bolling Field. This is a hotel that has housed the flying great of the world, from generals to second lieutenants. Originally the V.O.Q. had accommodations for 43 officers, but has been expended to 60, with an addition for 180 more now under construction. Major General Doolittle's Tokyo crew lived there, if you want references.

The meals are good, and cheap at the V.O.Q. Also, a bureau is maintained to sort out the available entertainment in town and let the boys know about parties. Clubs, fraternal organizations, sororities flood the V.O.Q. with invitations—it's not hard to dance or go out to plays or concerts.

Here's a point to remember about V.O.Q.: If you are stuck for a place to sleep, the office will attempt to get you a hotel reservation or rooms by the week or month, off the field. The Washington Hotel Association cooperates by giving priority to flying officers and emergency requests. ☆



Major General L. H. Brereton (right) and the author in Africa

We fought both NIPS and NAZIS

By Major Max Fennell

WE fought both the Japs and the Germans. For ten months, as part of the 7th Bombardment Group, we shuttled between the Middle East, India and China. We chased Germans from Tripoli to Tunisia. We bombed Crete and shipping in the Mediterranean, ran missions into Burma, and raided far behind Jap lines into occupied China. At the time, I happened to be C. O. of the 7th group's 9th squadron.

The first question everybody asks is, "Who's tougher, the Nips or the Nazis?" It's a fair question. The answer is- -both.

Personally, I think the Germans are going to be harder nuts to crack than most people seem to think. It seems to me they are getting tougher instead of weaker as time goes by. When we first ran into the Germans around Tripoli, their fighters were content to make two or three passes and get out. But as we advanced, they would attack and stay with us for 30 or 40 minutes. Both the quality and quantity of their planes are holding up and their pilots are getting more daring all the time.

Don't ask me why, but some of our men rather expected the Germans to be relatively sportsmanlike in their methods of fighting. Remember those stories you used to hear of wing tipping to a fallen enemy and other displays of mutual admiration? They are definitely not true. Again and again, the Nazis--just like the Japs—would strafe our boys as they parachuted to earth.

In the North African theater, we ran up against ME109s and JU88s. That's all they seemed to have in that area but they were plenty good with those ships. Usually our bombing squadrons were outnumbered—*before* the battle. If our gunners were on the beam, the Nazis got hurt and hurt badly.

At first, the Germans came in on our tails but our turrets back there literally shot hell out of them. Their principal attacking method thereafter was a direct head-on approach. For a heavy bomb squadron there's only one good evasive tactic against the MEs and that is good gunners. The entire success of your mission depends upon your gunners--they have to know their business. We found that if a gunner put a burst out in front of enemy planes as they started to come in, it would often break off the attack. The principal thing for a gunner to watch out for is his method of shooting ahead of his target. Lead your target by twice the distance you think you ought to and you'll get hits. Those MEs are very fast, but when you put some lead in their path and show that you've got them in your sights, they will often dive away without opening up at all.

The cannon in the ME is effective at about 1500 yards and the guns are usually opened at about 750 yards. However, the guns in our 17s and 24s are effective at 1000 yards and you can always outrange them. Some of their pilots would open at 750 and keep their guns going as they came right through our formation. The only thing we could do then was turn right into them. This would cause them to break off their attack, and they would generally go under us into a steep dive.

IF you are ever caught alone, your best bet is cloud cover—and there is usually plenty of it over the North African sector. If you are caught below 10,000 feet, "hit the deck." That is, get down low so they can't dive on you.

We usually flew in three elements of three planes each. When caught below 10,000, the lead element would drop down low with the second and third elements in echelon. Even then, many MEs dove down on us but they would have to break off at ineffective distances.

The ME is quite an airplane, fast and very well armored, and it will match the 17 in getting up to higher altitudes. If your gunner has a dead eye, he'll pick an ME's engine. The JU88s are much slower and not so well protected. Of course, it is not the job of a bombing plane to shoot down fighters. You're supposed to drop your eggs and get back home. You may have heard that you can't hit a maneuverable target from 20,000 feet and higher. You sure as hell can—and with as few as nine planes, too.

I remember the day nine of us went after a troop transport in the Mediterranean. Each of us had six 1,000-pound bombs and we pattern bombed from 19,500 feet. We got four direct hits right on the deck and twelve near misses. That baby was maneuvering like the devil but we blew her up with the first salvo. No matter how maneuverable your target, if you use pattern bombing by elements you'll find that the ship just can't move fast enough to get away. We came in on a steep angle and damn few boats escaped.

Most of the boats carrying supplies to Rommel were covered with fighter protection. They would wait for us to make our runs and close in as we came up to the target. Bombardiers ought to get plenty of practice bombing on very short runs because the

The comforts of home are left far behind at this command outpost near the Tunisian front lines.

A.A. fire will get your range and it just isn't practical to make a long target run.

When flying on to the target, we used stepped-down javelin formations for better visibility and extra concentration of fire power. We generally stayed in formation, bombing in elements of threes. That formation is very maneuverable.

Occasionally, after dark, we found the Germans hanging around our fields, waiting for us to come in. However, the British had an excellent location system and they'd send up their Beaufighters. Believe me, those ships are deadly for night fighting.

The Germans did a lot of night bombing, using their JU88s. They have an excellent flare system and caused us quite a bit of trouble.

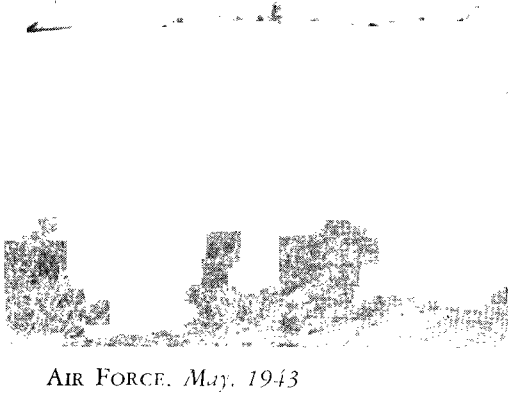
In December, we bombed Sousse and Sfax in Tunisia from an advanced field near Tobruk. Our headquarters was in Egypt and we'd move from there to the advance base and then go over the target. In our first raids we didn't find an awful lot of fighter opposition around these towns. Later, however, we ran into plenty of it—Hitler certainly pushed a lot of stuff down there to try to hold Tunisia.

I remember one thing in particular around that area. I was flying General Brereton and Sir Arthur Tedder, the British Air Chief, over Sfax at 2,000 feet. We thought it was in Allied hands and never knew until we got to Algiers that the Germans had the town!

Generally, the weather around North Africa is pretty bad. Rain halted operations for some time and gave the mechs a headache. During the Winter you'll find icing conditions about 6,000 feet over the Mediterranean. The only thing to do is try to get on top of the cloud formations.

Here's a tip for B-24 pilots. You'll find that although your ship is pretty heavy, it's a good steady plane. Be damned sure you understand the hydraulic and fuel systems. Learn them backwards before you get into combat. There's a lot of piping in a 24 and if ack ack hits some part of your hydraulic installations, you can cut it off and still get your flaps down. Be sure you know how before you try it.

A Chinese labor army employs primitive methods to construct an airfield at an advanced base.



Verbal snapshots about air war in China, India and Africa—by a pilot who was in the thick of it.

For quite a while, we were stationed in Palestine. It's really nice there, very much like Southern California. The weather is warm most of the time but during the Winter you're liable to run into lots of fog.

Because Palestine is populated by so many refugees, practically everybody talks four or five languages and you'll have no trouble making yourself understood. One evening we went into a night club and were informed that we were the first Americans who had ever been in there. When some of our Southern boys started singing "Dixie" we were amazed to find that the entire place joined in on the chorus. And they all knew the words, too.

Some of us were ordered into China from Palestine to do some survey work and, later, to run a couple of missions against the Japs.

GETTING into China from India is no easy job. You have to go over the Himalayas through some of the worst weather in the world. All flying is on instruments and you'll have to get up to 22,000 feet some of the way. Our Air Transport boys, pushing supplies into China, are really the unsung heroes of our war over there. Sometimes during good weather they'll make the India-China round trip every day.

If you ever get down around that territory, don't depend on the Chinese maps. Actually, the mountains are always higher than they appear on the maps. You can follow the rivers, however, for they are accurately charted.

Should you get lost over Chinese territory, all you have to do is circle the nearest village. The people will realize your circumstances and phone to the closest radio station—there's always one around—and they will let you know where you are and how to reach the nearest field.

If you are forced down in any part of China not occupied by the Japs, the best thing to do is stay exactly where you are.

Crew of a B-24 study maps in preparation for a bombing raid on coal mines in Occupied China.

No matter where you go down, the alert Chinese will have seen you and they'll come after you. One plane I heard about was forced down in an almost impenetrable wilderness—it took the Chinese two full months to rescue the crew but they got them all out alive.

One of our raids while on that assignment stands out in my memory. We flew 800 miles behind Jap lines to bomb the Linsi coal mines in Occupied China. There were six B-24s on the mission, each carrying six 500-pound bombs. We were in the air about 13 hours and didn't come across one enemy fighter. We flew at 16,000 feet and came down to 14,000 for the bombing run. Over the target we ran into some AA fire which didn't do any damage at all. The power house was our target. A string formation was used, we bombed individually and all of us made two runs over the target.

The mission was arranged so that we could fly back under the cover of darkness. When we returned, the Chinese lit a flare path for us and put an AA searchlight over the field. The entire flight returned safely.

Some time later, six B-24s made an eight-hour flight from Calcutta, India, to bomb Rangoon. We didn't run into anything—neither enemy aircraft or ack ack fire. Each plane carried five 1,000-pound bombs and we hit the target from 27,000 feet. One crew had to bail out because of some electrical difficulty but we all got back safely.

China is really wonderful. We had plenty of chicken and steaks, prepared in American style by the Chinese, who are the best cooks in the world. For breakfast, we always had scrambled eggs, toast, and coffee.

One of the most revered customs in China is that of drinking tea with your host before any business is transacted. If you ever have occasion to visit a Commanding Officer of a Chinese outfit, don't discuss business until after you've had tea. But once tea is over, the Chinese go to work with a real vengeance. War is in their hearts and they'll do anything you want done. Most every place you will find an interpreter provided for your convenience.

Many of the Chinese women are very beautiful, but if you pay too much attention to the young girls, you'll find that they consider the matter a very serious one.

One of the peculiar things in China is their system of money. Under the rate of exchange, one American dollar gets you ten Chinese dollars. When the boys played poker, Chinese money was always used and it was nothing to hear somebody say, "bet you a hundred." Money was piled high on the table and the winner usually needed a knapsack to carry his money out.

One day—soon, I hope—we're going over Tokyo and that's the ride I want to be on. Once you've been in China, you learn to really hate the Japs. Please don't consider this bold—but this is my personal request to be counted in on the next Tokyo run. Nobody is fooling in China when the usual American farewell of "so long" is replaced by "See you over Tokyo." ☆

"In case of accident"

(Editor's Note: On Feb. 5, during a routine flight Flight Officer Wilczynski, then a Staff Sergeant, and a companion suffered compound leg fractures in a crash which killed both pilots of their plane. This is the story of how they endured sub-zero weather, exposure, and bitter disappointments, finally to be rescued. Both Flight Officer Wilczynski and Lieutenant Mahan are members of the Alaskan Wing, Air Transport Command.)

In this battered hulk, the author and his companion met their darkest hour.

MY BIGGEST worry was whether I'd ever be able to fly again. I wasn't so scared of dying as I was losing that leg. I knew a wooden-legged pilot couldn't fly for the Army, and the one thing I want to do is fly.

You know, the day we got back to the hospital here in Edmonton, I got the two best pieces of news I ever expect to hear. One was, they wouldn't have to take off my leg. The other was that my Staff Sergeant days were over—I had got my Flight Officer commission. Can you tie that—after lying up there in the snow for nearly three weeks?

You want to know what we did to save ourselves. I'll tell it the best I can because it might help somebody else in a similar jam. As I figure it, the crash happened this way: We were in a cargo ship and the Captain, Pilot John Hart of Minneapolis, was making an instrument landing because of the snow that had been falling for several hours after we headed south out of Fairbanks. We had delayed a couple of hours looking for a lost bomber which later turned up.

When we got over the field where we were landing for the night, we were up about 8,000 feet. I was standing in the companionway just in front of our passenger, Robert Alexander of Denver, and telling him about how the instrument let-down was made. The last time we went over the field, I calculate we were around 1,000 feet and losing air speed fast. I could hear the co-pilot, Kenneth W. Jones of Elyria, Ohio, calling off our speed—100, 90, 80 and so on. That was when I first got worried and thought we would crash. The last count I heard was 60 and then we stalled. We fell off on the left wing, but the Captain brought her out of the spin and she was going nose first and level when she began to clip off the trees. This made a noise like spanking the wings with the palm of your hand. Then she hit a big tree that didn't clip off. She stopped and sudden.

I had started to back up in the companionway when I first saw we were in for it. I kind of pushed Alexander to the rear so both of us could lie down. We were flat on our backs with our feet braced, and I guess that saved us. Afterward, my left foot was so tangled in wires and controls around the instrument board that I had a devil of a time getting it loose. My head was alongside the front baggage door which had been torn off. The plane's nose was cut off from the front edge of the pilots' seats. They had been killed instantly.

MY first thought was to get out of the ship. I didn't feel any pain and didn't know my leg was broken till later. I put my hands out through the baggage doorway and tried to touch the ground but it was too far—three feet, I guess. Then I scrunched forward out of the door and let go. That's how I hurt my shoulder, which is better now.

Gasoline was leaking like it was coming out of a water faucet. I was afraid of fire. I dragged myself 10 or 15 feet off to the side and then stopped and hollered, "Anybody else alive?" There was no answer. I yelled again. Alexander, who was still in the plane, called back, "Can somebody give me a hand?" I started to crawl to the back of the plane thinking I could help him out of the rear door, which would be lower to the ground. I bumped into the trailing edge of the left wing and somehow caught some de-icer fluid in my mouth. Did it burn!

It was Arctic-dark and I was afraid to light matches. While I was lying there, Alexander found the same door I came out of. We listened to the dripping gasoline until we decided it wasn't going to catch fire and then we crawled back into the plane.

We didn't sleep that night. We figured we had crashed at 11:20 p. m. and it was a half hour later now. We were dog-tired from the shock and everything (crawling isn't any picnic as we found out later), but we were afraid we'd freeze to death if we went to sleep. Every fifteen minutes one of us would call to the other to make sure he was all right. By this time I knew my leg was busted and I wondered about that, too. What would I do with a wooden leg, anyway? Alexander didn't know his foot was hurt at first. It was numb and he thought one of his Arctic boots wasn't zippered up right. I tried to fix it for him—one of his arms had been paralyzed from a

previous sickness—and then I told him, "Your foot is broken, too."

The next day we just tried to keep warm. It was still snowing—and kept at it off and on for five days. I heard from the airport later that it was 40 below that second night. We did manage to find the Army emergency rations and we nibbled at them for all the nineteen days. For water, we ate snow. I'd scoop it off the wing through the emergency window but it was full of pine needles and bark.

When no more snow was in reach, I beat the ceiling of the plane with a shovel and knocked more of it down off the roof. We didn't get enough and we were all dried up when they brought us in. I might add that we found the Army emergency bottle of brandy. It was frozen, but at the rate of two

When you're lost for 19 days in northern snows, you can still crawl home — even with a broken leg

or three "teaspoons" every hour we finished that in one day—for frostbite, you know.

Funny how an experience like this changes your way of looking at things. Once I got a can of snow and tried to boil it on a little stove there in the plane. The hot can fell right side up on the back of my hand. Instead of jerking my hand away to keep it from burning, my instinct was to save the water. That's how I burned my hand.

We found a bed-roll in the plane and used it for a mattress. Alexander got the wing covers which we put over us and that way we kept fairly warm. Anyway, it saved us from freezing. This second night we heard airplanes go over. I discovered we were so near the field that in the quiet of the woods I could tell when they taxied out to the end of the runway and revved up the motors. It was awful to lie there in the wilderness and hear civilization pass you by. Each night several planes would go. I got to timing the take-off and would calculate how long it took them to pass overhead. I figured 120 miles per hour, counting take-off and climb, and it took them three minutes to come over. This would mean about six miles to help. We thought they'd find us sure.

Trouble was, the new snow covered up the plane. Then, too, the right wing was broken off and was *(Continued on Page 32)*

By Flight Officer
Eddie Wilczynski
AS TOLD TO
LIEUT. LYNN C. MAHAN

Only six miles from base but unapproachable from the air. Above, a view of the wreck, and at right, a sample of the terrain through which the survivors crawled for four days.

ILLUSTRATED BY CAPTAIN RAYMOND CREEKMORE

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Maj. Gen.

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(2) ACT IN CG'S NAME
(3) SUPERVISE CARRYING OUT OF CG'S POLICY
(4) RECOMMEND NEW POLICIES AND CHANGES IN POLICIES TO CG

DEPUTY CHIEF OF THE AIR STAFF
Brig. Gen. L. G. Saunders

DEPUTY CHI
Brig.

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MARCH 29, 1943

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Col. J. B. Smart

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tratemeyer

MANAGEMENT CONTROL
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- AIR JUDGE ADVOCATE — Col. E. H. Snodgrass
- SPECIAL PROJECTS — Col. F. T. Davison

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e

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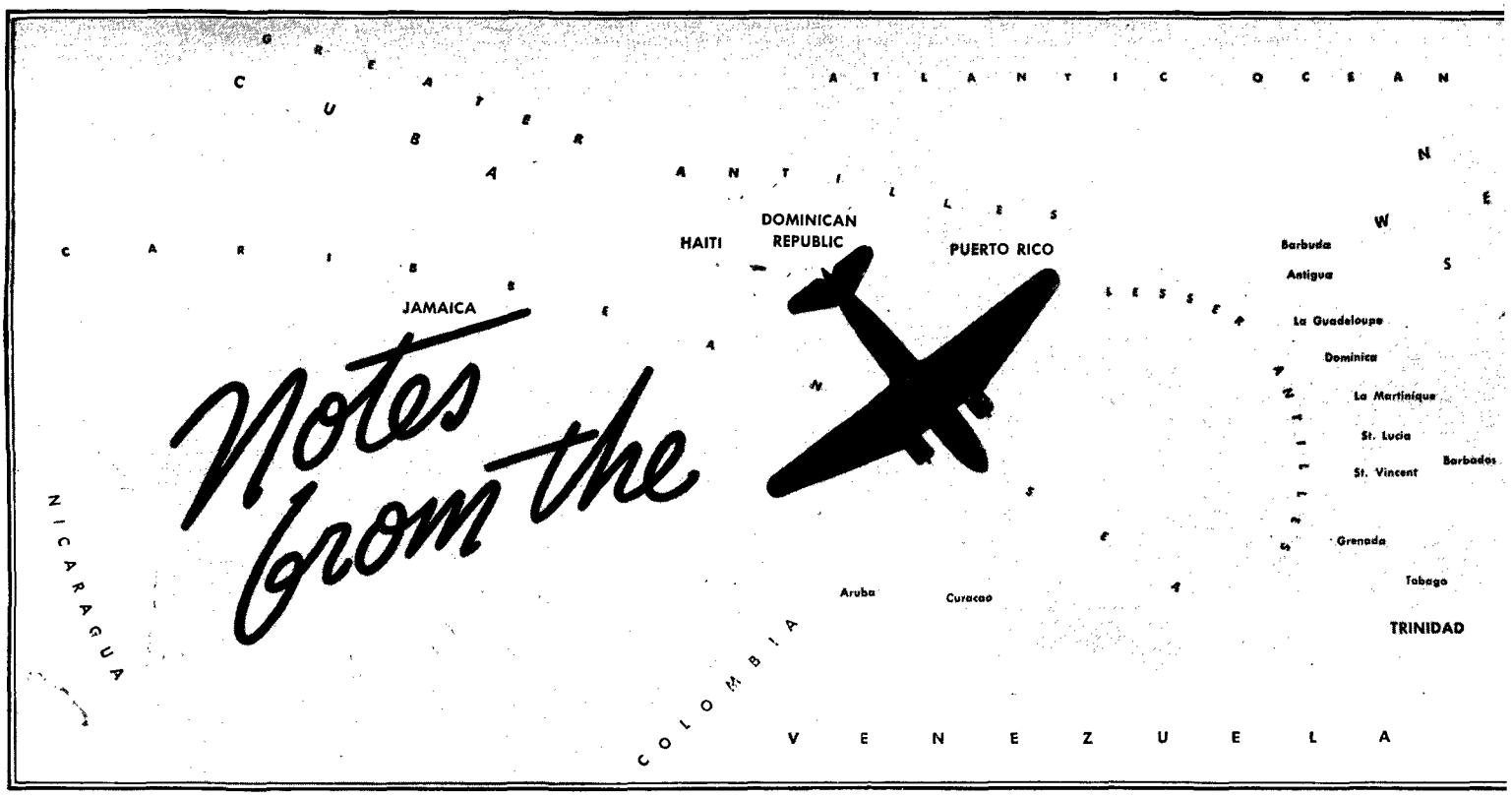
Brig. Gen.
C. E. Branshaw

5th, 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, AIR FORCES
(see footnote)

Footnote

5th Air Force	Lt. Gen. G. C. Kenney	8th Air Force	Maj. Gen. Ira Eaker	11th Air Force	Maj. Gen. W. O. Butler
6th Air Force	Maj. Gen. H. R. Harmon	9th Air Force	Maj. Gen. L. H. Brereton	12th Air Force	Maj. Gen. J. H. Doolittle
7th Air Force	Maj. Gen. W. H. Hale	10th Air Force	Maj. Gen. C. L. Bissell	13th Air Force	Maj. Gen. N. F. Twining
				14th Air Force	Maj. Gen. C. L. Chennault



By Captain Charles D. Frazer

GATEWAY TO THE AMERICAS. Since the Spaniards discovered the New World, the coral and volcanic islands of the Antilles have been recognized as the natural stepping stones to the Western Hemisphere. Conversely, in time of war, they become the natural barrier against enemy invasion.

The Greater Antilles include Cuba, Haiti and Dominican Republic, Puerto Rico and Jamaica. Well-known among the Lesser Antilles are such British possessions as Antigua, St. Lucia, Barbados, and Trinidad, and the French colonies of Martinique and Guadeloupe.

This vast loop of islands from Florida to the South American coast is today guarded by both Army and Navy forces—and by the Antilles Air Task Force, part of the over-all Caribbean Command, headquarters of which is in Panama, Canal Zone.

Some bases of the Antilles Air Task Force are modern, permanent stations. Some are small, remote, one-runway affairs, hemmed in by jungle and bamboo forest. Together, manned by fighter and bombardment squadrons, they are like a chest stuck out into the Atlantic against enemy air or sea attack on the vital approaches to both Americas, the Caribbean and the Panama Canal.

COVERING THE WATERFRONT. Squadrons based on the Antilles are of two types. Defensive and offensive. Fighter squadrons, equipped mostly with P-39s and P-40s, carry on the defensive work, with constant patrols and other tactical missions.

Bombardment squadrons are organized to hunt U-boats. This is the most important function of the Antilles Air Task Force, since the submarine is a vicious, ever-present menace to shipping through the Caribbean. Subs have even shelled some of the islands.

All Army air operations are carried on in full cooperation with Navy surface vessels and PBYs. Tactical plans are developed by joint commands and control is exercised by collaborating Navy and Army officers at various headquarters.

The large fields in the Caribbean area serve also as important way stations for the Air Transport Command and through them passes the greatest volume of military air traffic of any region in the world.

INTERNATIONAL SET. There is, for example, Borinquen Field, Puerto Rico.

The bar of the Aquitania never in its palmiest days boasted a more colorful international clientele than does the Officers' Club bar at Borinquen. Elbowing and shoving their way up democratically for a rum-coke or a daiquiri may be seen foreign diplomats and military aides, ferry pilots and war correspondents, "brass hats" of all the United Nations and ordinary seamen—survivors of torpedoed ships—dressed in the garb of the rescued sailor, a cheap seersucker suit.

In the passing parade at Borinquen, you can see a wider variety of uniforms than in an operetta. Combat and ferry pilots of the Army Air Forces mingle with flyers from Britain, the Netherlands, Free France, China, Russia, and many other nations. Prominent in the crowd will always be the gay and vivacious airmen of Latin America.

Not all celebrities are uniformed, by any means. A sombre business suit may call attention to a Wendell Willkie or a screen actor on U.S.O. tour or other globe-trotters, en route to or from the States.

Conversation takes place in so many languages in this Club that, to a casual listener, it sometimes sounds like a Berlitz school gone mad.

For foreign notables and general officers, Borinquen has special quarters near the Officers' Club. For lesser travelers, there is a spacious Hotel de Gink with a sign at its door reminding all comers to unload firearms before entering. Sleep is not easy to come by in these visitor quarters, because early starts are the rule, regardless of whether a ship is coming from or going to the States. From two or three a.m. on, alarm clocks are going off and people are stumbling around in the tropical dark. An hour after sunup, most transients will have left Borinquen.

SO NEAR, YET SO FOREIGN. Duty in the Antilles is foreign duty in every sense of the word. Thus, life is apt to be both interesting and difficult.

While only a wing-tank hop from the U. S., many of these islands present all the discomfort and primitive problems of a nook in the Southwest Pacific.

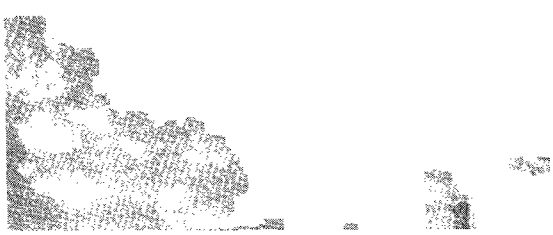
Malaria, venereal disease and amoebic dysentery are Three Horsemen of the region. You sleep under mosquito bars in many places and drink only boiled or purified water.

Drainage is a serious matter, for in this world of soft, green hills and dazzling white beaches some rain falls nearly every day. Everyone agrees that engineers attached to Air Forces units have had a difficult job and have done it well.

Scenes from Somerset Maugham. In these islands you can find all the authentic "atmosphere" of a tropic novel.

Lush jungle presses in upon barracks and airfields, native thievery and mystic doings are not unknown, and there is an engaging variety of snakes, ants, parrots, monkeys, and other fauna.

Snakes, particularly. There are tiger snakes, black on top, bright yellow underneath, handsome and deadly poisonous. The coral snake is another bright-colored beauty, frequently found swimming in the pale blue water of the Caribbean. It is known as the "15-minute snake," since that's about par after a nip or two.



At one field a 23-foot anaconda was killed less than 50 feet from a Captain's quarters. This delicate specimen has been known to crush a cow in its coils and swallow the victim whole. Usually, however, the snake will reconnoiter in a two- or three-mile radius before the meal, to be sure that no army ants are near. These ants are something. Parasol ants of the army ant family sometimes travel in crawling masses 20 feet high, devouring everything in their path.

Planes vs. Jackasses. One airfield is especially bad at night when its runway becomes crowded with the wild jackasses abounding on the island. They can be chased away, of course, but they scamper back with all the stubbornness of a jackass to make landings hazardous.

Flying weather on the Caribbean Sea Frontier is generally excellent. Rain moves in squalls and you can fly around it or stay up till it stops. Afternoon usually brings some mists but most of the average day is CAVU.

Trouble, however, is likely to be real trouble. Most flying is done over limitless reaches of water. A forced landing may bring you down on the sea, in which case you will have to contend with a terrific tropical sun and with sharks and barracuda.

Down here, there is no academic nonsense about whether sharks will attack a man or not. People anxious to live don't test the question. If they swim in the sea at all, they learn to pick a shallow bay well protected by reefs.

Or you may be forced down in the jungle, which is worse. Much of it is trackless and impassable. Revolvers, knives, axes, emergency rations, water purifiers, emergency radio equipment—all these things are as important to a Caribbean flyer as his parachute.

Languages, dialects, and double talk. An Air Forces man stationed in the Antilles must soon acquire some knowledge of languages. On many islands, Spanish is the common usage. Other spots in the Indies are more difficult.

So polyglot is the population of one island, for instance, that there are 15 to 20 different languages and dialects in which a native can feign to misunderstand you.

Pidgin English can get you by, in most cases. Some of the natives have developed a medium of conversation known as "talkee-talkee" which is enough to help you get laundry done.

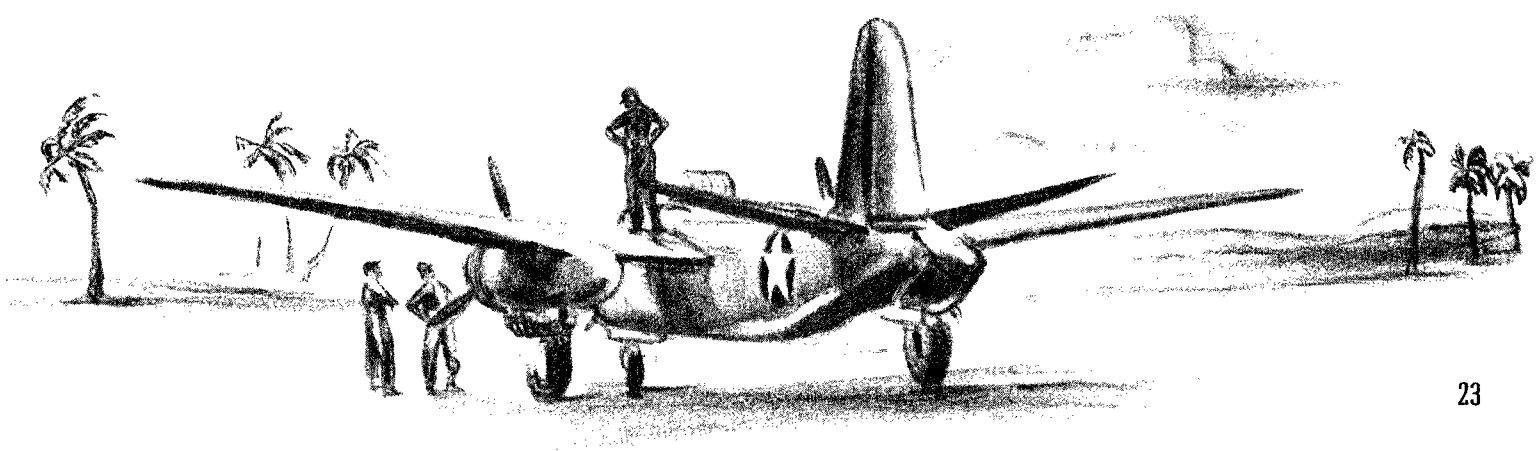
Incidentally, the laundresses of one island caused a bit of trouble at the beginning. They were accustomed to wash clothes in a very simple manner—by standing in a river stark naked, from the waist up, at least, to do the washing. This spectacle resulted in a number of man-hours lost among inquisitive G.I.s until the girls were prevailed upon to wear a little something over their impressive chest formations.

The double emphasis of talkee-talkee seems to fascinate the people of the Caribbean, for they use the trick to describe many things. A famous tree, for example, is the "divi-divi"—a strange looking growth with its upper branches and leaves standing out at right angles to the trunk, due to the constant pressure of 40-mile trade winds.

Nowhere in the world, probably, can there be found people of such varying colors, religions, and races as in certain of the West Indies and local customs are frequently quite odd.

Virgins. You know you're a long way from home when you discover that Hindu virgins are advertised to the passerby.

There are many Hindus in these islands and almost every tiny front yard has its bamboo flagpole. *(Continued on Page 32)*



Why BLACK-OUT?

By Major G. W. Holt

FLIGHT SURGEON

FLYERS learn early in the game that one of the important stresses affecting the human body in modern high-speed aircraft is acceleration. The forces produced in some maneuvers act with dramatic suddenness and result in momentary though profound sensory and physiological effects.

Acceleration may be defined as the rate of change of velocity in direction or magnitude, or in both. It is most simply thought of in terms of the accelerations of gravity.

Any body having mass and located in the earth's vicinity is attracted to the earth by the force of gravity. This force is such that a body falling toward the earth would accelerate—were it not for air resistance—at a rate of 32.2 feet per second for each second of fall.

This magnitude of the acceleration of gravity—represented by the symbol G—is a convenient unit with which to measure acceleration.

Because the law of gravity holds true only when an object is falling through a vacuum, a parachutist free-falling through the air with chute unopened does not accelerate in exact accordance with the law of gravity. The resistance of the air is such that in free-falling from a stationary blimp, one's speed would increase to about 120 miles an hour and then remain constant.

This constant velocity results because the force of gravity and the force developed by the air resistance are equal and oppositely directed. The constant velocity of free-falling is referred to as terminal velocity.

Speed in itself is a much less important flying stress—from the standpoint of physiological effect—than a change in direction or magnitude of speed. A plane diving at a constant speed of 650 miles an hour causes no sensation when the pilot is protected from the slip stream. Only when there is a change in direction or magnitude of the 650-mile-an-hour dive is a sensation produced.

A full explanation of the forces of acceleration developed in flying is apt to become very complex. To simplify the discussion, three general types of acceleration may be considered: linear, radial and angular.

Angular velocity is measured in degrees of a circle traversed per second. Thus, the second hand on your watch goes around a complete circle (360 degrees) every 60 seconds; its constant angular velocity is six degrees per second. If this angular velocity were to increase by a certain number of degrees each second, we would refer to the motion as angular acceleration.

A man sitting in a revolving chair can be turned at a constant angular velocity without experiencing any sensation if his eyes are closed. However, if the angular velocity is changed (as in starting and stopping the chair) so that the man is subjected to an angular acceleration of at least three degrees per second each second and for a period of at least five seconds, definite physiological effects are produced.

How acceleration creates unusual sensory and physiological effects in flying personnel

Consequently, whenever aircraft motion is such that a pilot is turned around an axis passing lengthwise through his body (as in a revolving chair) he may suffer adverse physiological effects that are caused by stimulation of the organs of equilibrium located in the internal ear. Actually this reaction seldom occurs except during a spin.

The radial and linear accelerations, however, are encountered in sensation producing degree with regularity. In general, radial acceleration is present in circular flight; linear acceleration, in level operation.

For the purpose of illustration in this discussion, we will consider that the pilot and other personnel are sitting upright in the aircraft.

IN linear acceleration, the speed of a plane is changed not in direction but only in magnitude. An example is the acceleration experienced in a ground run prior to take-off. Linear deceleration occurs in a landing ground run. The rate of change in magnitude of the velocity here is so small that little if any sensory effect is produced. However, linear acceleration may reach sensation-producing, and even dangerous, magnitudes in catapult take-offs and crash-landings. Thus it is seen that linear acceleration and deceleration occur in straight line paths of motion. Dangerous linear decelerations also occur on opening a parachute immediately after bailing out from a plane diving at speeds very much greater than the terminal velocity of 120 m.p.h. and in crashes.

On the other hand, when a plane follows a circular path, the plane and its occupants are subjected to a centrifugal force directed along the radius of the curved path. This centrifugal force is that of radial acceleration and is developed in most aerial acrobatics involving high-speed circular flight and especially in rapid recovery from a power dive.

The effect of this centrifugal force on the human body depends on four factors:

1. Magnitude of acceleration, or number of G's developed.
2. Direction in which the acceleration acts.
3. Length of time the acceleration lasts.
4. General condition of the individual.

Thus in recovery from a power dive, the extent to which the pilot is affected depends on the number of G's developed, the direction in which forces of acceleration are applied to his body, the length of time he is subjected to these forces, and his general physical and mental stamina at the time.

Positive acceleration refers to accelerative forces which are applied from head to foot, such as those produced in a sharp recovery after a steep dive. The physiological effects of positive acceleration consist of such dramatic episodes as grey-veiling of the field of vision and black-out.

In sufficiently severe positive accelerations, with a high number of G's and a duration of many seconds, there may be momentary loss of consciousness—and the individual may not necessarily remember the loss. This fact has been proved to pilots who insisted they did not lose consciousness by showing them cockpit motion pictures of themselves in such an unconscious state.

In recovery from a dive or sharp pull-up, the body is pushed upward by the airplane and moves with the ship. The blood in the vessels, particularly the great veins in the abdomen, reacts as a fluid within a distensible system of vessels and thus tends to col-

lect in a pool in the veins of the extremities, abdomen and pelvis. The blood is not able to return to the heart, and X-rays have shown that in such maneuvers the heart is practically empty during the acceleration.

The heart thus is prevented from pumping any oxygenated blood into the arterial circulation and, therefore, little if any fresh blood reaches the brain. Blood pressure decreases rapidly in the arteries of the neck, brain and eyes.

The structure of the eyeballs is such that it contains fluid under pressure. This pressure within the eyeball normally has to be exceeded by the blood pressure in order to supply the eye with arterial blood. Since the eyeball requires normal blood pressure for vision, it naturally follows that sight will fail in high positive acceleration maneuvers. Moreover, the blood supply to the eyes is more profoundly affected by positive acceleration than is that to the brain tissues due to the intra-ocular pressure working against the blood pressure. For this reason loss of vision occurs before loss of consciousness.

THE threshold value for positive acceleration—that is, the magnitude and duration of the acceleration which causes the average individual to black-out—is thought to be about 5.5 G's for four or five seconds.

Such acceleration has other effects on the body. Since the body reacts according to its weight, the number of G's multiplied by the individual's weight will give the relative reaction in a given positive acceleration. For example, if a pilot weighing 150 pounds pulls out of a dive with five G's, his relative body weight and the pressure he exerts on the seat will be 5 x 150, or 750 pounds. The blood also will exert pressure in the direction of head to foot as though it were as heavy as mercury at one G. In high G maneuvers a pilot's body may be momentarily immobilized due to the forces produced in the acceleration involved. After violent acrobatics, some flyers have experienced a complete temporary inability to move or lift their hands or feet.

These physiological effects of high positive G are temporary, and are not regarded as having any permanent untoward effects on the individual. They are just a part of the day's work. Nevertheless, these effects do represent a potential menace in combat. Many anti-G mechanisms are being studied with the purpose of preventing grey-veiling black-out and loss of consciousness.

One device consists in the alteration of the pilot's position by using a tiltable seat. This seat tips backward as the ship begins recovery from a dive and the pilot lies in the long axis of the aircraft. The forces of positive acceleration consequently are directed at right angles to the long axis of the pilot's body. The pooling of blood and delayed filling of the heart are minimized and black-out is proportionately decreased.

Another means of increasing an individual's tolerance to positive G is for him to assume a crouch position. This move is made relatively easy by placing a step on the rudder bars. Crouching reduces the length of the venous column of blood above and below the level of the heart, thus facilitating the return of blood to the heart and increasing the ability of the heart to pump blood to the eyes and brain.

Negative acceleration occurs in maneuvers in which the forces are directed in the long axis of the body from seat to head, or in the opposite direction to those of positive acceleration. Forces of negative acceleration are developed in such maneuvers as push-downs, outside loops, outside spins and inverted flying.

In negative acceleration, since the force is directed from seat to head, there will be a pooling of blood in the head. With high negative acceleration in the neighborhood of three to five G's, suffusion of the face, congestion of the conjunctival membranes of the eye, and redding of the fields of vision may occur. Rupture of a cerebral blood vessel has been produced.

Transverse acceleration refers to an acceleration in which the forces are applied transversely across the body. Since this type of accelerative force is applied in a direction at right angles to the long axis of the great blood vessels, there is a far less tendency toward the pooling of blood in one end of the body. For this reason, much greater transverse G can be tolerated than positive or negative G. The tiltable seat changes accelerative forces from positive to transverse.

High transverse G may occur in catapult take-offs and crash-landings. Although it is true that the tolerance to black-out is greater with transverse than with positive G, injury can result from either catapult take-off or crash-landing if proper protection is not taken against impact deceleration.

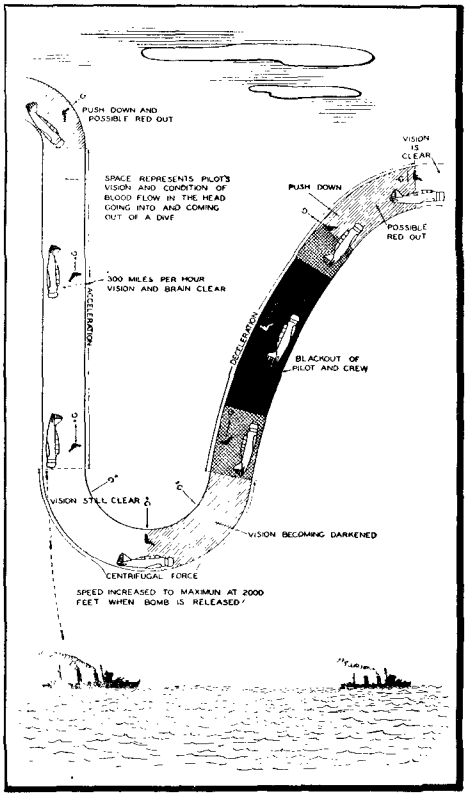
Retarded acceleration, properly spoken of as deceleration, is an important consideration of crash injuries. Most fatalities in plane crashes, excluding burns, are due to sudden impact injuries to the head. The resultant concussion frequently prevents a plane's occupants from escaping before the ship catches fire.

In crash landings at sea, concussion resulting from impact head injury has frequently resulted in the drowning of personnel. Thus it can be seen that high G values of deceleration and the resultant effect on the head and brain are of primary consideration. By conversion of high G decelerations of the head to low magnitude decelerations, it is possible to prevent concussions and many severe—and often fatal head injuries in crashes.

A simple means of decreasing the high G of impact head injuries is to place the arms against a portion of the plane's structure and rest the side of the head firmly against the arms. A parachute pack between the structure of the ship and the head is also effective in this respect.

Occupants in the tail or rear cockpits frequently walk away from crashes while those in the front compartments are killed or gravely injured, due to the fact that less deceleration is sustained in the rear portions of aircraft. Other safety methods by which high decelerative injuries must be reduced include recessing all projections, especially those with small surface area; increasing the surface area of any projecting instrument or knob which cannot be recessed, and covering projections with sponge rubber. Crash helmets are also effective. Such methods of improvement are always being studied and applied by aircraft manufacturers.

The chart below illustrates the effects of acceleration, deceleration, centrifugal force and "push down" on pilots of dive-bombers.



CONCLUSIONS:

1. Acceleration is of primary importance in consideration of flying problems.

2. Threshold or black-out tolerance to positive acceleration is about 5.5 G's for four or five seconds for the average man.

3. Negative acceleration sustained in outside loop maneuvers is dangerous in excess of three G's.

4. Tolerance to acceleration is partially dependent on general physical condition of the individual.

5. By assuming a crouch position or by using tiltable seats or other anti-G devices under development, flyers can increase their tolerance to acceleration.

6. Deceleration of high magnitudes is a major cause of serious—and often fatal—head injuries, the resultant concussion frequently preventing occupants from escaping crashed ships which burn, or sink at sea.

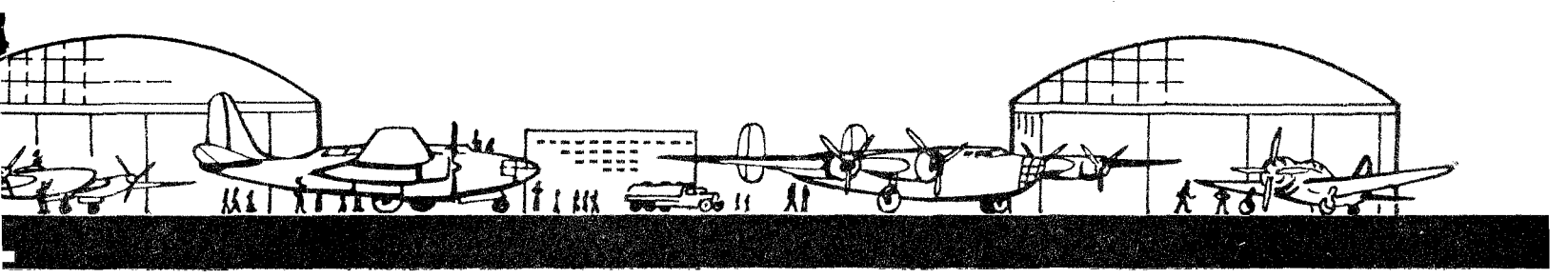
7. Measures may be employed in reducing magnitude of deceleration in head injuries to a point where such injuries are negligible. ☆

ON THE LINE

WHAT'S WRONG WITH THIS PICTURE?

HERE are a few maintenance boners that always follow light aircraft—fighter planes included. "If you're a keen observer, you'll immediately spot six, yes, six mistakes—all due to carelessness and all easily correctable," said Staff Sergeant Raymond C. Raduege who selected this month's boners.

The picture above was posed by (left to right) Pfc. Sidney Wachtel, Sergeant Harry C. Hartleben, Staff Sergeant Francis M. Seitz and Staff Sergeant George S. Jonas, all of Headquarters Squadron, Air Service Command, Patterson Field, Ohio. The answers, if you need them, are on the opposite page.



A monthly roundup and exchange of hints for mechs — some old, some new — in the interest of better maintenance.

Technical Data from Manufacturers

Have you ever wondered why your letters to Airplane, Engine and Accessory manufacturers requesting books or other technical information often go unanswered? If so, here is the answer.

The manufacturers have all been instructed to forward to the Air Service Command for necessary action all requests from service activities for technical data.

Manufacturers are obligated by contract to supply technical data to the Army Air Forces. In supplying this technical data and revisions as necessary, the contractor fulfills his obligation to the government. It then becomes the responsibility of the Air Service Command to reproduce the material and supply it to the service. Quite frequently the equipment is altered by the Army Air Forces or specific instructions for the operation or repair are changed.

Obviously, then the technical data as supplied by the manufacturer must be reviewed and edited before release to the service. In the case of Technical Orders, these data are published and become a part of the Technical Order file and are listed in the Technical Order Index (T.O. 00-1) which is published monthly and lists all active Technical Orders, Charts, etc.

Technical Orders are distributed to all activities of the Army Air Forces according to the distribution table in T.O. 00-25-3, which also gives specific instructions for requisitioning additional copies. Drawings are distributed in accordance with AAF Regulation 5-17. That regulation also outlines the procedure for requisitioning drawings.

All of your questions regarding maintenance, repair and operation of Army Air Forces equipment can and will be answered if you direct them to the right place.

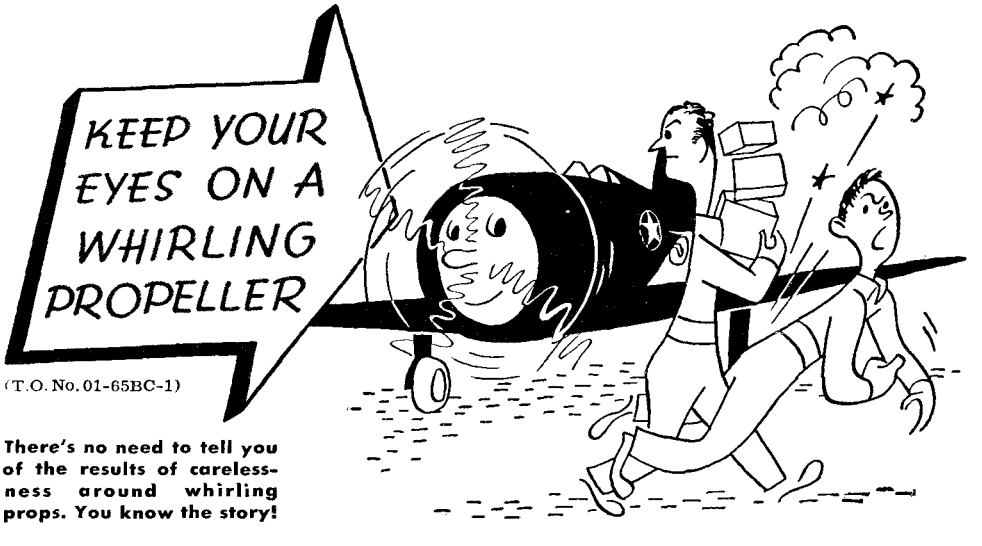
Rubber Conservation . . .

You men ON THE LINE can be a great help in the vital rubber conservation drive! Here's a ten (10) point program that will really save rubber:

1. Prevent oil leakage and spillage on tires.
2. Keep tires properly inflated.
3. Inspect casings for early failure.
4. Keep runways clear of debris.
5. Use proper tools in mounting and dismounting tires.
6. Mount late production tires on fast planes.
7. Discourage improper braking on airplanes.
8. Maintain inspection routing on tires.
9. Protect casings standing in the sun from deterioration.
10. Take precautions on the proper storage of rubber articles such as bullet sealing gasoline cells, life rafts, deicers and bullet sealing hose.

Jack Notes

For your own safety, it's imperative that the capacity of all jacks be marked. Stencil the information right on the main barrel; this will prevent picking up a low capacity jack when a high capacity is needed! You'll find this especially helpful in the case of the one and one-half and five ton jacks which look so much alike. Incidentally, over-loading jacks that do not have safety valves is especially dangerous to personnel and equipment.



(T.O. No. 01-65BC-1)

There's no need to tell you of the results of carelessness around whirling props. You know the story!

Mistakes on Opposite Page

Reading from left to right

1. No, no, no! Never lift an airplane by means of the stabilizer. Use your head—not your shoulders; you'll dent the leading edge and perhaps warp it out of shape. Take it easy there, you on the end; that stabilizer tip is fragile. This type airplane should be raised by means of a lifting bar inserted through the hole provided and marked for that purpose. Reference: Common sense.

2. Look out above! You men are going to crumple that rudder and, at the same time, slice through the de-icer boot or smash the landing light on the C-53 wing right above you. Move your plane forward before you raise it and always be sure it is in the clear. Reference: More common sense.

3. Did you catch this one? Airplanes should never be parked in this position. He calls attention to T.O. 00-15-1 in reference to the radio antenna and to T.O. 08-5-2. It is possible that intentionally or accidentally someone may turn on the radio switch. With the antenna being within twelve inches of another airplane, sparks may jump across, starting a serious fire.

4. Watch your foot, big boy. That oil spot on the floor is an invitation to a broken leg or other personal injury. Grease and oil on hangar floors should be cleaned up immediately.

5. How about those shoes being worn by Pfc. Wachtel and Sergeant Hartleben? Flying boots are for flying—not for hangar or ground work. Refer to AAF Regulation 65-23 dated July 2, 1942, and you'll find the complete details in paragraph nine. In fact, the entire regulation will tell you lots of things you should know about Flying Equipment. Why not read it?

6. Wait a minute; are you kidding? That's definitely the wrong horse to use. It's a wing truss with the top slanted at a sharp angle; the fuselage will not be very steady or safe on that type of stand.

What's your AIR FORCE I.Q.?

We're off, and the questions ahead look tough. Are you on the beam this trip? 100 is perfect—and very unusual; 90 is excellent; 80 is good; 70 is passing; 60 or less—and you're grounded! Answers on Page 40.

1. ***The C-54 is a ..... engine ..... plane with a ..... retractable landing gear***

2. ***The Andreanof Islands are***
   a. In the Mediterranean, off the boot of Italy
   b. Five hundred miles west of Murmansk, Russia
   c. In the Aleutian chain
   d. North of Japan, between Vladivostok and Tokyo

3. ***The 12th Air Force is at present based in***
   a. England
   b. Africa
   c. India
   d. China

4. ***What is the most obvious criticism of this report: "I was flying a C-46 and sighted three Me 109s. I climbed to 25,000 feet and dove at them out of the sun"***

5. ***When saluting a senior in rank, you should bring your hand down***
   a. When six paces past the senior
   b. Immediately, with precision
   c. When you feel like it
   d. When the salute has been returned

6. ***When marching at double time, the command: "QUICK TIME, MARCH" changes the rate of step from 180 to***
   a. 200 steps per minute
   b. 120 steps per minute
   c. 90 steps per minute
   d. 100 steps per minute

7. ***The cargo version of the B-24 is the***
   a. C-56 c. C-78
   b. C-87 d. C-54

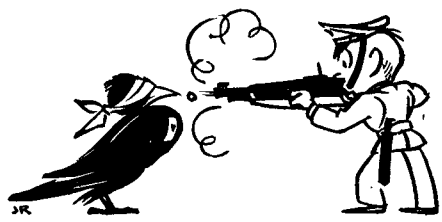
8. ***The R.A.F. Bomber Command is headed by***
   a. Air Marshal Sir Arthur T. Harris
   b. Prime Minister Winston Churchill
   c. Lord Beaverbrook
   d. Air Vice Marshal Sir Arthur Tedder

9. ***At the position of ATTENTION, a soldier's heels are together on the same line and his feet are turned out equally, forming an angle of***
   a. 20 degrees c. 45 degrees
   b. 30 degrees d. 60 degrees

10. ***Torque effect can be defined as***
    a. The reaction from typhoid shots
    b. The effect of strong headwinds
    c. The tendency of a plane to roll in the direction opposite to that of the prop rotation
    d. The tendency of the center of gravity to shift after a wing tank is empty

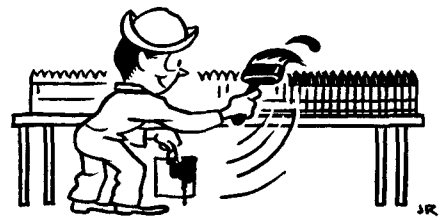
11. ***Which of these planes is best known as the Stuka dive bomber?***
    a. Heinkel 177
    b. Junkers 87
    c. Focke-Wulf 190
    d. Junkers 86

12. ***The tropopause is***
    a. An emergency landing field in the tropics
    b. The tradition of initiating ship passengers crossing the equator for the first time
    c. A rest period prescribed for flyer fatigue
    d. The boundary between the troposphere and the stratosphere



13. ***If you were ordered to shoot "pigeons" you would be going***
    a. On a strafing mission against the Japs
    b. Out to the skeet range
    c. To intercept enemy messenger pigeons
    d. On sub patrol

14. ***In a string of .50-caliber cartridges, the tracer projectile tips are painted***
    a. Green c. Blue
    b. Red d. Yellow

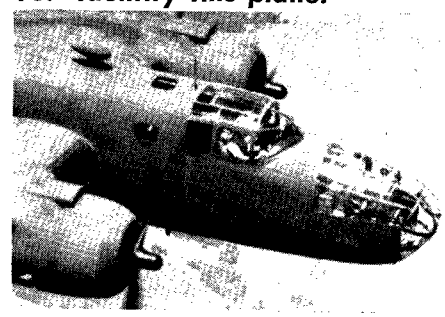


15. ***If you landed in Henderson Field you would be in***
    a. Cairo
    b. Port Moresby
    c. Guadalcanal
    d. Honolulu

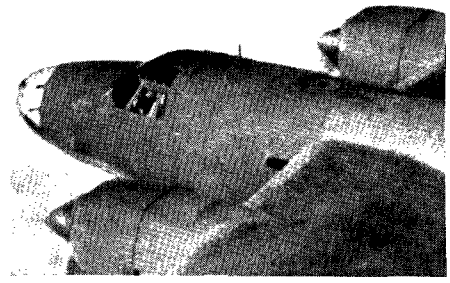
16. ***When a pilot is flying the "iron compass" he is***
    a. Traveling by rail to a new station
    b. Flying on instruments
    c. Diving on tanks
    d. Following a railroad track

17. ***Which of these words is out of place in this group?***
    a. Barograph
    b. Thermograph
    c. Cardiograph
    d. Hygrograph

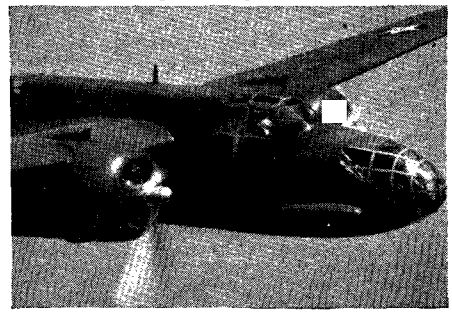
18. ***Identify this plane:***



19. ***Identify this plane:***



20. ***Identify this plane:***



DON'T JUST STAND THERE— Say Something!

A working knowledge of foreign languages is easy to acquire and might some day save your life

So the day finally arrives and you find yourself, not in California, but in Cairo or Canberra or Chungking or Christmas Island. You've got a lot of problems both in tactics and supply. You want to get things done, you want to ask questions. Some of these questions can be answered only by natives. But how do you talk to the natives?

The Educational Branch, Special Service Division, A.S.F., has thought about that. Already they have worked out, in understandable form, a method for soldiers to conquer 25 languages and dialects. In a short time there will be 15 more. These languages range from German and Japanese to Fante (Gold Coast) and Hausa. For the most part, this material is prepared to be inserted in the back of the Soldier's Information Manuals ("Short Guide to North Africa", "Short Guide to Great Britain", "Short Guide to Australia", and so forth).

But aside from this, Special Services have put a good deal of the material on phonograph records, which may be obtained by any group desiring to study a language. They are accompanied by mimeographed sheets of essential assistance in listening to the records. The sheets are divided into three parts: 1. "Hints on Pronunciation." 2. "List of Most Useful Words and Phrases," which is composed of the words given on the records. 3. "Glossary," containing words and phrases not included on the records.

The first section, "Hints on Pronunciation," presents a few simple rules for the pronunciation of vowels, consonants, and accents, and the nearest equivalent English sounds they represent. It furnishes a method of writing any language so that one representation and only one occurs for every significant sound in the language.

The second section, paralleling the material on the records, contains a list of the most useful words and phrases needed by soldiers, to be thoroughly memorized.

The third section of the language material is a glossary of additional words and phrases. These words are not given on the records, but with the aid of the "Hints on Pronunciation" and of the records themselves, it should be easy to master them.

These records and written materials do not attempt to teach the grammatical principles of a language; they do teach the soldier to make simple statements and ask simple questions. With a few hours of conscientious listening to the records, and study of the written material, a man will be able to understand simple greetings and general phrases, to ask directions and to have a slight but practical vocabulary that will stand him in good stead when need arises.

Not only will a man feel less strange if he can understand what is said to him and pass the time of day with people of the country, or if he can ask for a glass of beer, or find out where the latrine is; but understanding even a little of the language of the country may mean actually the difference between life and death.

In any event, even a limited ability to meet the ordinary social situations will greatly increase the cooperation given our troops by the people with whom they are billeted. There is probably no quicker way of proving your good intention to a man than by trying to speak to him in his own language.

The presentation of the records follow a very simple plan:

First, a word or phrase is given in English and is followed by the word spoken by a native using his own language. After a pause in which the soldier has opportunity to repeat the word aloud, the foreign word is repeated, as is the pause provided for the soldier to repeat again. This gives an opportunity for the soldier to hear the words and phrases twice and to repeat them twice.

Vowels and consonants are given on the records with their approximate English equivalents so that the listener can imitate the sound he hears.

The introductory vocabularies are practically the same in all languages and dialects.

As a concrete example of the way in which these languages are taught, some of the "most useful words and phrases" taken from the material on Melanesian Pidgin English accompany this article.

Melanesian Pidgin is spoken in much the same way in New Guinea and through the islands south and east of New Guinea, all the way to New Caledonia. It is not to be confused with the other Pidgin—Chinese—which is quite a different language. NOTE: In general, your pronunciation of words which are the same in English and Pidgin will be understood by the natives. However, you will notice that their pronunciation might sound very strange to you. But it will not be too difficult to get on to. Pidgin has a peculiar whining sort of intonation. This is quite easy to imitate and very important. ☆

When you mean . . .	Say . . .
I am an American soldier, I am your friend	Me man belong 'Merica me perehn belong you
Food	Kai-kai
Bring some food	Bring-im kai-kai ee come
Bring some drinking water	Kiss-im water belong drink ee come
I am hungry	Me hungry
I am sick	Me got sick (and point to the affected part)
Where can I sleep?	Me can sleep long wuh-name place?
Where is the village?	Where stop place belong ka-na-ka
Yes	Ee got; or na-wuh-name or yes
No	No-got; or no
Understand	You savvy
I don't understand	Me long long
Where is	Where stop; or ee stop where
You come and show me the road	You come line-im me along road
I want some firewood	Kiss-im some pella pire-wood, ee come
Bring it	Kiss-im, ee come
Mosquito net	Taw-nam (particularly in Rabaul area)
Village interpreter	Tul-Tul ("u" as in "put")
Come quickly	You come hurry-up
Come here	You come
Go quickly	Run you go
Where are you going?	You go where?
Milk	Soo-soo
Eggs	Kee-au
Native tobacco	Brus ("u" as in "put")
Yesterday	Assaday
Today	Now
Tomorrow	Tomorrow
Day after tomorrow	Hap tomorrow
Day before yesterday	Assaday bepore

Sgt. L. C. Rambo

CONGRESSIONAL MEDAL OF HONOR

LIEUTENANT COLONEL: Pierpont M. Hamilton.

DISTINGUISHED SERVICE CROSS

MAJORS: William G. Benn, Algene E. Key, Allan J. Sewart, Jr.* **CORPORAL:** Ivan W. Henderson.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERALS: Lewis Brereton, James E. Chaney. **BRIGADIER GENERAL:** Laverne G. Saunders (Also Silver Star). **COLONELS:** Everett S. Davis, Uzal G. Ent, Paul B. Wurtsmith.

SILVER STAR

MAJOR: David L. Hill. **CAPTAINS:** Rob Roy Carruthers (Also Distinguished Flying Cross with Oak Leaf Cluster), Graham Gammon, Paul H. Payne (Also Oak Leaf Cluster to Silver Star), Jay P. Thomas, Manford K. Wagnon (Also Oak Leaf Cluster to Silver Star), Carl E. Wuertele. **LIEUTENANTS:** George W. Chandler, John J. Heard, Jr., John G. Hemans, John F. Hopkins (Also Oak Leaf Cluster to Silver Star), Charles E. Norton, Albert J. Progar, William H. Roe (Also Distinguished Flying Cross and Air Medal), Wayne W. Thompson, Homer W. Vail, Frank T. Waskowitz, Clarence M. Wilmarth. **WARRANT OFFICER:** Anthony A. Albino. **TECHNICAL SERGEANT:** Charles M. Noble. **STAFF SERGEANTS:** James E. Briggs, Daniel L. Cross, James F. Gates (Also Air Medal), Eino S. Hamalainen (Also Air Medal). **SERGEANTS:** William L. Hammack, Richard C. Inman. **CORPORALS:** Roger W. Ferguson, Robert A. Fries, Joseph D. Lillis, Walter E. Stephanik (Also Purple Heart and Air Medal), Joseph H. Wood. **PRIVATES FIRST CLASS:** Henry Majeski, Leroy Payne.

OAK LEAF CLUSTER TO SILVER STAR

MASTER SERGEANT: Meyer Levin. **SERGEANT:** Kenneth A. Gradle (Second Oak Leaf Cluster to Silver Star). **CORPORAL:** James C. Underwood.

PURPLE HEART

MAJOR: William C. Addleman. **LIEUTENANTS:** William B. Adams, Jr., Robert L. Ager, Willis W. Burney*, Wesley E. Dickinson, Forrest D. Hartin, Elton C. Hefley, Gilbert S. Portmore (Also Air Medal). **WARRANT OFFICER:** Philip K. Head. **STAFF SERGEANTS:** Franklin E. Abbott (Also Air Medal), Lucas L. Achay, John J. Hudjera. **SERGEANT:** T. E. Roberts. **CORPORALS:** William E. Irons, Russell D. Johnson (Also Oak Leaf Cluster to Purple Heart), T. C. Luczyk. **PRIVATES:** Theodore A. Alleckson, Floyd A. Northam, T. W. Ryan, H. J. Tiffany, R. P. Vidoloff, Charles W. Wells, Hugo I. Wiener.

DISTINGUISHED FLYING CROSS

BRIGADIER GENERAL: Frank A. Armstrong (Also Oak Leaf Cluster to Distinguished Flying Cross). **COLONELS:** Hugo P. Rush, James H. Wallace (Also two Oak Leaf Clusters to Distinguished Flying Cross. **LIEUTENANT COLONEL:** John S. Chennault. **MAJORS:** Paul L. Fishburne, George E. Glober, George W. Prentice (Also Air Medal), John A. Rouse. **CAPTAINS:** John H. Buie, Walter E. Chambers, E. A. Doss, Donald J. Green, Thomas R. Jemison, Thomas J. Lynch, Bertram C. Martin*, Albert W. Schinz (Also Air Medal), Fred E. Thompson (Also Air Medal), George B. Uhrich (Also Air Medal), Furlo S. Wagner (Also Air Medal). **LIEUTENANTS:** John D. Bailey, Joseph B. Boyle, Albert H. Burr, John A. Castle, Jack Cohen (Also Air Medal), Francis E. Dubisher, Melville V. Ehlers, Henry A. Fischer, Jr., Kent M. Fitzsimmons, Russell S. Gustke (Also Air Medal with three Oak Leaf Clusters), Frederick C. Harries (Also Air Medal), Harold Henderson, Robert M. Hernan, William G. Ivey, James T. Jarman, Paul K. Jones, David E. Latane,

Capt. W. T. Cherry

Sgt. R. G. Ryan

Major J. A. Rouse

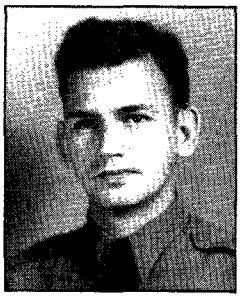
* Posthumous.

ROLL OF HONOR

Clarence Wilmarth

Lt. J. T. Jarman

Capt. J. P. Thomas



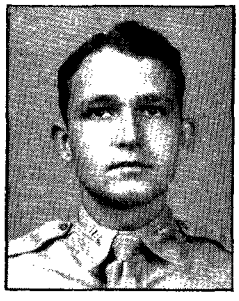
t. B. B. Southworth

Lt. J. J. Heard

Major H. J. Holt

.Gen. F. Armstrong

Lt. R. S. Gustke



Lt. Howard M. Crow

t. A. M. Bloshko

Lt. Col. J. S. Chennault

Capt. J. H. Moore

Jack C. McIntyre, George Oxrider, Charles W Peterson, William R. Ross, Francis E. Widman, Marion J. Wood, Marshall A. Younkman, John Zarlengo (Also Air Medal). **TECHNICAL SERGEANT:** Chester F. Thew (Also Air Medal). **STAFF SERGEANT:** Raymond P. Legault (Also Air Medal). **SERGEANTS:** Alexander Bloshko, Lewis Coburn, Donald L. Kerns, Glenn D. Norton (Also Air Medal), Charles H. Spencer, Gordon Thorpe.

SOLDIER'S MEDAL

MAJORS: Frederick E. Crockett, Curtis W. Handley. **CAPTAIN:** Clarence H. Bomberger. **MASTER SERGEANT** Warren J. Morris. **FIRST SERGEANT** Guy G. Cope. **STAFF SERGEANTS:** Robert L. Beale, Louis C. Conner, Irvin M. Patterson. **SERGEANTS:** Harlos G. Ackerman, Hendrik Dolleman, Niels C. Jensen, Stockton W. Teague, Oran E. Toole. **CORPORALS:** Roy J. T. Harris, Donald Kent, Cecil V. Luke, Walter K. Riddle. **PRIVATES FIRST CLASS:** Ormund H. Munger, Jr., Joseph C. V. Pelletier, Salvatore Pillera, Joseph Profeta. **PRIVATES:** Benjamin W. Bay, Floyd A. Nelson, Frank M. Szunyogh, Godfrey E. Walker.

OAK LEAF CLUSTER TO SOLDIER'S MEDAL

LIEUTENANT COLONEL Bernt Balchen.

AIR MEDAL

GENERAL Henry H. Arnold. **COLONEL** Donald N. Yates. **LIEUTENANT COLONELS:** Milton W. Arnold, Henry V. Bastin, Jr., Robert L. Morrissey. **MAJORS:** Paul D. Brown, Harry J. Holt, David M. Jones, William P. Martin, Edward P. Myers*, Wiliam M. Redington, Charles B. Westover. **CAPTAINS:** Richard H. Beck, Donald Blakeslee, William T. Cherry, Jr., Thomas R. Cramer, Gerald J. Crosson, Charles W. Dean, Selden R. Edner, Donald L. Gilbert, Joseph R. Holzapple, Willis E. Jacobs (Also Oak Leaf Cluster to Silver Star), William E. Kinney, John W. Livingston, Edwin A. Loberg, Robert V. McHale, Ray Melikian, John C. Nissen, Richard C. Ragle, John M. Regan, Edward W. Robinson, John L. Ryan, Billy B. Southworth, Jr., Richard D. Stepp, Henry W. Terry, Thomas J. Watson, Jr., Fred E. Wright. **LIEUTENANTS:** Robert G. Abb, Raymond L. Adair, John C. Adams, Frederick T. Albanese, Carl L. Aubrey, Edward J. Bechtold, Clinton W. Benjamin, John G. Benner, Grover C. Bentinck*, Vernon A. Boehle, Rozert A. Booch, Guy C. Brantley, Sheldon S. Brinson, Richard C. Brown, Samuel M. Brunson, LeGrand W. Burt, John J. Charters, James A. Clark, Jr., Charles W. Cranmer, Howard M. Crow, Dean E. Delafield, Joseph Dockweiler, Joe E. Dodson, Scott S. Douglas, Robert U. Duggan, Robert D. Eames, William W. Elliott, Leo M. Eminger, Isaac L. Epperley, Jr., William F. Erwin, Roy W. Evans, George E. Ewald, Maurice Stephen Feltz, Gene B. Fetron (Also Oak Leaf Cluster to Air Medal),

(Continued on Page 38)

"IN CASE OF ACCIDENT"

(Continued from Page 19)

standing up against a 60-foot spruce tree. It didn't look much like a plane even if they could see it. They didn't either, till the eighteenth day, and by that time we had almost given up hope. We had taken off—I mean crawled off like hurt dogs—when they found the ship. But I'll come to that later.

Mostly we stayed in the wreck under heavy covers, the first six days. I hadn't been able to find the flare pistols but did locate some warning signals like railroad fuses. When a plane was coming over, I'd light one of these and hold it out the window. But the light wouldn't even shine above the trees. We found the same trouble later when we built fires outside—the smoke wouldn't go above the forest.

During the second week we'd build a fire whenever it was clear. Dry wood was hard to find near the crash and we'd burn crates from the plane. After a time we began to wonder whether they would find us. What did I think about? Mom and Dad back in Wisconsin—they were born in Poland, you know; my girl, Eleanor, whom I met in Hollywood during basic training; my kid brother, who's in basic training now. Then I'd wake up thinking about hamburgers, and malted milks after basketball games. Or Mom's doughnuts after my cousin, Kuba, and I would return from hiking. We'd go every Sunday when I was off work at the paper mill.

A funny thing happened once. At the mill I guess I handled tons of what we called blue batting. When Alexander's fingers froze I got out the first aid kit and unwrapped the gauze. I noticed the paper wrapping was made by the mill where I had worked.

Well, on the eleventh day we thought we'd better try to crawl to the airfield. Alexander, though, was afraid he couldn't keep up. He's older, you know, and he wanted me to go ahead alone. I didn't want to go off and leave him, but on the thirteenth day I started out, sort of on my hands and knees. I strapped my bad leg to the little toboggan-sled, which the planes carry, and put a ski on my right foot. I'd lift the sled forward with my left foot, then slide ahead on my right foot. Three times I fell down and it would take fifteen or twenty minutes to get up again. My broken leg would get tangled. About a quarter of a mile out I heard a plane testing its magnetos. The sound came from straight ahead so I thought I was on the right track. But when the plane took off it showed up to the rear, and I knew I'd been thrown off by echo. I'd been out three hours in the wrong direction. It was uphill all the way but I made it to the plane just after dark.

It was warm that day—maybe as high as 50 above. My clothes were wringing wet and Alexander made me undress. Next day, he said he'd try it with me. It was one p. m. before we got off. I took the sled, which we loaded with rations. We took four packages of dried noodle soup, seven squares of bouillon cubes and a three-inch length of summer sausage. We also took matches, a hunting knife, the .38 Colt, and extra parka for me and a leather flight jacket for Alexander.

I went ahead. I took the lead rope of the sled and tied it to my wrist. Then I fixed a strap to the rear of the sled and tied it to the same wrist. This way I could push the sled ahead with my arm as I crawled forward and yet keep the sled from getting away. I'd dig my elbows into the snow and pull forward. It worked.

Alexander used snow shoes on his hands. First day he put his arms through the foot fastenings up to his elbows, then rested his knees on the "heel" of the shoe. This was a mistake because he skinned his knees very badly. Next day he just grabbed hold of the bindings and used the shoes on his hands to pull himself forward.

We crawled this way for four days. The Canadian Mountie and U. S. Army lieutenant who found us the morning of the fifth day said we had made four miles. We knew we were close, for the night before we'd seen a plane overhead with his landing lights turned on.

That fifth morning of the crawl we had gone 100 feet. There was a shout: "Hello there." The Mountie came through the brush and I said: "Gee, am I ever glad to see you!"

That's about all. Mac, the Mountie (Constable N. S. MacWhirter and Lieutenant Felix Davis had run across the trail I made on my false start. They traced it to the plane, then picked up our new trail which was four days old. The Mountie went off for more help and Lieutenant Davis stayed with us. Soon a plane flew over and dropped a mailbag full of rations. We fought to stuff food into our mouths. Then the rescue party came—fourteen of them—with a toboggan and sled. They pulled us to the edge of a nearby lake, where a ski-plane waited. It flew us to the field and we were put in the base hospital. Next evening we left for a hospital in Edmonton. And, boy, did they treat us good!

The newspapers always tell about the notes you leave when things look black. Well, I left one, too. It said:

"In case of accident please send baggage to Mr. Stanley Wilczynski, Nekossa, Wis. Also have baggage at Curtis Hotel, Minneapolis."

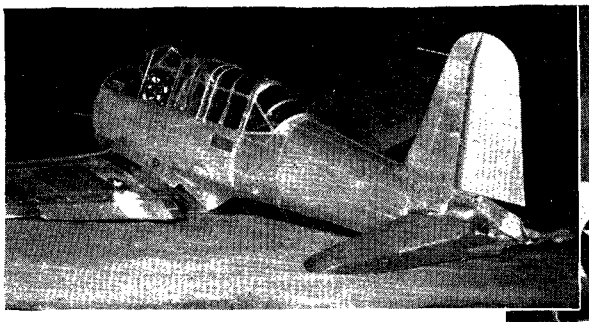
You know, I forgot to tell them where to send me! ☆

NOTES FROM ANTILLES

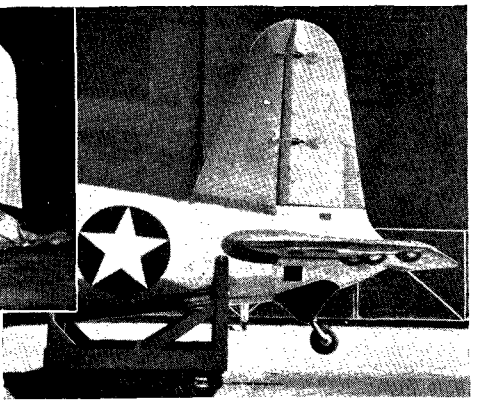
(Continued from Page 23)

If a red pennant with white fringe flies from this pole, it indicates that the family has a virgin daughter of marriageable age; the white signifying her chastity. A large red pennant without fringe but with a smaller white-trimmed red flag under it means that a girl in the house has borne a daughter out of wedlock. A large white pennant announces a boy in the family. A small white one under a large red one tells that a girl has borne a boy-child out of wedlock. An orange flag means that papa will trade a daughter or two for a son. A purplish pennant has been called "practically an SOS signal"—a notice that the old man will sell some of his daughters for cash.

THINGS YOU REMEMBER. The slow but reliable, hard-working, weatherbeaten B-18s used through the islands, particularly one called "Ye Ancient Ox Cartte" . . . The numerous hangars and engineering buildings made of palm fronds, native fibers, sheet tin, and anything else that comes to hand . . . A sign in an Air Transport Command base bar, announcing that it's the "Tuna Puna Tavern, Ltd. Main Office, Brooklyn, N. Y." Sandwiches in this tavern are offered as follows: "Hamboigers—15c; Ham—20c; Chizz—15c" . . . Young flyers, in bland disregard or ignorance of regulations, heading back to the States with monkeys, parrots, and koala bears from Down Under . . . The picturesque but unserviceable paper money—gook money—used in many of the British West Indies . . . G.I. truck drivers airily driving on the left in those same B.W.I.s as though they'd been born to it . . . A tennis court on one island made of bauxite, which is 50% aluminum. So plentiful is bauxite ore that natives use it as gravel to build roads . . . The varieties of rum drinks — rum-and-coke, rum-and-soda, daiquiris, frozen daiquiris, rum-swizzles, planters punches, and just plain rum—that are the vogue in the Caribbean . . . The familiar story that one island, plagued with snakes, imported mongeese to kill the snakes. Now there are no snakes but the people don't know how to get rid of the multiplying mongeese . . . A sight from an airplane in a sunny tropical rain—the shadow of the plane on a cloud below, encircled by a rainbow. Sometimes called the Pilot's Cross and supposed to be lucky . . . Businesslike transport planes on their way to Africa, loaded to capacity and then some . . . The many men who have been in the Antilles for two years or so, and who have missed a good many boats, eager to know how things are back home . . . And, above all, the morale of these same men. Doing a hard, vital yet unsung job, and doing it cheerfully. You hear as much spontaneous singing in the Antilles as anywhere in the Army Air Forces. ☆



Usable sections of a wreck . . .



. . . become prefabricated parts.

Pre-Fabrication Speeds Repair

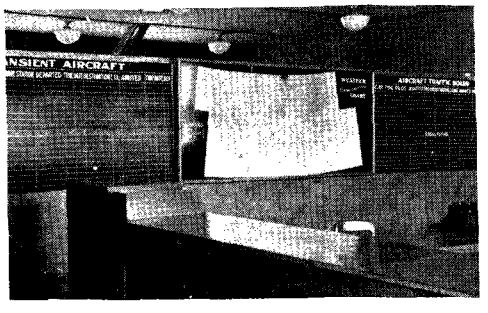
At Perrin Field, Texas, Major Douglas Soper and his civilian mechanics of the 98th Sub-Depot have developed what they believe to be a new method of quickening repair work on damaged aircraft. Briefly, this is an adaptation of the familiar production line technique--prefabrication.

Sub-assemblies are put together from airplane parts salvaged from previous crashes and repaired. These assemblies, completely rebuilt, are set up on cradles and held in readiness for further needs.

This method is said to be so successful that a Vultee basic trainer--the type of plane serviced by the Sub-Depot--was returned to the flying line only 28 hours after suffering major damage in a forced landing.

As shown in the photo above, taken just after the crash, only the fuselage was usable. Major Soper's crew hauled out their prefabricated assemblies, put the rebuilt plane together, gave it an hour's slow time on the engine, test-hopped it and returned it to service.

To the obvious objection that prefabrication ties up parts, Major Soper replies that when individual parts are needed they can be removed from the assemblies. Then, when damaged parts are repaired, they replace those taken from the assemblies.--**Perrin Field, Texas.**



Large Scale Weather Chart

A chart (above) showing contact, instrument or closed weather conditions at principal airports in a large area—thought to be the first of its kind in the Air Forces—has recently been installed in the Dispatcher's Section of the Post Operations Office at Merced Army Flying School, California, by Lt. Col. P. O. Brewer, Operations Officer.

The value of this "Weather Flying Condition Chart" to the pilot contemplating a cross country flight is apparent. He can determine conditions in advance for his entire trip and choose the proper route, according to the safety of conditions in certain localities.

The chart is made of black sheet iron. Four regional maps are pasted on it, and plastic letters are used to designate conditions— "X" for closed, painted red; "C" for contact, painted blue; "N" for instrument, painted black. On the under side of each letter is a small magnet which makes it stick to the chart. Changes in the hourly weather sequences, if any, are indicated on the chart as they are received from the Weather Officer. On this page is a photo of the chart as it appears in the Operations Office. --**Merced Army Flying School, California.**

Hollow-Steel Props

Erosion of propeller blades from dust, sand, mud, gravel and water thrown into the propeller disc by the nosewheel of airplanes has been practically eliminated through development of the hollow-steel propeller blade.

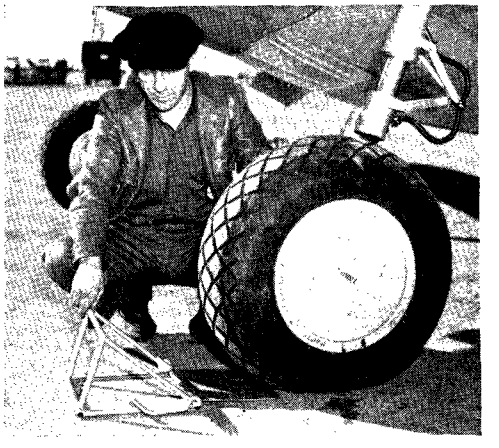
In addition to superior erosion resistance, the hollow-steel blade is lighter than large-diameter wood propellers and permits use of small compact hubs; its tortional rigidity is greater than any other type. Damaged blades can be repaired readily with a comparatively small amount of equipment. Service life of these blades is believed to be unlimited.

The United States, it is believed, is the only nation having hollow-steel propeller blades in production.

Four large factories have been in quantity production for some time on three different types of hollow-steel blades—all developed by Army Air Forces funds. A fifth factory is ready for production of a new type of flash-welded construction, invented and developed under the supervision of Materiel Center, Propeller Laboratory engineers. **Wright Field, Ohio.**

98th Invention

Earl C. Gregg, 44-year-old senior machinist in the sub-depot of the Enid Army Flying School, Oklahoma, has to his credit 98 time- and labor-saving devices—last of which is a new type airplane wheel chock which operates mechanically. Made of bar steel, it has a steel apron which becomes an anchor to prevent the aircraft's wheel from sliding either to the front or to the back while the engine is being warmed. This chock will soon replace the old wooden block at Enid.



Automatic wheel chock.

Gregg (above), whose walking has been impaired since he was six years old, was formerly operator of a machine shop in Enid. Three of the inventions he has submitted to the government are reported to be now in the experimental stage. One is a new type bomb, another is a motorless torpedo, and the third is a magnetic ship lock. --**Enid Army Flying School, Oklahoma.**

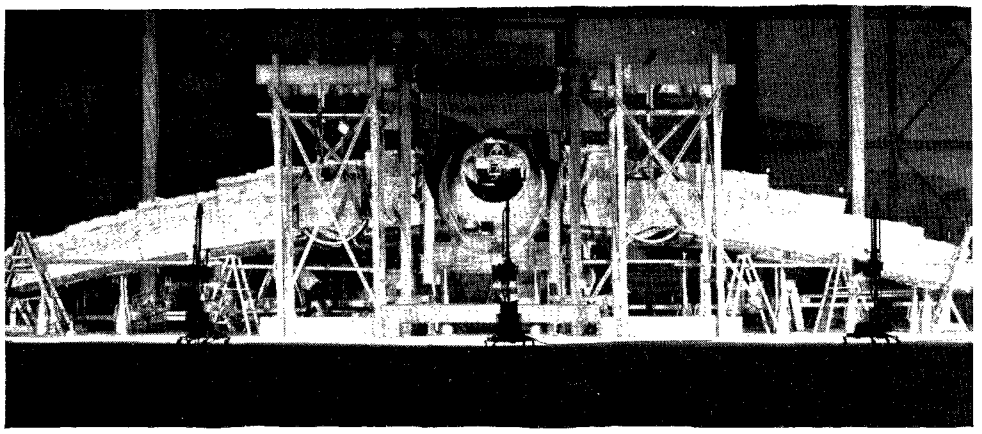
New Rescue Aid

A new rescue aid of the Army Air Forces now being packed in all life raft emergency kits, is a yellow-green fluorescein dye that can be seen for many miles when spread on the water.

Packed in metal cans and paper envelopes, the dye can rapidly be scattered on the surface to attract the attention of friendly aircraft.

This dye also is used in Mae West (B-4) Life Vests. It is enclosed in a small packet that is cemented between the inflatable envelopes of the vest. Upon contact with the water the packet and dye dissolve, coloring the water for a large area around the survivor.—**Wright Field, Ohio.**

TECHNIQUE



Static Test on B-26c

More than sixty tons were stacked on the wings of this B-26c bomber (above) while undergoing tests in the Static Test Building of the Aircraft Laboratory, Engineering Division, Wright Field.

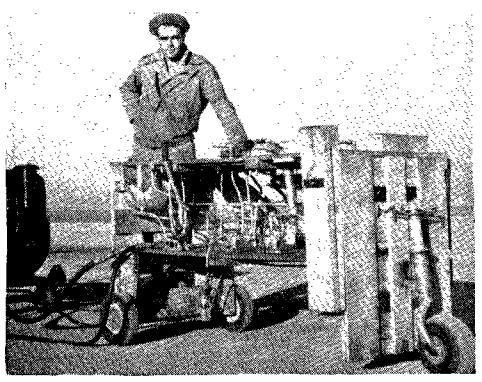
When the picture was taken, the wing load was 25 per cent more than the maximum load for which the wing was designed. Maximum load under Materiel Center specifications includes a suitable margin of safety to protect plane and pilot in maneuvering and in unusual emergency conditions.

The test was conducted from a positive low angle of attack condition to determine maximum overload possible on this type of plane. The test was one followed to destruction and is typical of tests conducted by the Aircraft Laboratory on plane components.—**Wright Field, Ohio.**

Mobile Test Bench

Men of the 28th Air Depot Group at Stinson Field, Texas, have developed a mechanical monstrosity known as the "Hydraulic Jeep" (below), which is proving useful as a trouble shooter.

Whipped together from spare parts lying about the hangars, this contraption is a mobile test bench which can be moved right out onto the flying field and hooked up to the hydraulic system of any airplane. It will locate the trouble instantly, thus obviating the necessity of taxiing the plane to a hangar.



The front wheel of this gadget is really an old tail wheel from a discarded airplane. It is not only connected with the steering gear but is retractable, permitting the bench to lower itself to the ground for stability. The "rear wheel construction" is made of a fabric material coarse enough to provide excellent traction on any field's surface.

The enlisted men who designed and built this device are Privates August Canney, Paul Kahn, William D. Cooney, Sam Durfee, Herbert Doershuk, Bernard Lawrence, and Bob Hirschback. All are under the command of Captain Fred A. Deyo, Engineering Officer, who has previously contributed to Army Air Forces inventions by perfecting a bomb-loading device now in general use.—**Stinson Field, Texas.**

Heated Surface De-Icing

Although not new in principle, heated surface de-icing systems have been satisfactorily installed on most types of Army Air Forces planes. Advantages of the new de-icing system are simplicity of control, as compared with the rubber boot de-icer commonly used, and the conservation of large amounts of critical rubber.

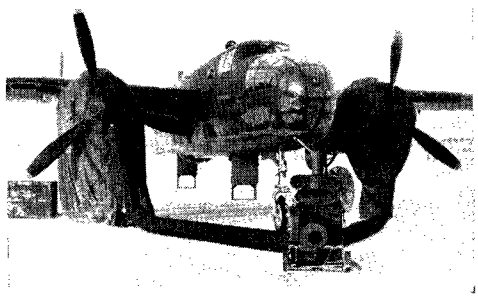
The heated surface system conducts exhaust gas through an air exchanger. Cold air, which is picked up by a ram usually located behind and within the radius of the airplane propeller, is passed across or through the heated air exchanger. It is then carried in ducts along the leading edges of the wings and empennages. The air, after losing its heat, drifts toward the trailing edge of the air foil where it is exhausted.

The system can be operated continuously during flights in which the formation of ice is considered possible, thereby relieving pilots of the necessity of looking carefully for ice formation on airfoil surfaces, as they must do with rubber boot-type de-icers.—**Wright Field, Ohio.**

Preheating Saves Time and Engines in Arctic

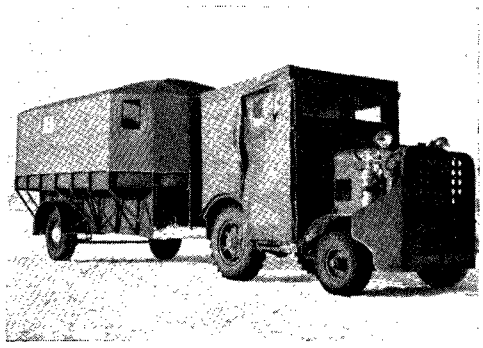
Army Air Forces fighting ships based at Alaskan airfields are now being preheated by gasoline-fed heaters. Motor-driven fans blow hot air through pipes to the vitals of the engines, and the heat is confined to the points at which it is needed. Engines are brought to the proper flying temperature in from 15 minutes to an hour, depending on the degree of the outside cold. In temperatures frequently far below freezing, this method saves time as well as wear and tear on parts. In extreme cold, engines can not be turned over until properly "cooked."

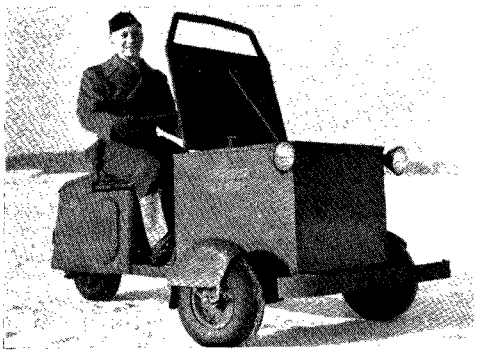
Below is a B-25 North American Mitchell bomber being prepared for service, its engines swathed in padded canvas hoods.



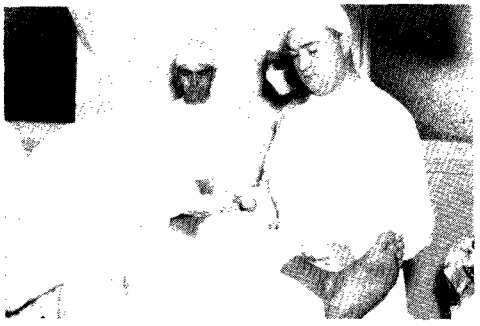
New Model "Cars" at Dow Field

. . . Eighteen mechanics, complete with working equipment, can be transported to jobs around Dow Field, Maine, on the time-saving vehicle (below) designed by men of the 332nd Sub-depot. A canvas covered trailer is towed by a conventional Clark tug. Over-all length of the trailer is approximately 24 feet. The canvas is supported by horseshoe-shaped ribs, both of which can be removed in summer so that a larger load can be accommodated.





2 . . . Lt. George Van Laethem (above), of the 332nd Sub-depot, Dow Field, rides a scooter rigged with a "windbreaker" to take the edge off Maine's winter winds. The windbreaker, used on auto-gliders or scooters, is of simple construction, incorporating a framework of half-inch round stock in two rigid sections, the lower half being covered with canvas, the upper half having a light grade of plexiglas sewn into a canvas border for proper driving vision.



Capt. F. M. Lyle operates before the camera.

Surgery Movies for Instruction

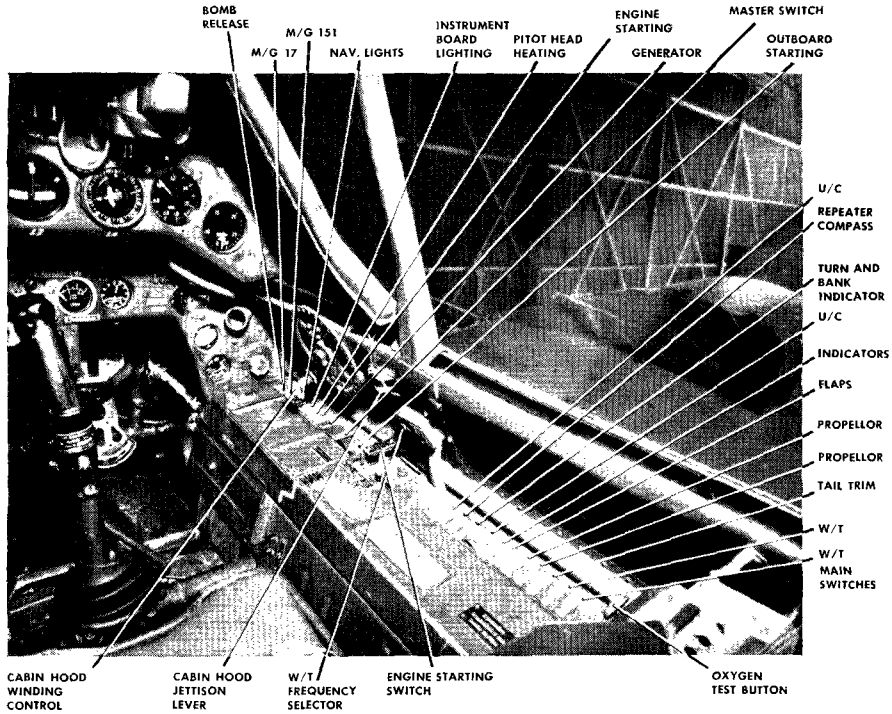
Captain Francis M. Lyle, of the Base Hospital at Wendover Field, Utah, has instituted a policy of filming important surgical operations performed at the hospital. Education and training of enlisted men students will be greatly facilitated through use of these films, for they show pictorially details which otherwise might require hours of oral description.

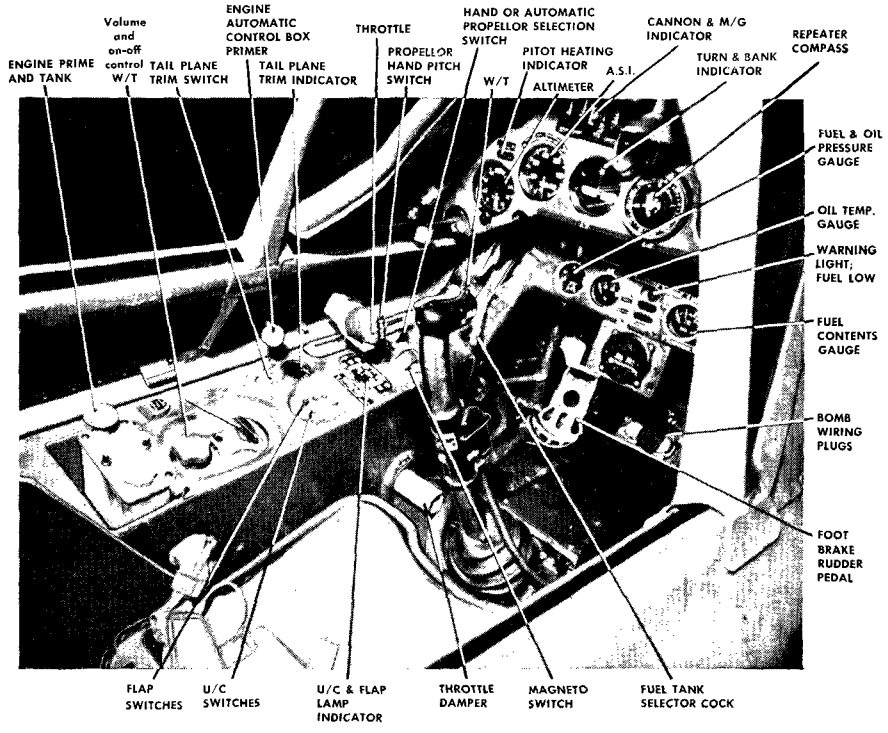
First operation to be filmed at Wendover (above) was an operation on Corporal William Woznak of the Repair Squadron. While carrying an anvil, Corporal Woznak suffered a torn cruciate ligament and a mesial semi-lunar cartilage. A 45-minute operation was photographed from beginning to sewing of the last stitch by Corporal Norman M. Germond.

While first films have been black-and white, Captain Lyle intends to try color film shortly. This, he says, "should add immeasurably to the clarity of the record."—**Wendover Field, Utah.**

Closeup of the Focke-Wulf 190 Cockpit

The capture of enemy aircraft in salvageable—sometimes flyable—condition has proved an invaluable aid to our engineers in determining designs and adjustments in our own aircraft which will make them superior to those of our adversaries. The photos below show the cockpit of the FW-190, with the various instruments labeled in English. Pilots of this German fighter have fewer instruments to work with than pilots of the average American fighter plane.





Look Proud Mister—

You're at O.C.S.!

By Lieut. William L. Richman

HARLINGEN GUNNERY SCHOOL, TEXAS

WHERE is the Coral Sea? . . . What's the difference between a Springfield and an M-1? . . . What makes you think you'll make a good officer? . . . How high is up?

It didn't make a bit of difference to the Board of Officers seated around a large table who you were, where you came from or what you did in private life, or how much money you had.

I was lucky. I knew the right answers—at least some of them. I decided before I walked into that room that I wasn't going to try to outsmart them. I made up my mind, scared as I was, that if I didn't know the answers I'd say so. Hell, I hadn't cracked a newspaper or listened to the radio once during the ninety days of basic it took me to learn how to tear apart the bolt of a Springfield rifle; how to adjust and remove a gas mask in 20 seconds; the I.D.R. and its various complications; a complete course in K.P.; "How to G.I. a latrine", and a million other things a soldier needs to know.

There wasn't an easy moment learning how to be a soldier. And strange as it may seem I enjoyed every minute of it. My delicate stomach disappeared. I no longer had any need for or used the saline preparations my wife tossed into my bag when I walked off to join the Army of the United States.

I left our little farm house, sixty miles north of New York City, early the morning of June 2nd, 1942, after kissing my wife and 11-months old baby goodbye. This war wasn't going to be a glamourous adventure for me—wings and all. I knew it meant hard work. And after sitting in a law office for more than fifteen years, I was frightened at the prospects of hard work. But I had to go and my wife knew how I felt.

Who is the Commander of the British Army in Africa? . . . Where are the Solomon Islands? . . . How come you left a wife and baby to join the Air Corps? . . . How long have you practiced law? . . . So you were in the Connecticut National Guard? . . . How many hours can a soldier fight aggressively with a gas mask on?

When I boarded that train to the accompaniment of the Post Band, I was with a bunch of kids 15 years my junior. We had taken the oath of allegiance and been put through the induction wringer in New York. Now we were on our way, and we didn't know where we were going. My heart pounded and my knees shook. I thought I was thrilled. Maybe I was scared.

WHEN would I see my family again—if ever? Who's responsible for these goddamned wars? Isn't it possible that after this thing is over we'll be able to move into the driver's seat—and hold the reins?

Thirty-three hours later we stretched tired legs on the platform at Miami, Florida. The town looked good again. I was glad to get back. It would be nice, I thought, to renew old friendships made on previous pleasure trips. Maybe I'd play a little pinochle. If you can't play pinochle, don't get assigned to Miami.

It was beastly hot. I sweated like a pig. They gave me salt tablets. They marched me to the golf course that I knew so well. I didn't play golf. I marched in squares—and wound up in circles. Five long hot hours each day. We stood in lines two blocks long for a gulp of warm water during the ten-minute breaks each hour. I developed the most beautiful set of blisters ever seen in the United States Army. And when it rained! Well, we just plowed through water up to our knees, soaking wet, steaming hot.

ILLUSTRATED BY
LIEUT. WILLIAM B. LENT,
O.C.S., Miami Beach, Class 43-B

I pulled K.P. on my birthday. The boys gave me a little party just before the dinner rush, presenting me with an officer's belt and a carton of cigarettes. After that they sent me to the kitchen and I washed and rinsed food trays until eight that night. We marched back singing—my voice the loudest in the formation. I washed windows—millions of them. I "G.I'd" the beautiful hotel floors until the skin wore off my hands. I lost that excess fat quickly. They waste no time at Miami Beach. For the first time in seventeen years I felt as I had when a buck private in the Connecticut 102nd Regiment, Inf.

The Army succeeded where private masseurs had failed. I was slowly getting conditioned without knowing it. I was eating twice as much food as I had at home, and enjoying it. It was good to regain the feel of a gun again and I knew deep down in my heart that I was once again a soldier. I shed twenty pounds; my waistline slid from 37 to 30 inches. My corns disappeared and my G.I. shoes embraced my feet with loving care. I learned how to be a soldier at Miami Beach. My next job was to learn how to be an officer.

The Board accepted my frank statement when I said that I would become a good officer. I convinced them I was honest when I declared that I was satisfied that I had become a good soldier.

On September 18th, 1942, they made me a corporal. On the same day we marched from our headquarters up to O.C.S. Ten short blocks. God, we were happy and proud! We were accepted by the board—and that was really something. We had heard weird and fantastic tales about O.C.S. Miami Beach. But we were good soldiers—tested and found qualified.

"Processing" they call it. But we sweated it out. And what an experience!

"Sound off, Mister!"

"Let's see your shoulder blades touch!"

"Throw your chest out!"

"Suck your gut in!"

A graduate of Air Forces school at Miami Beach looks back over his "pop-to" days.

"Reach for the ground!"

"How old are you?"

"37? Good, let's see 37 wrinkles in your chin!"

You draw your chin back until you see black spots before your eyes and you gasp for air. To another chap: "So you were a first sergeant, eh? Well, listen, Mister, stripes don't mean a thing around here. Get them off!"

"From now on you're Officer Candidate Jones!"

"Look proud!"

"Don't you like it here, Mister?"

Indignation raged in my breast. I wondered if all this was worth it. I was about to say the hell with it when a brand new second looie, finding out I'd enlisted, leaving a wife and kid back home, whispered in my ear: "You're a good man, soldier, you have more of a right being here than I had".

That remark cheered me up. I really "popped to". It didn't matter that my chest was on fire and my back was breaking. I began to realize that there was a purpose behind all this "nonsense". They wanted to see whether or not "you could take it". They didn't propose wasting their time or the government's money training officers who might, at some later date, quit when the going got tough.

I got a big kick when Officer Candidate Clark Gable, Class 42-E, "braced" me. Make no mistake about that man. He may have been the great lover on the screen. At O.C.S. Miami Beach, he was every inch a soldier.

Mess Management (with the gnawing fear that you might wind up a mess officer); Supply; Administration; Military Law; Identification of Aircraft; Structure, Terminology and Theory of Flight and three dozen other subjects were thrown at you until you were dizzy. "Fizz-ed" with its obstacle course which left your muscles aching and your lungs pounding against your ribs; burpees; side-straddle hope; arm, shoulder and leg exercises. They really gave you a work-out, make no mistake about that.

Time passes unbelievably fast. Before you know it your fourth-week marks are posted and you find out for the first time where you stand. You either ease up a bit or tighten up. You can't and don't relax. The day just isn't long enough. Ten minutes to fall out for reveille at five in the morning—and they don't mean eleven minutes. More than likely Colonel McNair or Colonel Nelson or Major Lewis or our "house-mother", Lieutenant Jack Sullivan, might be observing the formation from the shadows.

And how they could make soldiers! I remember vividly how big Sully, a graduate Air Mechanic, with five days drill under his belt, arrived at O.C.S. Miami Beach and wound up a Group Commander in the Corps. It was a pleasure to watch his march. Nothing finer ever came out of West Point.

I plowed along. My "furrows" remained even. I did everything asked of me. I stood rigidly at attention for 45 minutes or so at

every retreat formation, never taking my eyes off the neck of the officer candidate standing equally as rigid in front of me. I often became oblivious of my surroundings. My mind would wander off. I'd try to think of my wife and baby. I wondered whether or not my mother was feeling any better. I wondered if I'd ever get to Australia or Africa or Europe.

I'd glance out of the corner of my eye and see kids "passing out." At O.C.S. the only way a candidate can leave a retreat formation is to be carried out. When Major Lewis heard that some of the squadrons were using spirits of ammonia to keep the boys from "peeling off," he hit the roof.

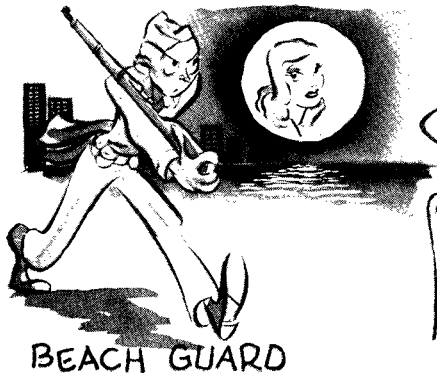
Before I knew it I became an upper-classman. I put shoulder straps on my khaki's and had the "hours till graduation" counted off for me by the under-classmen. I glanced at the eighth-week marks apprehensively. I was curious to know whether or not I slid a few hundred places or was holding my own. I started to figure out my chances of escaping the "washboard."

At that point you know whether or not you can ease up just a bit or really start worrying. And the powers-that-be cooperate beautifully. They let you go out and order your uniforms, and the stimulant is exhilarating, but you've just got to make the grade. That swell-looking uniform you tried on is waiting for you. You don't dare get careless. You are cautioned, cajoled and beseeched by your Tack Officer not to let down. You go into the home stretch with dreams of covering yourself with glory in some theater of operations. By this time the metamorphosis has set in. You're suffering from "delusions of grandeur."

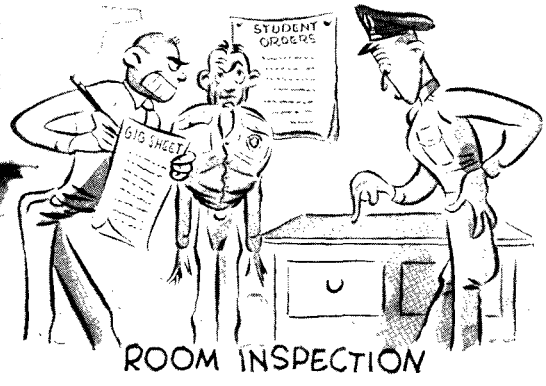
THE classification department tries to find out where you're best suited and fit you into the job you'll like. You knock your brains out trying to convince them that you're just right for combat intelligence. You're turned down. Too old or too many dependents or something. You hear that they're accepting applicants for aerial observers. Once again you forsake your dinner, dash up there, file an application and once again you're turned down. So what? So you start wondering.

For a while you feel sorry for the boys who "washed out." The orders of the day like to refer to these unfortunates who couldn't quite make the grade as "eliminees." The word sounds less harsh; the pain and disappointment remains. You move about feverishly to clean up odds and ends. By this time your marching pleases the West Pointers who run the school.

"Unfortunately," I missed the "dry run" the day before graduation. There was a little matter of walking a two-hour punishment tour that had to be disposed of—and my luck held out to the end. I squared accounts between 1500 and 1700 o'clock Tuesday, December 8th, 1942. The "dry run" was scheduled for 1700 o'clock the same day. The squadron marched off at 1645 o'clock. I got back to my billet at 1705 and at 1715 the heavens broke loose and for the next two hours, while my room-mates were rehearsing a "dry run" in a torrential downpour, I was reposing peacefully—stretched out on the carpeted floor—sound asleep.



BEACH GUARD



ROOM INSPECTION

CALISTHENICS

Yes, my luck held out to the end. That night we were honorably discharged from the Army of the United States. Despite the fact that we were civilians once more the authorities thought it might be a good idea if we remained their guests for the night. They confined us. Their reasoning was very sound. Lots of the "civilians," including myself, were just about ripe for a real "package." We didn't get a chance that night.

The next morning the underclass took over and marched up to the parade grounds. The stands were filled with proud wives and relatives. The entire corps passed in review —36 squadrons of upper-classmen about to be commissioned en masse, and their underclassmen, equally happy to move up into our places and dreaming of their brief moment in the sun six weeks hence. We were told afterwards that we marched like West Pointers. A greater compliment could not have been given us.

After the review, the under-classmen marched away to their own duties and problems. We were put at ease. Speeches were made, medals presented, and for the first time in 12 weeks we relaxed. We were strong and tanned and healthy. The strain and pressure left us, and with it disappeared the fatigue of 12 long arduous weeks.

A few minutes later we became Second Lieutenants (Temp) in the Army of the United States.

My wife persisted in clinging to my arm as we slowly strolled back toward by quarters. She shared in my happiness and I was happy for her. She was not only a Lieutenant's wife, she was a soldier's wife! All around us brand new Lieutenants were feeling proud and strong. Some had already blossomed out with their bars and insignia. Their exuberance knew no bounds.

Just as I was about to enter my hotel, we bumped into a sweet kid from New Hampshire who had worked with me when we were both privates. He had qualified as an Aviation Cadet and was awaiting appointment. He tossed me a snappy "highball." I told him I knew of no finer person to earn that dollar for the time-honored and traditional first salute. He asked me to autograph that dollar bill and said that he would cherish it as a good luck omen when his turn came to "soar into the Blue."

My orders directed me to report to the Commanding General of the Gulf Coast Army Air Force Training Center. From there I was fortunate in being sent down to the Harlingen Army Gunnery School at Harlingen, Texas.

Every Saturday afternoon I watch these youngsters, their new silver gunner's wings glistening in the Texas sun, march off to the railroad siding to keep their rendezvous. I go back to my desk, heave a sigh and continue to initial W.D. Q.M.C. Forms #33.

Despite the fact that I'm a victim of "delusions of youth," I live for that day when I'm ordered to foreign duty. I hope that day comes real soon. I'm getting restless as hell. ☆

ROLL OF HONOR

(Continued from Page 31)

Philip S. Fischer, Luther G. Fisher, Charles Folk, Andrew J. Friedrich, David L. Gaede, Russell J. Gardiner, Edward H. Gibbs, John L. Graw, Charles L. Grimes*, Edward S. Hadfield, Gilbert O. Halsey, Robert D. Havens, Joseph E. Hensler, Ray M. Hilliard, Jacob Hochman, Kenneth W. Howat, Theodore A. Janowski, Robert S. Jenkins, Clarence T. Johnson, Jr., Richard O. Johnson, Francois J. Judkins, Howard A. Kelly, Joseph H. King, Raymond N. Kurtz (Also Oak Leaf Cluster to Air Medal), Paul J. Kyle, Lucius G. LaCroix, Donald H. Lee, Jr., Burt Le Grand, Herman W. Lewis, Yale H. Lewis, Vernon H. Linder, Richard D. McMinn, George M. Manning, Dan D. Margworth, William B. Martensen, Richard W. Meldon, William E. Mikolasy, Fred Z. Milam, Ernest Miller (Also Oak Leaf Cluster to Air Medal), Richard E. Miller, Stanley M. Millick, Wendello Myers, Nathan Newman, John D. Nicks, Robert J. Nolan, Joseph M. Oblinski, Frederick C. O'Riley, Jr., Lawrence R. Ott (Also Oak Leak Cluster to Air Medal), Cadman V. Padget, Robert J. Paulsen, Carol W. Payne (Also Oak Leaf Cluster to Air Medal), Jan Pepe, Eugene J. Pollock (Also Oak Leaf Cluster to Air Medal), Victor H. Prendinger, Dean J. Raaz, Raymond M. Rahner, Glen Murray Rynerson, Kenneth Nick Saxhaug, Gene B. Setrow, Robert E. Smith, Frank Solinsky, Reynold A. Soukop, Robert D. Spitzer, George M. Staples, Edward H. Steere, Jr., Carl R. Storrie, Martin W. Strauss, Harvey S. Tamon, William M. Tharpe, Albert N. Thom, Omar D. Thomas, Thomas H. Trent, James F. Van Ausdal, Walter C. Vitumac, Oliver B. Vodrey, John W. Wallace, Jr., Russell K. Weller, Robert H. Willis, Milton E. Wills, Jr., Barnett C. Wilson, Paul F. A. Wilson, Frank H. Woltman, Ashley C. Woolridge, Joseph A. Worthington. **WARRANT OFFICER** Donald D. Greenawalt. **MASTER SERGEANTS:** Aaron R. Adams, Edward Schrempf, John J. Zuba. **TECHNICAL SERGEANTS:** Marvin W. Cox, Harry Goldstein (Also Oak Leak Cluster to Air Medal), Joseph M. Herbert, Michael Kruge, James Moore, Clyde W. Nowlin, Vinson L. Phillips, Albert K. Santowski, Charles C. Schierholz. **STAFF SERGEANTS:** Wayne F. Austin, Gail L. Bahr, George Bryan Boyte, Robert Chopping*, Fred S. Croyle, John D. Friess, Anthony Gaeta, Edward Gosk, Henry G. Hayes, Albert E. Hill, Charles D. Hill, Jr., Gerald H. Hooten, Charles F. Kindle, Robert S. Krijak, Stephen G. Krucher, Earle P. Lemoine, Allen Middleton, Stanley J. Milik, Peter F. Novak, Donald T. Ostlund, Matt Schu, Robert W. Sentency, Edwin G. Smith, Charles H. Snyder, Vance H. Spears, Joseph M. Spire, William J. Standish, Charles R. Tipton, Henry J. Walloch. **SERGEANTS:** James M. Abbott, Tom J. Alder, Chester M. Allen, Willett T. Allen, Arlee F. Aten, Donald C. Bargdill, Franklin E. Beattie, William A. Beckham, Theodore L. Billen, Floyd R. Blair, George W. Bowers, Jr., Edward A. Bradford, Emory O. Brown, Max W. Burns, James H. Cox, Bernard C. Creswick, Clifford H. Cruse, Melvin H. Devoaa, Melvin H. De Voss, Robert C. Dewey, James V. Dixon, James S. Doherty, Paul L. Duke, Albert J. Durham, Lloyd A. Ellefson, Jerome A. Even, Virgil D. Faust, Richard K. Ferrill, Clavoe U. Fry, Henry H. Garner, Everett W. Gustafson, Rollin B. Hefferman, Leonard L. Hendry, Raymond L. Herwig, Elvin D. Hilger, Chester A. Hillman, Ralph M. Hoke, Lawrence L. Holgate, Edward C. Hudson, Jeptha F. Hughes, Russell L. Hultgren, Carl E. Jennings, Hugh A. Jones, Jr., William R. Kerins, Peter A. Kucharski, Robert C. Long, Frank X. Lutie, Thomas D. McMahon, James R. Mathewson, Raphael F. Penzenik, Glidewell L. Pollard, John N. Powers, Leslie C. Rambo, Richard G. Ryan, Donald R. Royer, Samuel J. Salvo, Edward L. Savoy, Raymond N. Schmit, Oscar E. Seddon, Andrew M. Seed, Kendall Shoop, Jack D. Smith, James C. Stephens, Jr., Albert St. Jean, Jack H. Stull, Abraham Todras, William J. Tomko, Wallace A. Walke, Charles U. Ward, Norman H. Watson, Joseph W. White, Willis A. White, Jr., William H. Williams. **CORPORALS:** Millard M. Akin, Raymond H. Alsip, Forrest W. Averbeck, Frederick J. Ballard, Jennings G. Beckwith, Russell F. Boudria, Sanford Caviness, Norva C. Chapel, Robert L. Fitzpatrick, Leonard K. Florence, Wayne Garey, George R. Graham, John Gregal, William C. Gregory, Lloyd W. Grieve, Edward W. Holland, Louis F. Houston, John A. MacDonald, Farrell W. Middell (Also Oak Leaf Cluster to Air Medal), Bruce W. Osborne, M. E. Roberts, Robert K. Rollins, Ernest L. Sweigart, Charles W. Ward, Gaines W. White, Paul R. Williams. **PRIVATES FIRST CLASS:** Clifford O. Boatman, Joseph D. Caldara, Edward A. Carroll, Robert D. Chapman, Darwin A. Garrett. **PRIVATES:** Charles F. Casner, Aldo P. Ramella, Anton H. Schmidt.

OAK LEAF CLUSTER
To Air Medal

MAJOR John W. Weltman. **CAPTAINS:** Leo G. Clarke, Jr., Joel A. Owens, Jr., Theodore H. Runyon.

THE LEGION OF MERIT

(In the Degree of Officer)

CAPTAINS: William E. Dyess, Joseph H. Moore. **MASTER SERGEANT** Edwin A. Logston.

CITATION
11TH BOMBARDIER GROUP

(As announced by War Department)

"The 11th Bombardment Group (H), United States Army Air Forces in the South Pacific, is cited for outstanding performance of duty in action during the period July 31 to November 30, 1942. Opposing the full force of the numerically superior Japanese with all available aircraft, the 11th Bombardment Group participated continually in attacking the enemy in his efforts to obtain a stronger foothold on strategic territories. Heavy damage was inflicted on Japanese airfields, storage and supply areas, seaplane bases, docks, troop positions and other installations. In addition, the action by this group resulted in the sinking of four enemy ships, the damaging of fifteen and the probable damaging of nine others. Throughout its operations, the group was faced with extremely difficult problems of logistics, airdrome improvement, and the necessity for long, hazardous overwater flights to reach enemy objectives which frequently were located at extreme flying range of its bombardment airplanes. The superior courage and devotion to duty shown by combat crews and ground units of this bombardment group is in the highest traditions of the United States Army and will always be worthy of emulation."

This award entitles the group to have a streamer for its colors and flag as well as a silver band for its guidon. After an organization is cited twice, its members wear a decoration of a blue ribbon in a gold-colored metal frame of laurel leaves.

This is worn by officers and enlisted men if they were members in either or both actions for which the organization is cited. Members with the organization who were not attached during either occasion of citation may wear the decoration only so long as they are a member of the organization.

PICTURE CREDITS

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CORRECTIONS

In AIR FORCE for March, 1943, the Foster Field, (Tex.), skeet tower pictured on Page 35 was incorrectly located at Jackson Field, (Miss.), and in the AIR FORCE Quiz answers on Page 40, same issue, the Messerschmitt 110 was identified as a two-seat fighter. Actually, the plane accommodates three, but in combat the crew is usually limited to two.

Notes from the Air Surgeon's Office:

How to Keep Well in the BURMA THEATER

Brigadier General David N. W. Grant

THE AIR SURGEON

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

The following is the fifth of a series on health conditions in the various theaters of operation—THE EDITOR)

BURMA is an interesting country and a a most beautiful one, but under the surface of handsome pagodas, lofty mountains, dense jungles and deep rivers lies one of the most concentrated collections of hazards to the health of man that exists on this earth's surface.

One can enumerate on the fingers of the two hands the communicable diseases that have *not* been reported from this area. The recognition of disease and other dangers will be of great importance to American troops operating in Burma. However, modern military medicine, especially military hygiene and sanitation, as now taught in the Army, has been developed for the sole purpose of keeping men well and fighting in just this kind of a country.

Prior to the Japanese invasion of Burma, the British had established European communities in the larger cities. But practically all of the facilities of these European communities are said to have been destroyed either at the time of the Japanese occupation or, subsequently, by allied bombings. The native quarters of the towns and the rural districts have been little affected by the white man, and the people exist in much the same state of culture as they did 200 years ago.

In other words, the American will find none of the modern sanitary devices that he is accustomed to at home, especially such things as municipal water works that produce pure water, or sewage disposal plants. He will have to rely upon the fundamentals of military hygiene and sanitation to protect him from disease. It will be necessary for each individual to appreciation the necessity for maintaining the same strict sanitary precautions that are enforced in the environs of all military installations, and to apply them wherever he may be.

Malaria is the greatest single cause of death among the Burmese. It occurs throughout Burma even at heights of 4,000 feet or more in the mountainous districts. It is the most important disease in the whole area, and in many districts 100 percent of the people are infected. Because troops suffering from malaria cannot operate efficiently, every precaution should be taken to avoid the disease.

Each man should have a thorough knowledge of the various methods of protecting himself from mosquitoes, not only from the malaria carrying type, but also from others. Dengue and filariasis (mosquito borne diseases) occur in Burma, but are carried by different types of mosquitoes. He should know the value of the mosquito net, how to use it, and care for it. He should consider it an essential piece of his equipment and should keep it available at all times.

The malaria mosquito usually bites at night. However, it may be encountered during the day time in dense jungle or shaded mountain valleys; therefore, when it is necessary to go out of doors at night, or to operate in a mosquito-infested region, long sleeved shirts buttoned to the neck, long trousers tucked into boots, and head nets and gloves should be worn. It is best to stay under a mosquito net as much as possible after dark if there are no properly screened buildings at hand.

AVAILABLE insect repellents are of little value for more than a few minutes, especially if the individual is sweating, so too much reliance can not be placed upon them. Because so many natives are infected with malaria, and can act as reservoirs of the disease, and because mosquitoes capable of carrying malaria are usually found in the vicinity of human habitation, it is best to avoid towns and villages, especially at night.

In many parts of Burma the Medical officer will recommend that the suppressive or prophylactic treatment of malaria with either quinine or atabrine be used. This method of treatment does not prevent malaria in the true sense and thus can not take the place of the previously mentioned precautions. However, it does suppress the symptoms of malaria and thus allows a man to carry on until the military tactical situation permits hospitalization. When suppressive quinine or atrabine treatment is once instituted, directions must be followed explicity; otherwise it may do more harm than good.

As mentioned previously, the people have little knowledge of, and even more important, little regard for modern sanitation. They carelessly deposit garbage and human waste in the streets, in the fields and along the banks of streams, and, as a consequence, Burmese towns have a distinctive odor and characteristic sight. Buildings not only serve as dwelling places for the family, but also for pets and domestic animals. Many houses have granaries for the family rice supply, which usually attracts rats and other rodents.

Because the rate of exchange is favorable, and because wages are so low in this part of the world, Americans frequently hire native boys to cook, run their errands, do the laundry, and perform other menial tasks. These boys may appear clean and may be intelligent. However, do not trust their knowledge of sanitation and hygiene, for their customs will be the same as their forefathers. Personally supervise everything they do until you have thoroughly trained them. Be sure that the medical officers say that they are not infected with a communicable disease. Be sure that they know enough to wash their hands with soap and water whenever they are soiled. Be sure they prepare your food exactly as Army doctors prescribe. And above all, be sure that the supplies that they purchase for you are safe.

There is an adequate amount of water in most parts of Burma. However, it can never be considered safe for drinking until treated. Dysentery, typhoid fever and cholera are common diseases in Burma, where they are usually water-borne. Because of the presence of these deadly diseases, only water

that has been treated by appropriate Army personnel should be used.

Since such water may not be available at times, every soldier operating in this area should know one or more methods of purifying water (FM 21-10). If he has no chlorine or iodine he should always remember that boiling water is one of the easiest and surest methods of purifying it. Under battle conditions it may be impossible to spend very much time purifying water. And since the wet, humid climate of Burma will cause copious sweating on the part of an active man, each soldier should have a thorough knowledge of the conservation of water. Men have lived on a quart of water a day for many weeks even when that quart had to be used for all purposes, but, in order to get the full benefit of such a small amount of water it will be necessary to form certain habits.

IT is well to become accustomed to drinking small amounts of water slowly, or moistening the mouth and throat frequently with sips of water, and to drinking only at set intervals. Smoking and chewing tobacco increase thirst, while chewing gum or sucking on small pebbles stimulates salivation and thereby decreases thirst. It is essential for the body to have a certain amount of salt, but when one perspires profusely much is lost in the sweat. Unless this salt is replaced by taking salt tablets or by adding additional salt to the food, heat cramps and possibly heat exhaustion will result.

Even though flies and other insects exist in great numbers, there are few screened buildings in Burma. Foods in markets and kitchens are not protected, so it is easy for flies to move about at will from the manure pile to the food of man. Every precaution should be taken to combat flies. Flies that have been in contact with the wastes of persons suffering from the intestinal diseases (typhoid fever, dysentery and cholera) can carry these diseases to man.

Native fruits and vegetables are dangerous, for they are commonly raised in soil that has been fertilized with human waste, or washed in polluted streams. The safest rule is to eat only thoroughly cooked foods. Soaking fruits or vegetables in potassium permanganate solution is not satisfactory unless they have been soaked for a minimum of four or five hours. Thick skinned fruits should be peeled only by oneself and even then it is best to dip them in boiling water for a few minutes before peeling. There are very few dairy products in this area, and those that do exist are not safe to eat.

One should form the habit of never walking about barefoot. Fungus diseases, such as athlete's foot and dhobie itch are very prevalent in this area. They are not usually fatal but can cause sufficient trouble to cripple a man and thereby make him a liability to a fighting team. These diseases are easy to prevent if care is taken to bathe frequently. Dry all parts of the body thoroughly with your own towel, not with a towel that has been used by someone else. Be especially careful to dry between the toes, in the groin and under the arms. Dusting the body with powder, such as Army issue foot powder, and changing to dry clothing as often as possible are additional methods of preventing these diseases.

Fungus diseases easily can be transmitted from one individual to another, when the clothing of a man suffering from a fungus infection is washed with the clothing of others. It is therefore best to do one's own laundry or to always boil the clothing. Hook worm is another disease prevalent in Burma that can be picked up by walking about barefoot. A pair of bath slippers made of wood and some string is a great help in preventing both of these diseases.

The jungle country of Burma is inhabited by many obnoxious insects and pests, some of which are disease carriers, but the majority are purely troublesome. There are two types of leeches found in the low lying districts, the large dark horse leech and the small red jungle leech. The former inhabits fresh water, while the latter is found on shrubs and jungle grass. Although leech bites are not dangerous, they frequently become infected and lead to painful chronic ulcers. A leech should not be pulled off of the skin; when this is done its "stinger" is left in the wound. They can be removed with ease by touching them with a lighted cigarette or prodding them with a knife. The natives of this part of the world remove leeches by touching them with a small sack of moist salt that they carry tied to the end of a stick.

VARIOUS types of mites and ticks are found in cut over jungle land. One of these mites carries a serious disease known as mite typhus, and some of the ticks carry a tick typhus, somewhat similar to but milder than Rocky Mountain Spotted Fever. When traveling through mite and tick infested country, trousers should be tucked into the boots, and one should lie down in the grass only when it is absolutely necessary. It is well to remove the clothing two or three times a day and make a thorough search of the body for ticks. Do not remove a tick with the bare fingers, but place a piece of paper or cloth about the tick before touching it. They also can be removed in the same way as leeches, by prodding them with a knife or touching them with a lighted cigarette.

Because of the difficulty in keeping clean and dry, minor wounds such as leech bites, insect bites, scratches, cuts and burns, which would be of little consequence in the United States, become infected easily in this area. No matter how small or trivial, all wounds should be thoroughly cleansed and an antiseptic applied to them immediately.

THERE are many poisonous snakes, such as the Russell's Viper, the King Cobra, kraits, and a very poisonous sea snake. Many of these snakes live close to human habitations which they visit at night in search of food. On cool nights snakes like to get into warm places such as shoes and clothing. Therefore, carefully examine all clothing and shoes in the morning before getting dressed. Before getting out of bed at night turn on a flashlight to make sure that there are no snakes on the floor. Always look into cupboards, drawers, and other dark places before reaching in with your hand.

If bitten by a snake the patient should be kept quiet and medical attention obtained as quickly as possible. Do not give the patient a drink of whisky or of any other alcoholic beverage, and do not allow him to exert himself. Follow the procedure set forth in paragraph 128, FM 21-10. Start the treatment immediately. If bitten on an arm or leg apply a tourniquet just above the bite. This tourniquet can be made from a neck tie, handkerchief, bandage, piece of string, or vine. A cross incision one-half by one-half inch should be made over each fang puncture. These cuts should be from one-quarter to one-half inch deep, and are best made with a razor blade or small, sharp knife. Suction should then be applied for at least one-half hour. This may be done by either sucking with the mouth, using a glass breast pump, or by heating a bottle and applying its mouth tightly over the wound. Cooling of the bottle will produce considerable suction. If there are any cracks or sores on the lips or inside of the mouth place a small square of rubber, such as the rubber taken from a condom, over the wound to keep the snake's venom from coming in contact with the mouth.

Venereal diseases are common throughout Burma, particularly among the hill tribes of the north and the inhabitants of the seaport towns. Eighty percent of all of the natives in one district were found to have either syphilis or gonorrhea. Many of the native women are promiscuous and both professional prostitutes and clandestine pick-ups are common. The majority of these contacts suffer from gonorrhea and syphilis, and many are also infected with chancroid and granuloma venereum, two other serious venereal diseases. ☆

ANSWERS TO QUIZ ON PAGE 28

1. The C-54 is a FOUR engine TRANSPORT (or CARGO) plane with a TRICYCLE retractable landing gear.
2. (c) In the Aleutian chain. 3. (b) Africa.
4. The C-46 is a troop carrying plane. Upon the appearance of enemy fighters, evasive tactics should be adopted.
5. (d) When the salute has been returned.
6. (b) 120 steps per minute.
7. (b) C-87.
8. (a) Air Marshal Sir Arthur Harris.
9. (c) 45 degrees.
10. (c) The tendency of a plane to roll in the direction opposite to that of the prop rotation. 11. (b) Junkers 87.
12. (d) The boundary between the troposphere and the stratosphere.
13. (b) Out to the skeet range. 14. (b) Red.
15. (c) Guadalcanal.
16. (d) Following a railroad track.
17. (c) Cardiograph is out of place. It is used for recording movements of the heart; the other instruments are for recording weather elements.
18. B-25. 19. B-26. 20. A-20.

The AIRY TOUCH

"P" Shooter

Something about a fighter job
Just gives a man a thrill,
She kinda sets your heart a-throb,
You know she's built to kill.

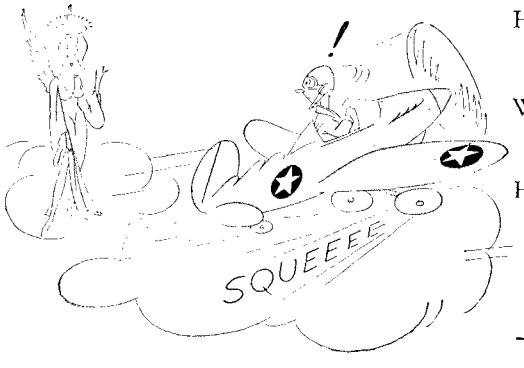
She doesn't have plush cushions,
The torque is pretty bad,
But she keeps right on a-push'n
Despite the hell she's had.

There's not much there but motor,
Some stubby wings and guns,
But there's plenty power to float her,
And she weighs about four tons.

It's true she's hot to handle,
And landing takes two tries,
But nothing holds a candle
To the ship that rules the skies.

When the gates of hell are open,
And the battle starts for true,
There's one thing for which I'm hop'n,
A "P" Shooter to fly me through.

—Lieutenant Jacob W. Dixon, Fighter Squadron, Alaska

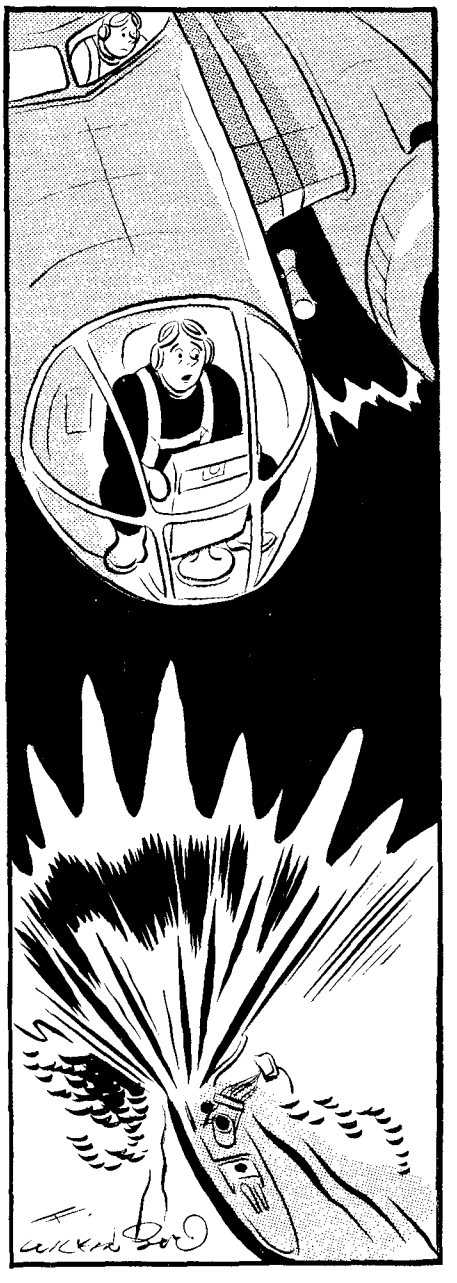


The Weatherman's Lament

Bards through the ages have filled many pages
Extolling the Infantry's glory;
They love to enlarge on a Calvary Charge
And make it the theme of their story.
The boys in the tanks are beginning to rank,
And the caissons keep rolling along;
While pilot and plane will most always attain
Their full credit in story in song.
The reporters adore the parachute corps;
The medics come in for their praises;
But there's one bastard crew, a forgotten few,
On which glory's light never blazes.
They spend their dull hours in forecasting showers
And in judging the height of the clouds,
But anticipation of precipitation
Will elicit no cheers from the crowds.
Problems climatic are not so romantic,
As is shooting down Japs from the blue,
But bet your last dollar fliers would holler
If the weatherman failed to come through.
When the Bomber Command has a mission planned,
And is set to raise hell with the Jap,
There's question whether all's well with the weather
Enroute to that spot on the map.
That's the weatherman's call to get on the ball,
And to get all the dope for the flight;
He can't play the breaks, or allow for mistakes,
And no guessing— he's got to be right!
When there's nothing to clear he'll sit on his rear,
He's lazy, that point is conceded;
He'll loaf on the job, and he'll jawbone an ob,*
And ain't worth a damn—'till he's needed.

*Weather forecast.

—Pfc. Don H. Fields, 10th Weather Squadron



"Another near miss—it didn't go down the funnel!" —F. Wilkinson

The Cry of the Kee Bird

You have heard the wail of the siren,
As an ambulance sped down the street,
And mayhap you've heard the lion's deep roar
Down in Africa's grim desert heat.
Or the piercing cry of the tiger
At night, as he stalks his prey,
Or the locomotive's high shrill whistle
As it sped, through the night, on its way.
But these sounds sink to a whisper,
You've heard naught, I assure, 'til I've told
Of the blood-curdling cry of the Kee Bird
In the Arctic's cruel frigid cold.
This bird looks just like a buzzard,
It's large, it's hideous, it's bold,
In the night, as it circles the North Pole
Crying, "Kee, Kee, Keerist but it's cold!"
The Eskimos tucked in their Igloos,
Toss fretfully in their sleep,
While their huskies asleep in a snow bank,
Start burrowing away down deep.
For this cry is so awe inspiring
It freezes the blood I am told,
As the Kee Bird flies in the Arctic
Crying, "Kee, Kee, Keerist but it's cold!"
The Mounties, abroad in their dog sleds
Visiting these Wards of the Crown,
Often hear this strange cry and stare skyward,
With a fierce and sullen frown.
For odd things happen in the Arctic,
And many weird tales they have told,
But their voices drop to a whisper
At the cry, "Kee, Kee, Keerist but it's cold!"
And many a brave man on this Base site,
Strong and bold, from a Northwest State,
Are taking the first ship back to homeland,
To forget this fierce bird's song of hate.
They can "take it", it seems, in the day time,
But when the midnight hour is tolled,
They cover their heads in shameless fright,
At the cry, "Kee, Kee, Keerist but it's cold!"
So back to the States they are going
To sleep in a real bed, as of old,
To slip their strong arms 'round their loved one
Her fair slender form to enfold.
Then off to sleep in warm comfort,
And wifey's soft hand they will hold,
To wake, terrorized by a "Kee Bird" nightmare,
And the cry, "Kee, Kee, Keerist but it's cold!"

—Ed. J. Pritzinger

PRINTED IN U. S. A.

WHO - ME?

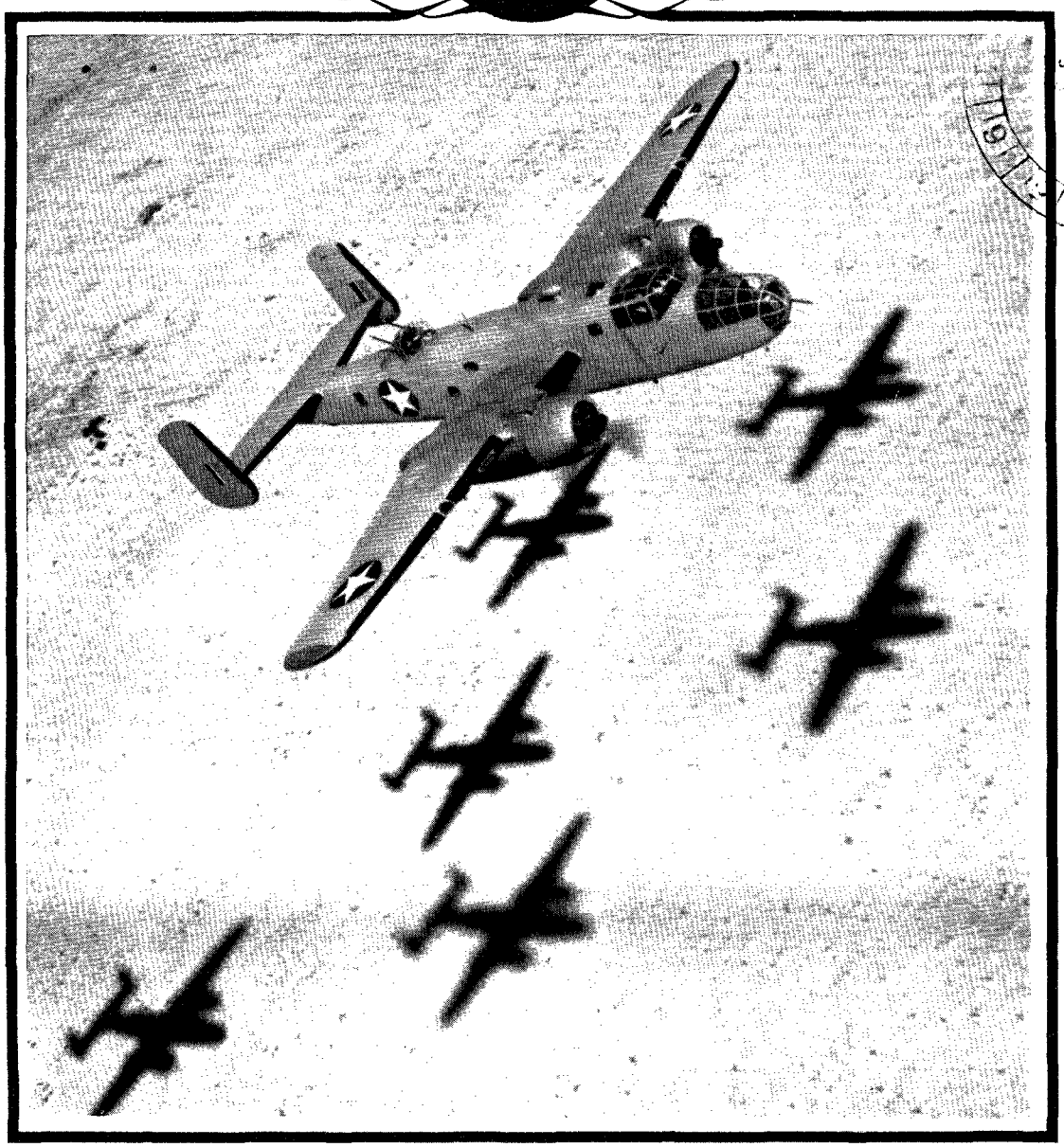
Yes, you... think before you write. A careless pen is more deadly than a bomb. For your own safety — and for the protection of your comrades, don't write about forthcoming troop movements or destinations, mode of travel, number of men or types of planes and equipment in your unit.

Write home often but...

KEEP IT PERSONAL

AIR FORCE

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



JUNE 1943

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Contents

AIR FORCE

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

June Brief

IF FLEDGLING fighter pilots heed the advice of one of the best in the business, they'll "get a chip on their shoulder" and keep it there. This comes from Colonel Robert L. Scott, Jr., former commander of U. S. fighter groups in China. Colonel Scott, whose combat record against the Japs includes at least thirteen enemy planes shot down, was asked to write an article for AIR FORCE based on his experiences in the India-Burma-China theatre. The article appears on Page 6. Colonel Scott is now on duty at the AAF School of Applied Tactics, Orlando, Florida.

YEARS AGO, students at the old Air Corps Tactical School at Maxwell Field, Alabama, foresaw the need for a school in aerial combat tactics and technique which would go beyond mere theory and concentrate on training under simulated combat conditions. Many of these old-timers, now Generals and Colonels for the most part, have seen their dreams come true with the establishment of the AAF School of Applied Tactics at Orlando, Florida. AAFSAT has as its first commandant Brigadier General Hume Peabody, who at one time served as Assistant Commandant of the tactical school at Maxwell. On Page 8 in this issue, General Peabody introduces the new school to personnel of the Army Air Forces.

FAST-MOVING, dramatic stories of combat have sprung by the hundreds, but for our money the story of Shorty Gordon, belly turret gunner on a B-17 operating out of England, ranks with the best of them. Shorty's exploits are set forth by Captain Bernard W. Crandell, former United Press writer now on duty with the Eighth Air Force. His article, "Angels Don't Shoot Guns," appears on Page 10.

"PREPARE FOR TROUBLE," in the finer sense of the phrase, should bring to the mind of every airman the importance of emergency kits. A full discussion of the contents and proper selection of emergency kits and equipment currently in use by the AAF has been prepared for AIR FORCE by the Arctic, Desert and Tropic Information Center. It appears on Page 34.

THE LITTLE GUY you see on the opposite page wandered into the AIR FORCE Editorial Office a few weeks ago under the sponsorship of Stan Eckman, well known cartoonist who at present is working with the Western Procurement District of the Materiel Command. Mr. Eckman's "protege" made such a hit that we introduce him to all our readers. What he needs most of all right now is an appropriate, "air-forcey" name plus a few suggestions on duties he might perform. We'll be glad to receive your choice of a name for the little man and have you issue a few orders for his benefit. Mr. Eckman will do the rest.

MAJOR STEPHEN L. GUMPORT, first flight surgeon on duty along the central African air route, relates his experiences in an article on Page 18. Since his return in February after more than a year in Africa, Major Gumport has been assigned to the Medical Division of the Air Transport Command Headquarters.

THE PERSONNEL classification problem is as old as the Army—any army. An interesting study of the manner in which the problem is being solved on the squadron level by the Army Air Forces may be found on Page 39. The author of the article is Lieutenant Matthew Huttner, statistical officer for a fighter group being readied for overseas action. Formerly engaged in radio and public relations work, Lieutenant Huttner assumed his present duties after attending OCS, Miami, and the AAF Statistical School at Harvard University. Lieutenant Huttner was graduated from the University of Pittsburgh (M. A. in social science) and in 1937 received the John J. Pershing Medal for military citizenship as a result of his fine record at Citizens' Military Training Camp.

TAD has become AFTAD. So what? Simply this: the Training Aids Directorate, which was a part of the AAF School of Applied Tactics in Orlando, now has become the AAF Training Aids Division, an exempted activity under the supervision of the Commanding General, with headquarters at One Park Avenue, New York City. The Assistant Chief of the Air Staff, Training, exercises supervision for the Commanding General. The training aids section in AIR FORCE this month is devoted to an explanation of AFTAD's field liaison organization, a round-up on available synthetic training devices and a background study on training literature. It begins on Page 26.

THE FRONT COVER photograph, with its unusual portrayal in shadows, shows a flight of B-25s winging over a desert stretch in North Africa on one of the hundreds of aerial missions which contributed so vitally to the rout of Axis forces in that theatre.

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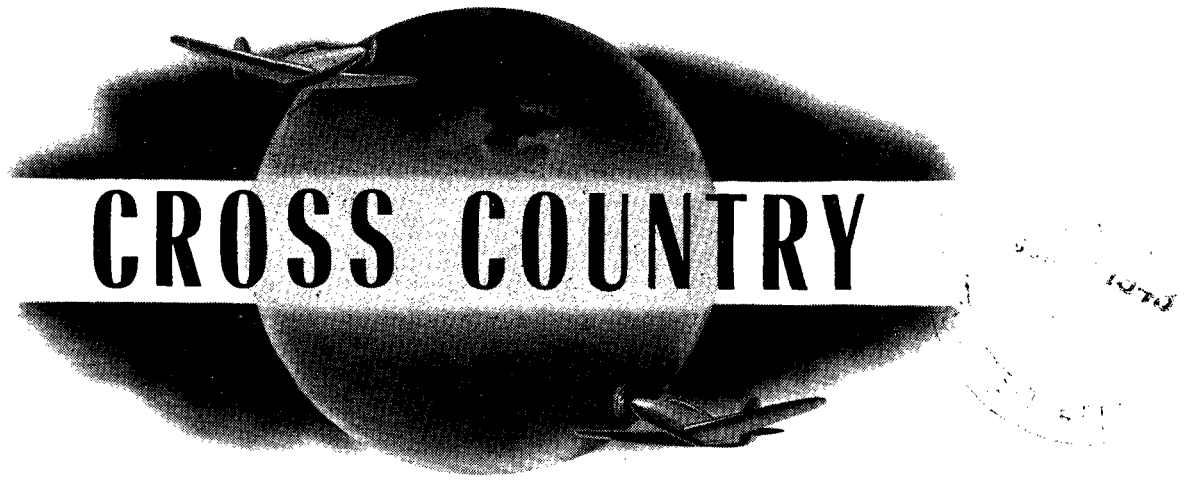


The new air-sea rescue program, and other developments of the month within the Army Air Forces

A COORDINATED program to handle the rescue of air crews forced down on land and sea has been newly established by the Army Air Forces.

More and more attention has been given air-sea rescue work, but it has continued to be handled largely as a local problem. Now the responsibility for developing and supervising the operation of a working system rests with a single agency—the Air-Sea Rescue Wing of the Flight Control Command.

We can't give you all the details of the program, for much of it is still in the making, but plans call for air-sea rescue squadrons to be stationed throughout the world. These squadrons, some of which are now being activated, will be made up of specially trained personnel; many of the men in command will be those who learned forced landing procedure the hard way—from experience. The squadrons will operate in combat theatres and on the fringe of such theatres, as well as along our own shores and along air transport routes wherever such services might be required.

Special equipment will be brought into play. Plans call for utilizing helicopters, PT boats, dog sleds, snow plows and liaison planes, as well as conventional aircraft, to give all possible aid to air crews who have been forced down.

The first big job will be the standardization of procedures regarding the ditching of multi-engined aircraft at sea, and for bailing out, parachuting, and the like. Right now, the Command needs all the information and suggestions it can get, especially on the subject of ditching at sea. The experiences of crews who have been forced down will be most valuable. The Commanding Officer of the Command asks officers designated to question crews after ditchings to send in complete reports, which should include the pilot's own story and answers to such questions as: Was the pilot satisfied with the ditching procedure followed? If not, what does he specifically recommend? If the emergency equipment wasn't satisfactory, what was most in demand? The reports should include the type and model of aircraft and emergency equipment used. Such information should be sent to Headquarters, Flight Control Command, Winston-Salem, North Carolina.

The educational side of the program will be handled by the Air-Sea Rescue Section of the Command's Safety Education Division. Movies, booklets, posters and manuals will be used to tell you what to do in emergencies.

A manual now being produced in cooperation with the Bombardment Department of the Army Air Forces School of Applied Tactics will outline approved procedures for ditching medium and heavy bombers, and for individual bail-outs. A booklet, "Swimming Through Fire," soon to be available, will show you how to swim through fire in the event the water is covered with burning oil and gasoline. An air-sea rescue movie to be known as "Ditching" will outline the approved methods of ditching multi-engined aircraft.

Two manuals—"Jungle and Desert Emergencies" and "Arctic Emergencies"—are off the press and are being included in the jungle and Alaskan parachute emergency kits (Types B-2 and B-1). In addition, a limited number of the manuals will be available for use in schools and training areas.

A movie titled "On Your Own in the Arctic" will put the information contained in the Arctic manual in graphic form. Other movies now in the planning stage include "How to Live in the Tropics" and "How to Live in the Desert."

Supplementing these mediums will be two series of posters showing in step-by-step form the bail-out and ditching procedures for the B-17, B-24, B-25, B-26 and A-20. These posters will go to schools, operations offices and operational bases.

As the air-sea rescue program develops, its many phases will be covered in future issues of AIR FORCE.

MORE ABOUT HELICOPTERS

All official world records, including the altitude mark, have been broken during routine testing of the Army helicopter, and under stimulus of the successful tests, larger

Make your reservations early.

helicopters are under development by the AAF Materiel Command. In fact, it is reasonable to assume that ten to twenty place helicopters can be built; top-flight speed would be in the neighborhood of 150 miles an hour, utilizing the present principle of power.

We've mentioned that helicopters are planned for use in air-sea rescue operations. Also, tests now underway will determine to what extent this type of aircraft will be used in our anti-submarine work.

For the last seven years all military development work on rotary wing aircraft has been conducted by, or under the supervision of, the Army Air Forces. In the March issue of AIR FORCE we covered the Army's first experimental helicopter, which was officially accepted in May, 1942. The craft was a success but its performance, capacity and speed were limited. Much progress has since been made.

Upon completion of testing at Wright Field, production orders for the helicopter were given by the Army. From this production order the Navy is to get three experimental models and one service test model.

SUBJECT: COMPRESSIBILITY

Not long after we had completed work on the May issue and sent it off to press, a letter arrived from Colonel Ben S. Kelsey, author of the series of articles on compressibility which was concluded with that issue of the service journal.

The opening paragraph told us that Colonel Kelsey had dictated the letter in a West Coast hospital while nursing an ankle injury sustained in a bail-out from a P-38 during the course of a dive investigation. (He is now engaged in fighter aircraft research work for the Materiel Command.) It was too late to fill the Colonel's request and print his message along with the concluding article on compressibility, so we are doing it now. This is what Colonel Kelsey had to say:

"1. Having just had an airplane disintegrate with me in a compressibility dive during the course of flight research in this field, it seems as though some of the items covered in the compressibility discussion need more emphasis.

"2. At best, compressibility is an unpleasant and dangerous region closely associated with trouble. The principle of learning how to 'stay out' rather than how to 'get out' is of primary importance.

"3. The lift and balance, or trim, of the airplane depend on an entirely different type of airflow than that with which we are normally familiar, so that the usual change in attitude, change in flight path, or accelerations which we use normally to indicate what is going on, may no longer apply. A straight-down dive, for instance, may be trimmed with zero stick force, then with application of full tab, or destructive elevator displacements may produce no change in attitude or flight path. The maximum lift is limited, just as it is in the regions beyond the normal stall, so that changes in attitude, if attained, may produce nothing except destructive distribution of load on the wings or tail.

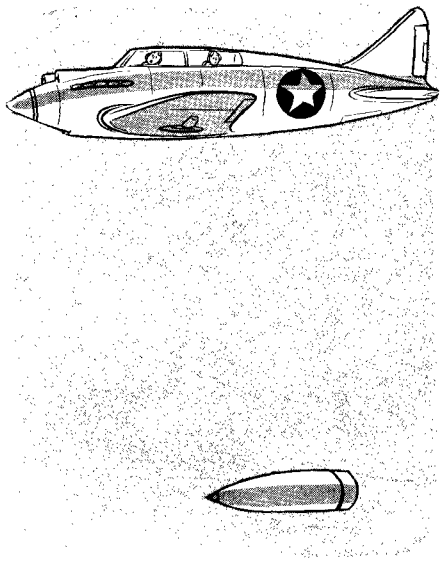
"4. Due to the speed, the aerodynamic forces are capable of shucking tabs, elevator, tails, and wings off a plane as easily as you would flick cards off the top of a deck.

"5. Recoveries must be limited to a slow and easy pattern, using moderate tab displacements and moderate stick force applications. It's a long way out and easy does it. Care must be exercised to ease off on recovery application as progress is obtained to avoid equally disastrous reaction as compressibility lets go its hold.

"6. The controls can be rigid, heavy, or sloppy, depending on the airplane and the flight condition.

"7. Avoid using ailerons or any control you don't need to avoid starting an over-balanced or flutter condition.

"8. Buffeting will usually be present and probably increases with recovery efforts. This has to be endured and mild or moderate recovery procedure must be constantly maintained. However, the controls should be restrained from motion insofar as possible to avoid destructive oscillation. This applies particularly to ailerons.



"Fast? Look what we're passing!"
—FRED WILKINSON

"9. Don't let familiarity with the edges of the phenomena breed contempt. It only takes a little slip to have Old Man Compressibility grab you with one hand while he takes you apart with the other. The result can be more than a little alarming and confusing.

"10. Incidentally, parachute jumping at high speeds involves its own hazards. The harness must be particularly snug fitting if it is to stay on."

"11. We are on the track of solution, but the region of high speed, particularly above 20,000 feet, demands plenty of respect, and I am talking from the jail."

We don't wish for more bail-outs under such conditions, for Colonel Kelsey or anyone else, but we do hope to get more letters "from the jail," if such has to be. We can't think of a better start toward solving many of the problems confronting us—no matter what the field of work—than an exchange of ideas for the benefit of all personnel.

THOSE GROUND OBSERVERS

Stories of persistence, ingenuity and unfailing devotion to duty on the part of volunteer ground observers in the Aircraft Warning Service are legion. We mention here only a few of the instances which have come to our attention:

Sixty-four-year-old Charles Holmes and his dog Trixie spent 4,000 hours on duty during the first year of war at an observation post far up on the rocky, barren foothills of the western slopes of the Sierras behind Bakersfield, California. Trixie was taught to bark when he saw or heard a plane.

Two of the five members of the crew of an Army bomber which crashed about half a mile off the coast of Oregon were rescued thanks to the fast work of Observer Charles Voorhees, who saw the plane go down from his post near Seaside, Oregon, and flashed a quick message to the Portland Filter Center.

Mr. and Mrs. John Jeans saw a fighter plane fall into Fern Ridge Dam Lake near their home just outside Eugene, Oregon. Mr. Jeans went to the rescue in his outboard motorboat while Mrs. Jeans called a nearby observation post. Within eight minutes after the crash, the pilot, suffering from shock, was in the Jeans home and fifteen minutes later an ambulance, summoned by the ground observer, arrived to take him to a hospital.

Two observers near Sheridan, California, saw a truck and trailer skid off the highway on to the tracks of the Southern Pacific Railroad. One of the observers drove to another town up the line and an oncoming train was flagged to avert a wreck.

MORE LOST CHUTES

Captain Raymond A. Fitjar, commanding the 491st Bombardier Training Squadron, AAF Bombardier School, Midland, Texas, reports three chutes are missing. Their serial numbers are 41-1928, 42-53174 and 42-57119. Inventory your chutes and if you spot one of these numbers, notify Captain Fitjar.

VICTORY GARDENS

The War Department encourages the planting of victory gardens as a voluntary off-time activity at posts, camps and stations, providing (1) approval is granted by the CO so as not to interfere with the primary mission of training, (2) planting is done where the equipment and tools are on hand or readily available and no additional farm implements are necessary, and where soil is suitable and plots are reasonably available to quarters, (3) gardens are of such size and are planted with "such vegetables" that military personnel in the time available can care properly for the gardens, and (4) that food so produced will be for the consumption of military personnel only and not for sale to civilians.

First word of an Air Force victory garden in actual operation comes from Bolling Field where farm-minded personnel looks to a cultivated 38-acre tract for some

10,000 cabbages, 20,000 tomatoes, 5,000 eggplants, 5,000 pepper plants and eight acres of corn. First Lieutenant Frank R. McFarland, Jr., former farm manager and graduate of the University of Maryland Agricultural College, is in charge of the project as Post Farm Officer.

BISMARCK SIDELIGHTS

In answer to a cabled request, these sidelights on the Battle of the Bismarck Sea, which we discussed last month, were dispatched to AIR FORCE by Headquarters of the Fifth Air Force in the Southwest Pacific:

Lighting a Fuse

One incident that occurred early in the three-day engagement last March had much to do with the ultimate outcome. It involved the lone B-17 lost in the battle. The crew of this bomber was forced to hit the silk after the ship had been set ablaze by enemy fire. The men would have had only the barest chance of survival once they touched the surface of the water as the sea was filled with sharks. But these crewmen didn't even get that chance. As they floated slowly downward about a dozen Jap Zeros broke off their combat with P-38s and made pass after pass at the airmen dangling defenselessly in their chute shrouds. The scene was witnessed by all our flyers engaged in the fight, and others were given a complete fill-in on details later. From that moment on, American airmen gave no quarter. Even the heavy B-17s began diving on ships and barges, their concentrated fire sending smoke, flame and debris high into the air and littering the sea with struggling Japs. The sharks formed a mop-up crew and had a field day. Sharks came from miles around to account for a large share of the estimated 15,000 Japs who lost their lives in the engagement.

Graveyard

Before the B-17s, the B-25s and the A-20s, the P-38s, the P-40s and P-39s of the Army Air Forces, plus the RAAF Beaufighters and Catalinas, called it a day in the Bismarck Sea encounter, all that remained of a 22-ship Jap convoy with its tons of equipment and thousands of troops were oil slick splotches, debris of shattered cargo and escort vessels, smashed hulks of lifeboats and barges, and the tattered bodies of Jap soldiers and sailors. This was why the Bismarck Sea became known to the officers and men of the AAF who took part in the engagement as the "Bismarck Graveyard."

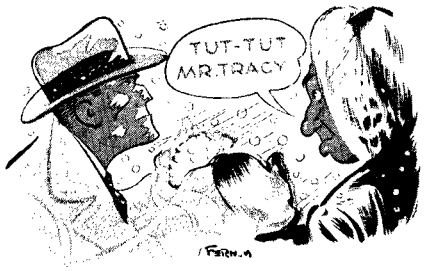
Weather Break

When the battle opened up,—in fact when the lone B-24 on reconnaissance first spotted the Jap convoy, the elements favored the enemy surface craft. Our attacking planes could only strike and hope for results; they couldn't see. But at 1000 o'clock on March 3 the cloud curtain rolled back. There in plain view and under almost cloudless skies bobbed the bulk of the enemy ship concentration. On that day every available plane was thrown into the task of demolishing the Jap convoy. (Continued)

TIPS FROM THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER

AIRMEN on combat missions in the Southwest Pacific have taken to wearing G. I. shoes, paratroop or marine-type boots instead of the flying boot. Reason: Bail-out experiences reveal that flying boots frequently snap off in descent, resulting in serious discomfort and injury when ground travel on bare feet is attempted over coral-strewn areas, hot stony terrain, or in jungle bush.

IT'S A GOOD IDEA *for crew members on flight missions in any theatre to provide themselves with a good shoulder-type holster for small arms. Web-type or leather pistol belts around the waist are frequently broken in parachute descent; often the weapon falls out of the conventional holster. Loss of the weapon may mean the difference between life and death. A good shoulder holster is the best insurance against such loss.*



A RECENT Dick Tracy adventure depicts that stalwart hero rubbing frostbitten skin with snow. The great Tracy ought to know better. NEVER RUB SNOW ON FROSTBITE! It's a dangerous thing to do because (1) it increases the freezing; (2) the rubbing tends to break the frozen tissues and will cause open wounds and possible infection. Slow thawing is the answer, Dick. For example, the right way to thaw a frozen hand is to warm it against the skin under your armpit, against your chest or between your legs; a frozen foot can be thawed between a companion's thighs or against his abdomen. And Dick, *don't ever use hot water* to thaw frostbite. Cool or lukewarm water is all right.

AN OPERATIONAL hazard in desert flying, especially at takeoff and landing, is encountered in the sand-swirls and minor whirlwinds generally found close to the ground. These occur only during the day and are easily seen. They should be watched for and avoided.

ARCTIC TIP: A hot thermos bottle may be kept hot much longer by wrapping it in a sleeping bag, heavy sweater or other insulating material. At extremely low temperatures there is danger that the cork may freeze in; to prevent such freezing fill the thermos to overflowing so that the hot liquid remains in contact with the cork at all times.

THE SECRET *of driving motor vehicles in desert sand is to keep rolling with as little wheel slippage as possible. Don't use excess power and spin your wheels. Nothing will get you stuck quicker or more thoroughly. If you come to a standstill, don't try to get out by spinning the wheels. You'll only go in deeper. Shovel the sand away from in front of both rear and front wheels or decrease your tire pressure. If you must stop in sand, stop on top of a hill or a mound so that you can start downhill.*

SOME IDEA of the character of the global war we're fighting is reflected in these facts: The hottest spot on earth is Azizia, Tripoli (in the African theatre) where a shade temperature of 136° F. has been recorded; the coldest place is at Yakutsk, in Siberian Russia, where 90° below Zero has been reached.

CONTRARY *to popular belief, liquor is no asset in Arctic regions. Physiologists tell us that alcohol causes the blood vessels to dilate, which in turn results in accelerated heat loss and more-rapid-than-normal cooling. Don't be deceived by that rosy glow or warm feeling you get after a shot of the stuff. You'll just be inviting quicker freezing. Liquor in the North Country has its customary social advantages but it is not a fortifier against freezing cold.*

INSECTICIDES *for jungle fighters are now packed under pressure in tomato-can-size metal containers. Pressing a valve releases a bug-blasting mist that fumigates a regulation puptent in a few seconds.*

The Arctic, Desert and Tropical Information Center welcomes contributions from all Army personnel with knowledge of the non-temperate theatres of operation. Submit to: Arctic, Desert and Tropic Information Center, Eglin Field, Fla.

Slap-happy Jap

The intensity of the March 3 raids, the accuracy of AAF bombs and the general fury of American airmen threw enemy defenders into confusion. One Jap cargo ship inadvertently rammed another, but no one will ever know whether the collision was of sufficient force to sink either ship because within a few moments both were destroyed by American bombs. Our planes attacked from all directions. Anti-aircraft guns on the ships were waving madly about, trying to fire everywhere at once. Several times our medium and light bombers roared in mast high and encountered no flak opposition at all.

Pop Gun

B-17 Waist Gunner Sergeant Henry Garcia of Los Angeles had the last laugh on the boys who kidded him for taking his rifle along on a mission. The sergeant was working his machine gun overtime holding off Jap Zeros when suddenly his ammunition gave out. Jap pilots, seeing Sergt. Garcia's fire cease, moved in for one more pass on his side of the B-17. The sergeant jammed his rifle full of tracers and let go at the oncoming Zeros. The ruse was successful; the Japs mistook the rifle fire for machine gun tracers and veered off without causing any trouble.

JUST A REMINDER

Take stock of these tips published for your benefit at the suggestion of the Flight Control Command:

Harness

Why don't more pursuit pilots use the shoulder harness? With a crash coming up, all the pilot has to do is pull the locking lever and the harness will give him complete protection from head and face injuries resulting from impact with the dashboard or gunsight. When he wants to get out it's no trick to release the lever or simply slip out of the harness. Remember that the harness is there for your protection and the protection is adequate—but only if you're wearing the harness.

Night Adapter Goggles

Apparently not all night-flying pilots of the AAF are provided with dark-adapter goggles, or know how to get them. The goggles in question are officially known as "Goggles, Assembly, Polaroid type D. A., Class 13, Stock No. 8300-343575" and can be obtained through the regular supply channels of any organization by applying to the Air Service Command.

The goggles which have red lenses, are to be worn by pilots for at least thirty minutes before taking off after dark. They do not interfere with the normal use of the eyes such as reading and playing cards, but they greatly increase the probability that such enjoyment can be carried on indefinitely.

Cap Spike

You probably never considered your cap a dangerous article but it can be.

Reports have been received of flying personnel suffering some nasty gashes from the end of the screw post on the service cap insignia when the cap gets jammed down during rough weather.

Take a look inside your cap, and if you have a half- or three-quarter-inch spike pointing at your forehead you'd better have it cut or filed off.

A CLARIFICATION

The need for clarification of two statements appearing in the Cross Country section of the April issue of AIR FORCE has been called to our attention.

"Most conscientious bombardier I've ever seen."

—CPL. PAUL J. KAATZ

In explaining the procedure to be followed by enlisted men in applying for aviation cadet training, it was reported that the company commander had the authority to indorse or reject the enlisted man's application. Actually, the company commander cannot reject the application, but has authority only to forward the application and other necessary papers, with his recommendation and appropriate remarks, to the Commanding General of the proper service command. It is also called to our attention that a recent directive from Headquarters to the Commanding Generals of the Air Forces and the Air Forces Commands states:

"Because of the urgent need for greater numbers of aviation cadets, it is desired that you bring this opportunity to the attention of every potential candidate and see that his immediate superior officer does not disapprove the application or subsequent transfer."

The second statement in question has to do with the new bombardier-navigator training program. We reported that those bombardier-navigator trainees who are appointed flight officers upon completion of the first phase of their training will be commissioned Second Lieutenants on completion of the second phase. Actually, such flight officers will be commissioned Second Lieutenants *provided* such a commission is recommended by a board of officers. Otherwise, they remain flight officers.

AIR FORCE is indebted to the Office of the Assistant Chief of Air Staff, Training (Military Personnel Division), for making these clarifications.

SCRAP

From San Angelo (Texas) Army Air Base comes the observation that the bombardier cadet of the AAF Flying Training Command is among the top contributors in the Nation's scrap drive.

"Every time a cadet at San Angelo drops a 100-pound practice bomb," this statistically-minded correspondent reports, "he adds 15 pounds of metal to the scrap pile. At the present rate that adds up to something considerably over 7,000,000 pounds a year."

VOLLEY BALL

It has been reported that a "bay chief" of a training squadron at the Advanced Flying School, Altus, Oklahoma, placed a notice on his bulletin board that all men must get up at 5:30 a.m. to clean the barracks. He added a penciled postscript: "If you play ball with me, I will play ball with you."

A khaki-clad wag pinned a note beneath the notice:

"Dear Sergeant," it read, "Sorry, 5:30 a.m. is too early to play ball. We will be glad to play ball with you at eight. Sincerely, The Opposition." (P.S.—The game started as originally scheduled.)

From the Commanding General, Army Air Forces, dated April 22, 1943:

To all personnel of the Army Air Forces:

In violation of every rule of military procedure and every concept of human decency, the Japanese have executed several of your brave comrades who took part in the *first* Tokyo raid. These men died as heroes. We must not rest—we must redouble our efforts—until the inhuman warlords who committed this crime have been utterly destroyed.

Remember those comrades when you get a Zero in your sights—have their sacrifice before you when you line up your bombsights on a Japanese base.

You have demonstrated that the Japanese cannot match you in aerial combat or in bombardment. Let your answer to their treatment of your comrades be the destruction of the Japanese Air Force, their lines of communication, and the production centers which offer them opportunity to continue such atrocities.

Bath

At one stage in the rout of Axis forces in North Africa, American troops captured among other booty a real, honest-to-goodness porcelain bathtub which probably adorned the quarters of some ranking enemy field officer. Between stabs at the retreating Axis troops, enlisted men took turns sitting serenely in this prize of war, dreaming of those little tiled rooms at home, while their pals poured in North African water from buckets.

On Land in a Life Raft

Rubber life rafts can come in handy even on dry land, take it from First Lieutenant Sam Constantino, Air Transport Command pilot, who recently brought his ship down for a crash-landing among the African sand dunes. Lieutenant Constantino and his crew inflated the life raft and used it to good advantage as protection against the cold wind at night. Incidentally, Lieutenant Constantino and his crew made it to safety by hitching a ride with an Arab camel caravan after seven days of fruitless wandering.

Page St. Patrick

When the 1,200-acre tract was cleared near Orlando, Florida, as the site for Headquarters of the AAF School of Applied Tactics, engineers found the terrain a favorite playground for hundreds of snakes. Even after AAFSAT officers began to move in and set up training classrooms and staff offices, the reptiles continued to put in an occasional appearance to protest this intrusion. Most of the nuisance-makers were put to death and promptly forgotten—physically speaking. But not so with a big, fat cottonmouth moccasin and a coral snake which happened to meet their timely end near the medical buildings of the Air Service Department. True to his medical background, Major G. W. Holt, flight surgeon, pickled the specimens in alcohol. They now repose harmlessly, though prominently, in glass jugs on the Major's desk. This is the same Major Holt, incidentally, who wrote "Why Black Out?" appearing in the May issue of Air Force.

Plague

A corporal now stationed at an Alabama airfield attributes his recent divorce to mother-in-law trouble. Comes now word that his ex-wife's mother has been made a third officer in the WAACs, and is headed —yes, to that same Alabama field. Naturally, by reason of rank, she will be one of the corporal's superiors. Anybody know of a nice soft berth for this guy in New Guinea?

Handy Gadgets

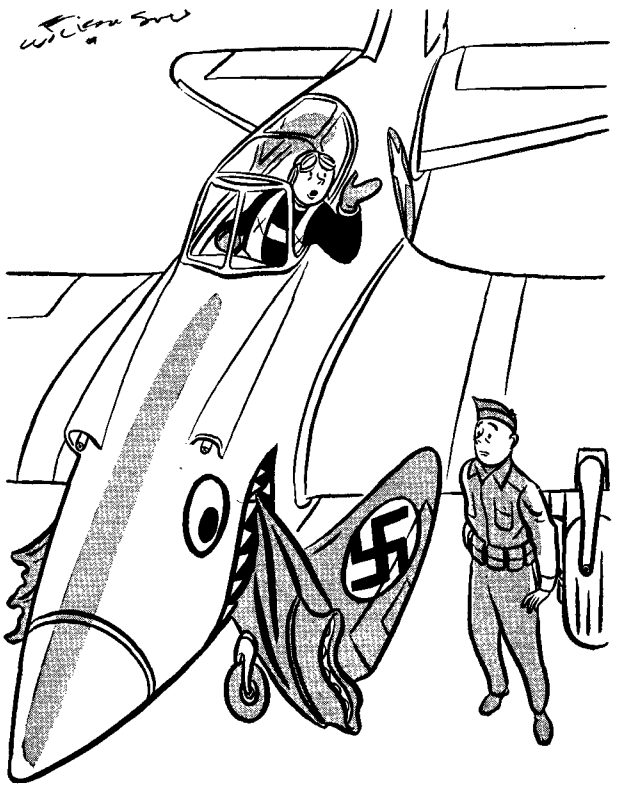
In the soon-to-be-ready hopper at Wright Field are these items which are destined to make life more pleasant for airmen who are forced to exchange their planes for rubber life rafts:

A salt water still, which handily converts ocean brine to pure drinking water; a sling-shot device for better seagull - shooting; a special mirror capable of reflecting the sun's rays to attract the attention of planes flying as high as 5,000 feet, and a vest-pocket container which, with a minimum of adjusting, can be used to catch and store rainwater.

Wrong Room

Sergeant Alvin O. Crabbe of the finance staff has inadvertently become the champion test-taker at the Newport (Arkansas) Army Air Field. Called to appear before the O. C. S. Board several weeks ago, Sergeant Crabbe was directed to the ground school building for the necessary examination. He was ushered into a classroom, handed a sheath of papers and told to get to work. For three hours Sergeant Crabbe sweated out the test and, turning in his papers, he inquired of the attending officer if this exam represented a departure from the usual O. C. S. test. Whereupon the astonished officer informed Sergeant Crabbe he had just completed a difficult examination for Army Specialized Training Program. The O. C. S. Board had been in session next door. The sergeant's appearance before that body was promptly re-scheduled for the next meeting.

P. S.—He scored exceptionally high on the A. S. T. P. test.



"I ran out of ammunition!"

FRED WILKINSON

Branch Bank

Our attention has been called to a banking service scheduled to begin at Sheppard Field, Texas, about June 1. The First National Bank of Wichita Falls, Texas, is opening a branch at the post, offering the usual banking privileges to military and civilian personnel with the exception of making loans. Similar enterprises have been established at several other Air Forces installations.

Supply Lines

Some interesting figures on the movement of cargo and troops in this war as compared to World War I have recently been divulged by the War Department. Troops transported overseas during the first year of war totaled 891,827; the figure for the same period during the last war was 366,603. Cargo shipped to overseas troops, not counting that consigned to our allies, averaged 82 pounds per man per day, as compared with 43 pounds per man per day in 1918-19. During the first year of our participation in the last war, approximately 1,725,000 measurement tons of Army freight were shipped overseas, as compared with 10,474,923 measurement tons in the comparable period of the present war. In one month last year the tonnage figure reached 1,554,127.

These figures do not include freight now moved by air transport, which is made up of articles of greatest strategic importance. As the projected program for the construction of transport planes is realized, more and more troops and larger and larger tonnages of cargo will be handled by air.

Allied Insignia Recognition

An instruction program has been inaugurated to enable U. S. Army troops to recognize more readily the insignia of rank in the combat forces of other United Nations. All training Air Forces and independent AAF Commands in the continental United States have been ordered by General Arnold to give instruction in recognition of United Nations insignia to personnel destined for overseas duty as "an essential part of military training."

Commanders are warned not to give instruction which obviously pertains to a particular theatre prior to movement of any unit to a staging area but rather instruction which pertains to all theatres in order to avoid revealing the unit's ultimate destination. Insignia identification posters designed to aid in the educational program may be obtained through the Special Service Section, Army Service Forces. —The Editor.

SHOULDE

By COLONEL ROBERT L. SCOTT, Jr.
FORMER COMMANDER OF U. S. FIGHTER GROUPS IN CHINA

SOME fifteen hundred feet below the blue waters of Victoria Harbor were rippling in the light of the setting sun. Some of those waves were caused by the wind but a few of them started with the splash of nineteen Japanese Zeros which seven of us had shot down in the last three minutes.

Just then I crossed the southeastern tip of Hong Kong Island and saw one more silhouette of an airplane. My gun switches were already on, my gunsight was reflected brightly in the armor glass of my windshield. I moved to attack the other ship.

There was not an instant of debate whether it was a friendly plane, a shadow, or a bird. With everything forward—prop control and throttle—I took military power from the throbbing engine and attacked.

A split second before my tracers would have rattled from the six fifties of the P-40, I saw the other ship wig-wag its wings. Then I heard a Texas drawl, "If that's a P-40 in front of me, wiggle *your* wings."

I mean I "wiggled" them, too, for the guns of the other P-40 were pointing right at me and you don't argue or hesitate with a P-40's guns. Ask the Japs in China.

The simple fact that these two American fighters were the last ships in the air over Victoria Harbor on that afternoon of October 25 meant the twentieth plane would not ripple the water that day. We were both *attacking*. There was not a single thought of defense or deliberation about whether the other plane was a friendly one. There can't ever be—or you will become the twentieth ship some day.

As for the two of us that afternoon, we were so glad to meet each other that we went into formation and arrogantly engaged in acrobatics as we passed over Kowloon and Canton en route back to our base in Free China.

THIS arrogance we call the "chip on the shoulder" that is just as necessary to fighter flying as formation or gunnery. It's the quality that gave western gunmen itchy trigger fingers. It's the heads-up way you have to play in this fast moving game in the skies.

To adopt it you must have developed a neck like an owl that lets you look around constantly while you're flying. You must have developed it while you were learning to fly and it must have grown with you until it becomes a movement that is as natural as blinking the eyes.

You've got to know that the little piece of dynamite you call your home in the air is a flying engine with guns tied on and with you as its brain. You live or die together as that brain decides.

Your mind is at ease once you are on a mission for there can be no doubt but that you are flying the best equipment in the world, that you have received the best training anywhere, that you have everything to fight for. You can laugh and know that any enemy pilot who faces you in combat is a fool and will die. Oh, some lucky bullet from the ground may get you, perhaps some ricochetting burst from an enemy plane. But this man in front of you shoot you down? Never in all the world. For you've learned that you are better than he; you are what you have wanted to be all your life, the actuating brains of one of the greatest weapons in the world. You have six to eight .50 caliber guns in your wings or synchronized in your ship's nose and perhaps you are flying one with cannon.

Stop and think for a moment of what you have read of machine gun and rifle companies and battalions in other wars and then realize that you have at your very finger tips the trips to more shots per minute than the infantry battalion.

"Let your every thought be an offensive one and be mad as hell when you can't find an enemy to battle."

Your first mission is to escort bombers and get the offensive arm of our Air Forces to its objective and away. But you can also carry bombs and learn to lay them in the groove. Did you know that those six fifties on a P-40 can sink a Japanese destroyer alone? They can, but for effective action you, first of all, must know your ship.

FLYING must be second nature to you. You must be so good in formation flying that it has long since become a pleasure for you to sit there on your leader's wing or to assume the responsibility of leading other men. Your gunnery must be at least that of a sharpshooter, preferably that of an expert.

You don't have to be tall or short, young or old, rich or poor, fat or slim. There is no pattern for a fighter pilot. His physique waxes and wanes as the moon. But the quality that must be there is a spirit of adventure. It's the certain something that makes you want to fly the little ships alone with no co-pilot to talk to, no navigator to turn to for directions, no bombardier to aim your load, and no gunners to keep the enemy off your tail. This is no reflection on the pilots who want to fly the twin engine bombers or the heavy four-engine ones, or those who look to a life in the transports. They are all just as necessary as you. Let them fall down on their job and the battle is lost.

But you are where you are because you want your job more than anything in the world. You carry that chip of superiority along with you all the time because your character in the air must be that way. When the chips are down, you know you stepped into the mess all by yourself and it's up to you to get out—by your own ability and the knowledge of what your ship will do. But by your own proper planning beforehand you can enhance your chances of escaping tight squeezes.

The one thing that you must never do is wonder: Can I do this? Should I be here? Should I wait and see if that is one of our ships? Am I meeting a better pilot?

You must forget everything but that you are the best in the world. You must have long ago learned to shoot so that as each Jap makes a head-on run against you, you will be glad that he helped aim the guns for you. You must be saying, "You poor sucker, I'll kill you long before you come within range with your poor little guns."

Yours is the job where arrogance in the air is a necessity—you are looking for a fight. You are mad if you escort bombers and the enemy does not intercept. How are you going to destroy his air force if he doesn't come up to fight?

Afraid in combat? It will never enter your mind. There won't be time for prayer or for fear. Sometimes when it's over you'll know that someone at home must have prayed for you. And you may experience fear later but not in the fight.

There was always a fear gnawing at my heart before the take-off for action. The night before I could never sleep. I could shut my eyes and see Zeros climbing into the bomber formation with cannon going, making their little smoke rings that floated out in front of the Japanese fighters. I would almost fall asleep with these images before me but then as I tugged desperately to get my fighter to them I would lose the race and see my own bomber go down in flames. Then I would jump wide awake for the hundredth time that night. Sleep would never come. Not from personal fear, but from fear that I would fail in my mission. Fear at first that combat would be unnatural for me, but never fear that some little bullet would hit me. I was too arrogant for that and you will be. You'll worry just like all of us do as you try to sleep the night before. Then as you stand around and wait the interminable seconds for the operations officer to brief your mission, you will be sharp

R'c.

and cross with the crewmen. You may even gripe at the Chinese boy who serviced your ship for stepping on your chute, but it will be from the tension of the moment. When you take off you'll be the happiest man in the world. Soon you'll say to yourself, why don't the devils come up? Why?

And there they are. At the first instant, the steepness of their climb chills you, then their numbers, but now you remember there aren't seven of you this time. There's a whole group, and another is sitting up there in the sun as support, and the reserve is higher still, and this is where the Jap dies and you're attacking without realizing your move.

In seconds, it seems, it's all over and you're looking around in a sky that's filled only with American ships. And the white stars on the wings and fuselage look to you like a part of the United States—Main Street or the State Capitol or the Mississippi River. And maybe a cheer will rise to your lips and the world will blur from a tear that comes hot in your eye. You'll think it's a privilege to be here and do this job for the greatest country on earth, and you will realize that this is the way to keep the country you love just the way you want it. You'll insure by hundreds of such raids that your wife will live the way she was living when you first knew you loved her, your little boy will have the same future that you've always planned for him, your Main Street—your American Way of Life—will go on.

IN a second that emotion passes and you're on the way home to base, sweating out your navigation and your gasoline. Then you're telling the boys who haven't been out yet that it's a cinch. "They blow right up when you get a good burst of fifties in on them. But, boy, they can climb!"

Then the routine begins all over—the impatient waiting and the griping for action.

It's going to do you and America a lot of good to see these hellholes we fight in, for when the war is over we will then understand the sacred thing that we have.

But as you ride out over the many fronts of this war, ride in confidence that you are better trained, you are in superior equipment, and you can outgun and outshoot any ship in the skies.

Let your every thought be an offensive one and be mad as hell when you can't find an enemy to battle.

Above all, never wait to be attacked. Get your gun switches on, get your gun sight on, get your controls on the throttle quadrant forward "to the firewall" for military power—and *attack, attack, attack!* Every fly speck, every vulture, everything that may be a plane is your target. Attack before he attacks you. Never have a defensive thought. ☆

FLORIDA'S COMBAT THEATRE

By Brigadier General Hume Peabody

COMMANDANT, ARMY AIR FORCES SCHOOL OF APPLIED TACTICS, ORLANDO, FLORIDA

A FLIGHT of B-17s roars out over the Gulf from Florida's west coast on a late afternoon bombing mission.

The distance between its base on the mainland and the target—marked by an aluminum slick on the surface of the water—represents the exact distance between an Allied bomber base in North Africa and an enemy airdrome on Sicily.

The B-17s reach their objective and drop their bombs. The mission progresses under conditions copied from a raid which actually had taken place several weeks before in the North African theatre.

Back on the mainland a night fighter squadron is alerted to intercept a flight of "enemy" bombers approaching the Florida coast. A completely equipped and staffed Aircraft Warning Service has picked up these "raiders" — represented by our returning B-17s—and is plotting their course as they move in from the Gulf.

Searchlight batteries and anti-aircraft units, kept advised of the exact location of the bombers, are ready to spring into action.

The night fighters take off and, under the guidance of a central Controller, move out to intercept the raiders. Coastal searchlights suddenly come to life, catching the bombers in their powerful beams and carrying them along despite violent evasive efforts by the raiders to escape the shafts of light. With their targets standing out clearly, the night fighters then move in swiftly for the "kill." Here, too, actual combat conditions have been simulated in detail.

THESE demonstration missions are typical of those flown daily as an integral part of the training program at the Army Air Forces School of Applied Tactics.

Back of such missions are days of academic training at AAFSAT in up-to-the-minute tactics and technique, lecture course in maintenance and supply, in aviation medicine and combat communications, instruction in air crew briefing and intelligence interview, and the countless other details that go to make a typical air force.

For all practical purposes AAFSAT is an air force—an air force operating in a "war theatre" which embraces some 8,000 square miles of territory in west central Florida. The AAFSAT air force has a Bomber Command, a Fighter Command, an Air Support Command and an Air Service Command.

The Author

From three of the twelve airdromes in this theatre heavy and medium bombers fly countless missions copied in detail from missions flown in combat theatres over the world. Fighters operate from five other bases, one of them a combat school for night fighters, the first in the United States.

Air support units, including light and dive bombers, troop carrier planes and gliders, and observation aircraft, are based on three separate airdromes. The other base is a "forward area" airdrome hacked out of the Florida brush by aviation engineers and used to simulate rough conditions to be encountered in many of the war theatres.

In addition, a complete air service organization from a general depot—the only one of its kind in the country—to the lowest field echelon operates full time to keep both planes and personnel in A1 fighting shape.

At AAFSAT headquarters in Orlando, where all academic work is accomplished, the high command sets up demonstration missions, keeps careful tab on their progress through complete operations center facilities, and makes detailed studies of the results.

OUR primary purpose at AAFSAT is to train air force cadres—key personnel framework for all new combat groups—in the latest combat tactics and under operating conditions approximating as closely as possible those with which these officers and men will be confronted in the various war theatres.

To accomplish this mission we are not operating on theory, nor on the mere basis of intelligence reports alone. We have as instructors and advisors outstanding combat-experienced officers, many of whom have spent more than a year in war theatres around the world and participated in one important aerial mission after another. In addition to these seasoned AAF instructors, AAFSAT enjoys the valuable assistance of Royal Air Force veterans in setting up training courses and field problems.

In the Air Defense Department of AAFSAT alone, more than sixty instructors have had overseas experience. Among them are Colonel Robert L. Scott, Jr., whose military career in the Far East has been one of the most brilliant of the entire war; Colonel Orrin L. Grover, who served through the Bataan defensive in the Philippine campaign and later in Australia; Lieutenant Colonel Oswald Lunde, whose combat service has taken him to the Philippines, Australia and North Africa; Lieutenant Colonel Walter B. Putnam, a veteran of the Southwest Pacific theatre; Lieutenant Colonel Winston W. Kratz, who was assistant A-3 of the Eighth Air Force for more than nine months; Colonels Arthur B. Nicholson and Thomas J. Cody, both veterans of the North African campaign; Major Charlie R. Bond, a member of the American Volunteer Group in China for more than a year and a half, and Captain Reade F. Tilley, who served with the RAF in England and Malta before transferring to the Army Air Forces.

Several former officers of the 19th Bombardment Group are on the staff of Bom-

Introducing the Army Air Forces School of Applied Tactics where key personnel of new Air Force Groups get a taste of modern air warfare before going overseas.

bardment Department at AAFSAT, including Lieutenant Colonel James T. Connally, Group C.O. for several months in Australia. Majors S. R. Patterson and Max Fennell, who served with the Ninth Air Force in Cairo, also are training bomber personnel. Lieutenant Colonel C. B. Whitehead, with the RAF Bomber Command during the early days of the war, is chief of academic instruction for the Department.

In air support, Lieutenant Colonel Ronald D. Hubbard and Major James B. McAfee are passing on techniques in light and dive bombing they used successfully as members of the 3rd Bombardment Group in the Southwest Pacific. Their former C.O., Colonel John H. Davies, took a leading part in setting up AAFSAT's air support program. Lieutenant Colonel C. E. Hudgens, who participated in the troop carrier mission from the British Isles to North Africa at the outset of the campaign in that theatre, offered valuable aid in the troop carrier training program while at AAFSAT with his own cadre.

These are but a few of the combat veterans lending a touch of war realism to the training courses. It is under the guidance of these officers that another purpose of the school is carried out- -the continued development of tactics learned in combat theatres.

Afforded the use of the latest types of equipment, AAFSAT instructors and students are able to explore new techniques, put them to rigid tests and, if they prove successful, pass them on to war theatres by the time the new equipment gets there. Thus AAFSAT becomes a tactical laboratory as well as a school of instruction in tactics.

By the same token, new tactics developed in combat theatres from time to time are made a part of the training program at AAFSAT. This is one of two principal methods employed to keep AAFSAT instruction from becoming static. The other is represented by a regular turnover (about five percent) of instructors. Now and then instructors leave AAFSAT to head up their own groups and squadrons bound for war theatres, and fresh instructors arrive from combat zones to replace them.

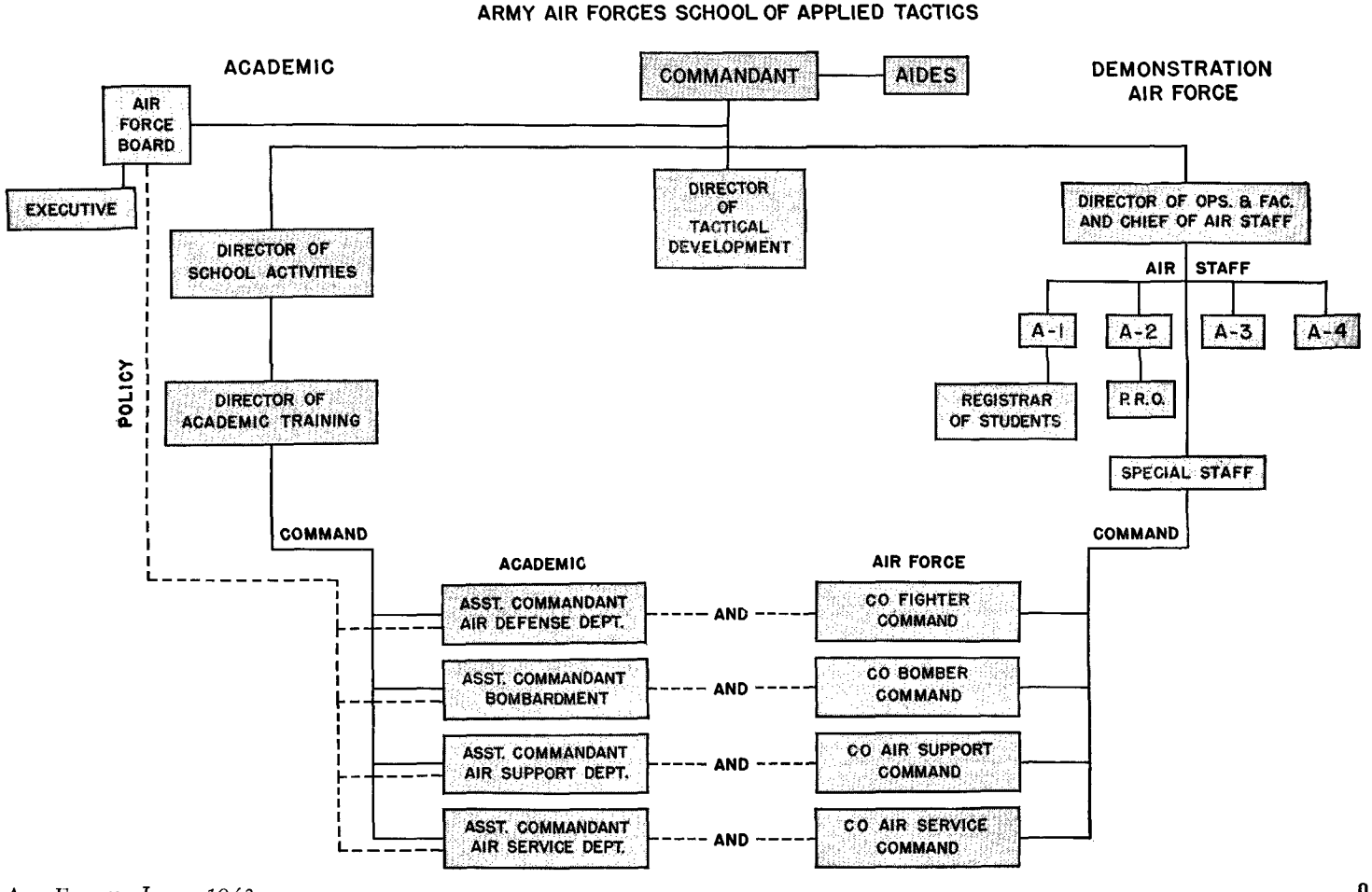
THOSE of you who come to AAFSAT will find at Orlando the school headquarters and some 1,200 acres of classrooms, buildings housing synthetic training devices, A.W.S. filter and control centers, barracks and mess halls. Here is where you will receive your academic training.

Chances are you will come as a specially selected member of a cadre- for the purpose of illustration, say a bombardment cadre. In your unit, picked from one of the training Air Forces in the United States to form the nucleus of a new Bombardment Group, will be about 150 officers and men ranging from the Group C.O. to supply sergeants and gunners.

At the outset you will receive a four-day orientation course. This goes for everyone coming to AAFSAT, from corporals to generals. The course brings students up to date on broad developments within the Army Air Forces and refreshes their minds on military topics which were supposed to have been absorbed in earlier training.

Operational personnel -pilots, bombardiers, navigators, radio operators and gunners—then will hear lectures on tactics employed in the various combat theatres and operate the latest synthetic trainers in practical illustration of the lectures. Meanwhile, the administrative and service personnel of the cadre—adjutants, intelligence officers, medical officers, maintenance men, supply sergeants and the like—will take classroom courses in the Air Service Department.

Your cadre will re-form for the final phase of the training at one of the AAFSAT bomber airdromes. There you will eat, sleep and operate under simulated combat conditions for about two weeks. You who are air crew students will fly missions with officers who know first hand what it means to push through damaging flak and fight off enemy interceptors to reach a target in the Mediterranean, or in Western France, or in the Solomons. (Continued on Page 29)



Shorty Gordon

Angels DON'T SHOOT GUNS

By Captain Bernard W. Crandell

HQ. EIGHTH BOMBER COMMAND

THIS is meant to be a story on the toughest gun position in a Flying Fortress but if it incidentally deals with the toughest little gunner ever to lay into a pair of cold blue fifties you may conclude that it takes a lot of both—metal and man—to do the right kind of a job on enemy fighters.

The Fortress can be most any one, just so long as it's heading out over the English coast toward the war mills of Europe with a bay full of bombs and belts choked with bullets.

The gunner, however, will be Shorty Gordon, who operates from a ball turret as round as the oranges that grow back home on his mother's San Fernando ranch.

At the pay table the signature behind the $172.80 is Staff Sergeant Lee C. Gordon, but when he's hanging up there under the belly of a Fort 20,000 feet above Germany, switching his long-barreled fifties at the buzzing Focke-Wulfs and Messerschmitts like a cow bothered by flies, he's plain Shorty Gordon, a hell of a good gunner.

When he's not flying he's talking about it so, figuratively at least, Shorty Gordon lives in that ball turret.

Two-thirds of his turret projects from the bottom of the B-17 to meet attacks from below. In it are two .50 caliber machine guns, several hundred rounds of ammunition, a range mechanism, gun sight, switches, buttons, pedals and petcocks. The gunner gets what room there is left, squeezing in between the guns, legs thrown forward, left foot on the range pedal and right foot on the interphone switch. His knees rest so close to the bolt mechanisms their action during combat often tears his clothes. Remarkable as this strictly G. I. invention may be, it is not nearly so popular in a particular Fortress squadron in England as the 20-year-old kid who operates it.

For Shorty hasn't missed a mission yet.

His feet have been frozen and his electrically-heated baby blue jumper has failed him at 45 degrees below zero.

He has had to work all night inside the wing of a Fortress and go up to fight the Luftwaffe the following day.

He has had to beg, wheedle or steal his way to a gun position in another ship when his own was out of commission.

He has worked on frozen guns at 24,000 feet while fighters were boring in and flesh was tearing off his fingers each time he touched his guns to coax them back into action.

But he hasn't missed a mission yet.

Before Shorty's virtues get out of proportion, let it be said that Shorty is no angel. Because angels don't get drunk and angels don't say "I'm the best damn gunner in this group" and angels don't land in the guardhouse and angels don't gamble or bootleg. And angels, as we all know, don't shoot guns.

Shorty, you see, may be short but he ain't sweet. To be exact, he is 5 feet 2 inches short which—believe it or not, you Air Force experts—might be a bit too small. Most gunners find a ball turret like a straightjacket, but Shorty slips in easily. In fact, he claims he's the only gunner this side of the Atlantic who can wear a parachute inside the turret. He needs a chute to fill up space. When he doesn't wear one he uses a pillow to prop himself up to the sights.

Shorty's pals get a laugh over those pillows. He's always had to use them for one thing or another. Back in the United States, at their base in the desert, a 1931 Chevvy came tooting home to them every night. On the rear seat rested the inevitable case of beer, and on the front would be Shorty, a ridiculous figure propped high on pillows peering over the edge of the windshield.

Shorty still prefers his pillows to a parachute—if the mission looks easy.

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

PREPARING properly for a five-hour ride in an unheated ball turret, exposed to the full blast of the slipstream, is as important as having clean guns. For if the gunner can't take the cold, the Fortress might as well have stayed home.

What does Shorty Gordon wear on a mission? We'll start him right from scratch, from a warm G. I. cot at 0430 o'clock on a cold winter morning.

First, Shorty, you'll get dressed. Step into that clean woolen underwear and clean woolen socks and be sure they're clean because if they're not moisture will collect and freeze. Now pull on your electric suit, that one you call your "zupe suit" just because it has zippers. And the electric shoes and gloves. Next is your cotton gabardine summer flying suit, and a thin leather jacket over that. You wear RAF flying boots because they're higher than your own G. I.'s and they keep the wind—that 45-below-zero wind you found over Wilhelmshaven—off your legs. A white scarf of parachute silk to keep the heat down in your suit, and your leather helmet, and you're ready to go.

You've had a pass at the chow line now, Shorty, and here is the briefing. St. Nazaire, the U-boat base on the French coast, is your target. You know all about this one. It's the one you all say is the toughest in Europe. You've been there before. You know the story from here, Shorty, you tell it.

"I've had to clean my guns and check the turret before we take off," Shorty Gordon begins.

"When the ship gets off the ground I climb into the turret from the inside. On

take-offs and landings I'm not in the turret because if we crash-landed the turret would be smashed. First thing I do is snap on the power switch, then get the guns charged. I have to charge them before we get too high because pulling back those bolts with both hands leaves me a tired guy at high altitude. When we get to the Channel I test the guns by firing a few rounds.

"The guns are pointed downward when I first climb in, but over enemy territory they are forward and low and I'm searching for enemy aircraft. If I'm in the lead ship I search to the front. Otherwise, I search to the front and side of the formation on which we're flying. If I'm in the rear element I concentrate against a rear attack.

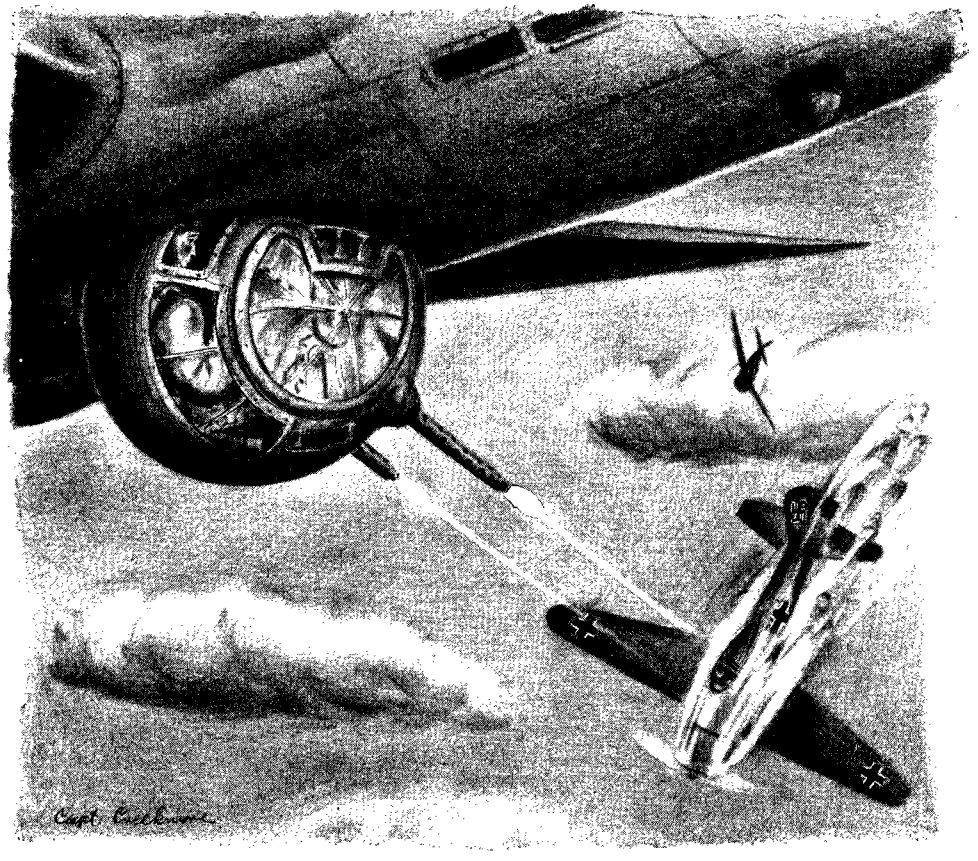
"When the turret revolves gunners usually lose all sense of direction because they can't see the bottom of the plane unless the guns are pointing straight to the front or straight to the rear. Some of us veteran

It takes a tough guy like Shorty Gordon to handle the toughest gun position in a bomber over Europe.

the sight plate I can't see to aim. I watch closely now for enemy fighters because this is a favorite time to attack.

"If I see one coming from behind the bomb bay doors I shoot right through them. It's either do that or let him get us. There is a catch on the turret that keeps the guns from swinging up and firing into the props or wings, although there have been times when our bullets have accidentally struck other planes in the formation. Luckily they caused little damage.

"When I hear 'bombs away' from the bombardier, I try to watch them falling so I can report to the Intelligence officer where they hit. On this St. Nazaire raid I watched



"He caught fire and went into a dive. One of the gunners saw him splash into the water."

gunners can tell just what position our turret is in by the screaming of the wind. It makes different noises as the gun barrels turn in different angles. It increases in volume when the guns are pointing forward and decreases as they swing to the rear.

"As we approach the target I have to hold one hand over an earphone to be sure of hearing the others calling out the direction of attacks by enemy fighters. The wind up there is pretty bad. Besides being way below zero it makes so much noise that when my guns are firing all I can hear is 'put, put, put', and the clicking of the bolts as they go back and forth.

"When the bomb doors open I point the guns down to keep off any oil or dirt that might fly out of the bomb bay. If oil covers our bombs go down until I lost them. You can't follow them all the way down when you're flying at 25,000 feet, but I estimated their direction and the time they should hit. Other bombs were hitting in the water near the target. Then I saw our first one in the water short of the target. The next one was closer, the third hit the corner of the target and the other two went right into the middle of it. There was a hell of an explosion and we found out later that we made a direct hit on a torpedo storage shed.

"There was so much flak as we approached the target that all I could see ahead was the barrage over the target, a great black cloud that hid the formation of Forts flying ahead. It was like a big thundercloud, thick enough to walk on. We all agreed later that it was the largest and most accurate barrage ever thrown up at the Forts over Europe. The barrage is a swell sight but it gets on my nerves. I could hear flak hitting the ship.

"I knew that if flak hit me while looking down I'd get it in the face, so I continued searching forward. About that time I heard someone on the interphone yell 'I'm hit,' and then another say 'I'm hit.' I thought this time we were going down in France. Everyone seemed to be shot up badly so I waited for the order to bail out. This was one mission I was wearing my chute.

"I was still searching forward when I saw the Number 1 engine on fire. I stepped on the interphone button but it was dead. I wanted to tell my pilot, Lieutenant Cunningham, about it, and wondered if I shouldn't get up into the ship and tell him. It was burning on the under side and he couldn't see it. I decided to stick in the turret because there might be more fighters coming. Finally Lieutenant Cunningham saw the fire through a flak hole in the wing and pulled the fire extinguisher on that engine. That stopped the fire, but the prop was windmilling out of control and I was afraid it would tear off the engine.

"We were over water on the way back when I suddenly remembered that I didn't have my Mae West and was trying to figure out how I could get ashore after hitting the water. But then I heard someone say that enemy fighters were approaching from 11 o'clock. I ran my guns to that position, nearly straight ahead, and waited. I could hear bullets hit our ship but I couldn't see the fighters. That's one of the worst things that can happen—hearing other gunners firing but not being able to help them.

"I heard the bombardier calling out two enemy aircraft coming in low from 3 o'clock. I turned and saw them and gave the first one a long burst at 800 yards. They were Focke-Wulf 190s and one was following the other. I hit the first one. Both of them saw my tracers and started to break off. Then I gave the first one another good burst at about 600 yards and saw my tracers going into his engine. He caught fire and went into a dive. I followed him for about 5,000 feet, then started searching for the other fighter. One of the waist gunners saw the first FW splash in the water. It was easy to see because we were only at 15,000 feet. The other fighter apparently turned back.

"My feet started to hurt pretty bad when we got down to 10,000 feet because they began thawing out. I had to take off my helmet and tear at my hair to keep from feeling the pain. My electric shoes hadn't been working. That was the fifth time I froze my feet. When I search forward my feet and legs are pointing ahead, and that makes the blood run back out of them."

FOR two weeks after that mission Shorty's feet bothered him. It wasn't their feeling numb and going to sleep all the time that worried him; he was just afraid they

wouldn't let him go up again in that condition. That fear of being left behind is one of Shorty's continual worries and it has been ever since his crew was broken up in the States just before the air echelon flew to England.

Shorty had to come over by boat. That boat ride mortified him—the best gunner in the group having to travel by boat. Back at Muroc he had been telling the boys in the barracks that he was going to be in the "Big Push," and a boat ride was an inglorious start to Shorty's personal invasion of Europe.

But Shorty was in a new crew before the group went out on its first mission. And he had happy hunting for a while. But the fifth time "Cunningham's Coffin" thundered back from the Continent it was in a state of salvage even before it landed. Normally, a crew waits until its Fortress is replaced. But Shorty couldn't wait.

He started bumming rides on other B-17s. Any old Fort would do, and if the ball turret weren't open for him, why, he'd take the tail gun. Yes sir, any old gun position would do. Even a waist gun. And if no position were open, Shorty would try to sell some other gunner the idea of letting him take his place.

FROM "Cunningham's Coffin" Shorty went to the famous "Boom Town." Then to "Little Joe," and then the "Sunrise Serenader," the Fort that came home from the second raid on Germany with one wing dangling from a direct hit by a 20 mm. explosive shell in the main spar. Shorty was scared that time. He might have been tired, too . . .

He had returned to the station from a 48-hour pass on the afternoon before the raid. He had had little sleep. He went to his ship, spent two hours cleaning his guns, and was about to hit his bunk when the engineering officer called for him. A supercharger needed changing on one of the Forts, and Shorty was the only man small enough to climb inside the wing and crawl out to the engine and do the job.

Shorty worked most of the night inside the wing of that B-17. In there between the spars, compressed, cold. But working. He was finished at 0400 o'clock. Just enough time for breakfast. Then the briefing.

He was tail gunner on that trip and his guns froze up over the North Sea on the way in. That was the day the mercury at 22,000 feet was 45 below. That was the time he took off his electric gloves to work on his guns. The waist gunners could see Shorty back in the tail, bent over his frozen fifties, but they couldn't see what the metal was doing to his hands. Every time the moist side surfaces of his fingers touched the barrels, skin was welded to steel. And when Shorty pulled his hands away, the steel didn't rip an inch.

"I won't be able to use these guns, Lieutenant," Shorty called over the interphone. "But I'll sit back here and tell the boys where the fighters are coming from."

That day Shorty became a broadcaster.

He gave a play-by-play description of the longest battle the Forts ever had over Europe. He had no sooner announced his broadcasting intentions when . . .

WHAM! It was a concentrated attack by FW-190s, ME-109s, 110s, 210s and even JU-88s. In they came and Shorty was on the air, warming to his job like a professional when the horses are heading for the wire. He was slightly excited at the time, he admitted later. In fact, he became unintelligible in spots and the other gunners couldn't quite follow his dazzling description of the 75-minute battle up there in the cold blue sky between the Forts and the Luftwaffe. They tried to tell him to get the hell off the air but his interphone switch was locked in position, the fight was just beginning, and Shorty was already heading for the wire.

Shorty saw everything that day. He saw things happen that had never happened before. He saw a Fortress drop out of formation with four Focke-Wulfs after it. The Fort took violent evasive action. It swung up and over, into a complete barrel roll. Fighters do that; not Fortresses. It took Shorty several minutes to get his voice down to a scream and describe it.

A few minutes later an FW collided with a Fortress head-on.

"The Focke-Wulf was starting to roll over and go into the usual dive away from our formation when his wing hit the wing of a ship in the element below us," Shorty recalls. "The impact cut the wing off the fighter and knocked the wing off the Fortress just past its Number 4 engine. The Fort started into a circle, then went into a tight spin. It broke in two right at the middle and the ball turret went spinning down looking like a baby's rattle. Then the wreckage exploded."

Returning across the North Sea, Shorty's ship had dropped back to protect a Fort limping along on three engines when a Focke-Wulf landed the cannon shell that nearly tore off the wing. They got the fighter that did it, and they eventually landed safely although the "Sunrise Serenader" was such a mess it couldn't be taxied off the runway.

Some of the things that Shorty does are not good examples for prospective gunners. They're not meant to be. Shorty at times is a horrible example. But most of the time a horribly good one. And everyone loves him for it. He's the one big factor in Squadron morale, with all his worrying about going on missions, and his extra-curricular activities. . . .

IT was after that eventful raid on Germany that other gunners down in the tin Nissen hut paused between deals to ask Shorty if the "Big Push" finally was on. They had waited months to hear it, and were so amused when Shorty said "yes", it was an easy moment for him to finger out the card he needed for 21.

Shorty never is lucky at cards although he gives them all the charm he can muster. Even his "Salt Mine" doesn't help very much. A gunner's "Salt Mine"—in Shorty's squadron at least—is any special article that brings luck to his cards. Shorty's once was a dilapidated, dirty old mechanic's cap with long strings that hung down in his face. This eyesore was what he wore to bring luck at Black Jack. But he found he couldn't rely on it. It lost him too much money. So now the tattered cap has been replaced by a new Salt Mine, a cat that hangs around the hut in the evenings. With the cat on his lap Shorty seems to do better, although even the new Salt Mine gets kicked out of the place occasionally.

THE other gunners view Shorty as a combination comic strip—Katzenjammer kid one minute, a Superman the next. They tell of the time their squadron commander inspected the barracks, walking right past a bed with blankets neatly drawn up and looking like any other bed—except for a slight hump in the center 5 feet 2 inches long. That's one of the Gordon tricks.

On the dance floor, Shorty's number fours can burn more timber than a forest fire. At one of the squadron dances he entered the jitterbug contest. His partner, a WAAF, couldn't stand the pace and gave up after the first thirty minutes, but Shorty was just getting his second wind. He went on jitterbugging by himself to win first prize. It turned out to be a fancy toilet kit.

Shorty has a girl, too. Two inches shorter than he is. And he wants to get married. Shorty has known her for three months now and would have married her before this but didn't want to "just jump into something". Army regulations here say you can't marry until you have officially stated your intentions, then waited two months. Shorty thinks he'll file his intentions any time now so those two months will be up at the same time he has completed 25 combat missions and can go off operations.

Shorty had a time convincing his fiancee's parents that he was not an ordinary Yank, the type about whom they had heard *stories*.

"But I began playing darts with her old man, drank 10 quarts of his beer and we got along fine," Shorty explained. "And her mother wept when she heard I was going out on combat."

Combat is the one thing he wouldn't be without. He'll take a good fight any time he can get it, and the best ones always are those above 20,000 feet where you're matching bullets with men who fly behind black-and-white crosses. They're grudge and blood fights because every man up there has had friends who never came back. Shorty is no exception. He hates their guts. He came face to face with a Jerry once. . . .

It was on the Romilly raid. An aircraft repair depot at Romilly-sur-Seine was the target.

Shorty nearly didn't make it. He couldn't get one of his guns together and the pilot was standing there beside him saying he was afraid they wouldn't be able to go if all the guns weren't functioning. But Shorty pleaded.

"Now, Lieutenant," he argued as he sweated over the *(Continued on Page 38)*

HIGH LEVEL JUMPING

Free fall, oxygen equipment, loss of consciousness, and other factors in parachuting from altitude.

The following article was compiled from information furnished by the Office of the Air Surgeon, at Headquarters, and the Materiel Center, at Wright Field.—ED.

ONE of the Air Forces' oldest "auxiliary" fraternities—older than the Short-Snorters, the Burma Roadsters and other "Orders" of the day—is the Caterpillar Club.

Its membership, somewhat exclusive in the days when planes still drew curious glances skyward, has mounted by leaps and bounds since the exigencies of war have forced more and more airmen to hit the silk.

There was a time when the average initiate into the club underwent a routine induction somewhat as follows: Something went wrong with the ship in flight. The pilot caressed his chute, muttered a prayer, bailed out, pulled the rip cord, hit the ground, sighed with relief. He was in.

This procedure still prevails, perhaps in the majority of cases, but nowadays a prospective Caterpillar must face other factors.

For instance, there's that tendency in this war to leave yourself open to a little target practice when you are so unfortunate as to be forced to abandon your plane.

In such cases, the boys who have any desire to enjoy their membership in the Caterpillar Club have learned to keep their hands off the rip cord until the last minute in order to make themselves a more elusive bullseye.

Another important element affecting parachute escape has been the development of high-altitude flying.

Many things happen to an airplane flying at high altitudes in wartime which compel the flyer to abandon his ship. Fire, a crumpled wing, or severe damage by enemy gunfire may cause an immediate necessity for bailing out, without allowing time for diving the plane to lower altitudes. Frequently, any attempt to lose altitude before abandoning a plane will result in structural collapse, complete loss of control and an added difficulty of escape.

From an altitude of 30,000 feet a flyer can open his parachute immediately without experiencing loss of consciousness or any other extremely ill effects during descent. But a bail-out without oxygen equipment much above this level, or without resort to other safeguards, result in more than a few unpleasantries.

By way of background, the average rate of fall at 30,000 feet with open chute is 32.6 feet per second; at 20,000 feet, 27.4 feet per second; at 10,000 feet, 23.2 feet per second, and at ground level, 20 feet per second. The rate of fall increases comparably to 40.4 feet per second at 40,000 feet.

However, without emergency oxygen equipment, an airman bailing out will have useful periods of consciousness of from one to one and a half minutes at 30,000 feet, about thirty to forty seconds at 35,000 feet, and only about fifteen seconds at 40,000 feet.

Obviously, then, he will reach sufficiently dense air in time to avoid ill results from the 30,000-foot level with open chute, but not from much greater altitudes.

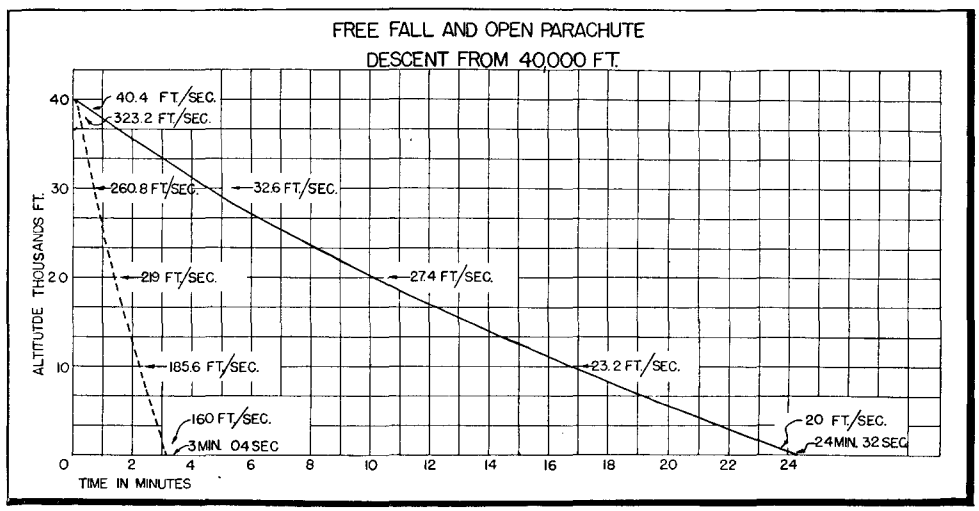
Fortunately, with the raising of aircraft ceilings, experimental engineers are devising equipment to take care of personnel at higher altitudes not only while they are in aircraft but when they are forced in emergencies to bail out.

A small oxygen cylinder—known as the bail-out bottle—has been designed to be carried in the pockets or strapped to the legs of high-altitude flyers. Oxygen is breathed through a pipe-stem. An eight-minute supply is available—sufficient to permit safe descent from any altitude in an open parachute without loss of consciousness.

EVEN the use of the bail-out bottle has its disadvantages, however, not the least of which is the necessity for the removal of the oxygen mask in order to place the bottle pipe-stem between the teeth. The protection from the extreme cold afforded by the mask is thus lost and the flyer's face is exposed to possible freezing during descent through the upper atmosphere. There are other shortcomings, but the bail-out bottle represents a decided step toward the solution of the problem.

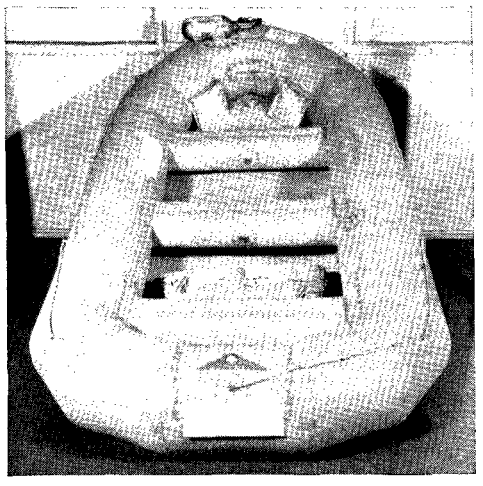
In multiplace aircraft, such as a bomber, the walk-around bottle as well as the bail-out bottle is usually *(Continued on Page 33)*

This figure shows the comparative rates of "free fall" and descent by parachute from an altitude of 40,000 feet.



TECHNIQUE

A MONTHLY REVIEW OF TECHNICAL DEVELOPMENTS IN THE AIR FORCES



The seven-man E-2 life raft pictured above has been adopted by the Army Air Forces for use on big planes.

Seven-Man Life Raft

In the collegiate Ford there was always room for one more and now a new life raft offers room for at least two more than usual with official adoption by the AAF of the E-2 model, a seven-man raft which is now standard equipment for our big planes.

Also ready and approved is an improved version of the five-man life raft, the A-3, just like the E-2 in every respect except size, for use with the Army's current production planes.

When the rafts were redesigned last year, increased comfort was the primary objective. This has been achieved in the E-2 and A-3. But you can't limit the number of occupants in an emergency so if it is necessary for twelve men to board a seven-man raft, it will hold them but with a consequent decrease in personal comfort.

Both of the new models come from the Equipment Laboratory at Wright Field and are equipped with more and better accessories.

Believed by AAF experts to be the finest raft of its kind, the E-2 has a 2,500 pound capacity and weighs 106 pounds with complete equipment. It fits into a carrying case 20 inches in diameter and 36 inches long. Both new models are made of a rubberized fabric that is more effective than the old rubber bladders and requires much less rubber. When inflated the E-2 is twelve feet long and five feet eight inches wide. By means of a compartment-type inflation device located in the bow of the boat, the raft can be inflated in from twenty to thirty seconds.

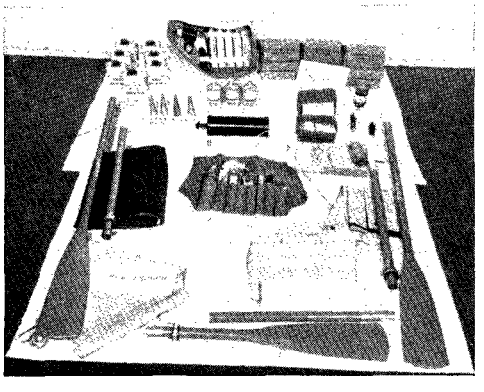
Horizontal instead of vertical bulkheads have been built into the new models. Here's what this means:

The chief disadvantage of the vertical bulkhead was that when one side of the supporting tube was punctured by gunfire from a strafing enemy craft or by the attack of a shark the entire side collapsed, dropping the occupants of the raft into the water with only the one remaining side-tube to cling to for support.

Horizontal bulkheads are a definite improvement. With either the top or bottom of the supporting tube punctured, the remaining top or bottom side can adequately keep the raft afloat and upright. So long as the entire raft is not completely riddled it will retain its boat shape and buoyancy.

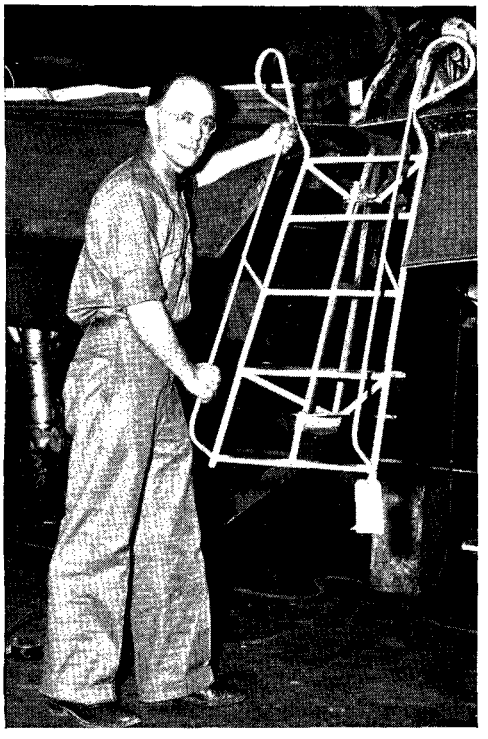
The five-man raft (A-3) is a 1,000 pound capacity raft. Like the E-2 it is made of rubberized fabric, contains horizontal bulkheads, lowered seats, more room, a mast and sail for improved navigation. It is 110 inches long and 60 inches wide, weighs 93 pounds with complete accessories, and can be rolled into a bundle 18 by 36 inches when deflated. Its accessories are the same as for the E-2.

The radio transmitter described in AIR FORCE (April) is standard equipment for both models.



The accessories shown above are standard equipment for the E-2 and A-3 life rafts.

These multi-place life rafts have almost enough accessories to open a general store. In addition to the radio transmitter, the following are standard equipment at time of writing on both the E-2 and A-3 models: hand pump with hose to maintain inflation of raft, repair kit, 75 pound test cotton cord for utility use and to lash accessories to raft, sea anchor, pyrotechnic pistol and five distress signals, emergency drinking water, a yellowish green sea marker dye to color water around raft to attract rescuers, type "K" rations, floating type flashlight, scout knife, police whistle to signal in fog, first aid kit, emergency fishing kit, paulin for use as sail, another paulin for catching rain water or for use as a signal, shade or camouflage, oars, bailing bucket, bullet-hole plugs, combination compass and match container. **—Wright Field.**



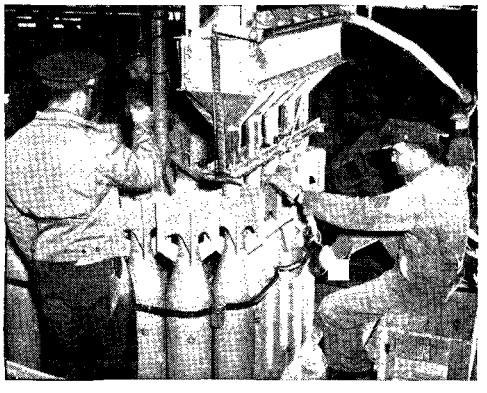
P-38 Ladder

A light, portable ladder which is attached to the stirrup of a P-38 to facilitate workers in going up on the planes is the design of Orval W. Meth (above), aircraft electrician in the engineering shops at the Sacramento Air Depot's McClellan Field, California.

Bomb Bottler

Five at a time, 100-pound practice bombs are each filled with 90 pounds of hot, dry sand and made ready for the powder charge by a "bomb bottling" machine (below) developed at the San Angelo, Texas, Army Air Field. The machine does the work of 10 three-man teams of soldiers releasing them for more skilled aviation work or combat duty.

Resembling a giant soda pop bottling machine, the "bomb bottler" is preparing thousands of practice bombs daily for bom-



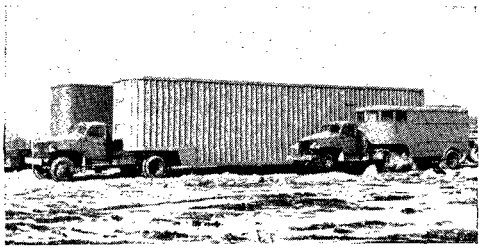
bardier cadets. Developed by aviation ordnance engineers, the loading machine accomplishes the first in a series of steps which prepare a 100-pound practice bomb, made up of 90 pounds of sand, five pounds of spotting powder and five pounds of shell and fins. Loaded with sand and powder charge it is for all practice purposes identical to the 100-pound bombs used in combat.

The job of the bomb-loading machine is to fill the practice "eggs" with the precise amount of clean, dry sand so that each will weigh the same. Accuracy in this operation is mandatory since wind resistance and trajectory of the falling missile may be altered by a slight variation in weight.

At the bomb plant siding carloads of bank-run sand are dumped. The sand then moves along an endless belt conveyer to a hopper and on into a revolving horizontal cylinder where it is cooked under several thousand degrees of heat until the last drop of moisture is gone. The sand then goes to a four-ton hopper to be screened of each stick or stone which might alter the weight of the bomb load.

Beneath the hopper is the "bomb bottler" which fills five bombs at one pull of the lever. A turntable affair with four sides, the machine fills one set while others are being readied, capped and unloaded.

An ordnance inspector checks each bomb, sends back those which need correction. A five-pound capsule of spotting powder is then inserted and the bomb is ready for the flight line.—**Public Relations Office, San Angelo Army Air Field, Texas.**



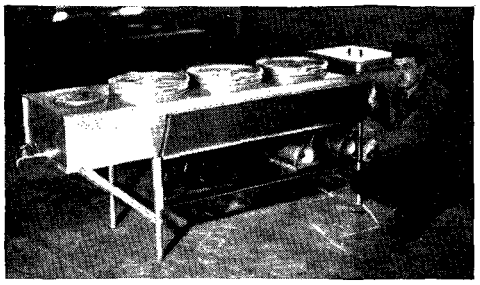
Glider Trailers

Huge trailers for the ground transportation of gliders are being used at Wright Field on an experimental basis. The trailers, which loaded can be hauled by a one and one-half ton tractor, were developed by the Glider Unit under the direction of Colonel F. R. Dent and are designed to transport either wings or fuselages. Two trailers can carry one complete glider. Originally of all metal construction, later models are of wood. In the picture above: left, the newer all-wood type; center, the all-metal, and right, a glider repair shop truck.—**Wright Field.**

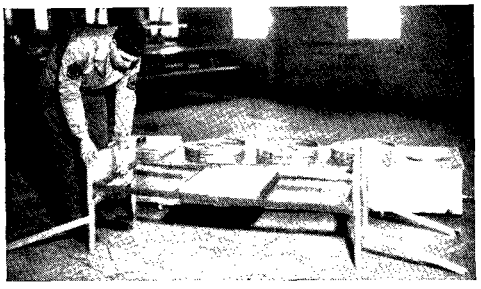
Portable Steam Table

A portable steam table suitable for field duty is the handiwork of Technical Sergeant Lauren N. Elkins, a mess sergeant at the Rome Air Depot, New York. Approximately 300 men can be fed keeping the food hot for an indefinite period.

It utilizes two gas units from army field ranges and has a 15-gallon coffee unit, with a convenient spigot. Food can be heated by placing it from the can into the steam table and letting the steam do the work. In combat it can also be employed to sterilize water. The center space between the gas units gives room for two tool kits.



Technical Sergeant Elkins and steam table. Below, dismantled for shipping.



The steam table can be dismantled for shipping in 28 seconds. It fits into a box which can be converted into two tables and two benches. One table and the benches form the officers mess, the other is utilized as a cook's work table.

Turns Tables on Turnbuckles

A thin piece of spring steel one-half inch wide and five inches long which may eliminate the necessity of adjusting turnbuckles on control cables of aircraft is the contribution of Master Sergeant Stanley Billet of Minter Field.

Turnbuckles are now checked every 100 hours because should they become loose a slack would develop in the control cables. But with Master Sergeant Billet's gadget—a spring steel lock plate and fastener pin which turned the cable-loosening forces against each other—the turnbuckle is held permanently in place.—**Public Relations Office, Minter Field, California.**

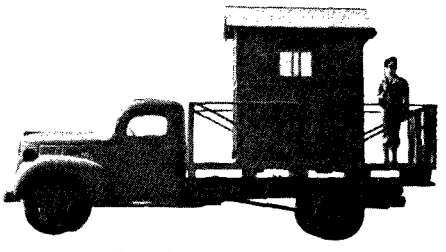
Umbrellas For Mechanics

Maintenance crews in desert and tropical areas will soon carry their own beach umbrellas. The sun shades, however, are not designed for languorous tropical lounging but rather to protect Army Air Forces mechs from the burning and exhaustive rays of the desert sun, enabling them to work longer and more efficiently.

Two types of umbrellas have been developed by the Miscellaneous Equipment Laboratory at Wright Field. One can be attached to the portable adjustable maintenance stand. The other has a standard with a spike which can be driven into the ground; heavy cord fastened to the plane helps support the umbrella.

The umbrellas not only aid the crews but also serve to shade aircraft and parts which frequently need cooling after exposure to the sun's rays.—**Wright Field.**

(Technique Continued)



Portable Sentry Box

Adapting one and a half ton Dodge chassis to specific purposes is a feature of the Automotive Department under Major William V. Garretson at the Newark Army Air Base. Shown above is a portable regulation sentry box on a platform completely surrounded with a safety railing. The sentry has excellent visibility from this elevated post.—**Captain Arthur J. Lonergan, Newark Army Air Base, New Jersey.**

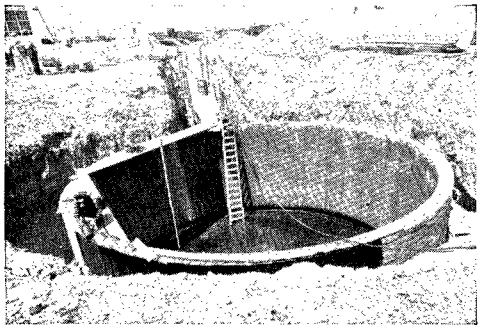
TECHNIQUE

Concrete Gas Tanks

A new gasoline storage tank constructed almost entirely of concrete at Lowry Field, Colorado, seems to answer the need for more gas storage facilities and the conservation of vital steel.

Six months of experimental operation has demonstrated that concrete tanks can do the job as well as steel and just as cheaply.

The project, conceived and carried out by Major Karl Weinand, Area Engineer, required only a ton of steel and it was used only for concrete re-inforcement. The tank measures 30 feet in diameter and 12 in depth and has a capacity of 50,000 gallons of 100 octane gasoline.



Gasoline concrete storage tank is shown above in early stages of construction.

The danger of leaks caused by cracks in the settling concrete was eliminated by specifying double walls separated by a water jacket. The inner wall is eight inches thick, the outer wall 12 inches, and they are separated by a five inch space filled with water. Should the inner wall spring a leak the water pressure would prevent gasoline from escaping. To complete the leak-proofing the floor is laminated and consists of 12 inches of concrete, a heavy layer of mastic and then eight more inches of concrete.

The inside walls were treated with carbon dioxide to remove any free lime that might have remained in the pores, thus eliminating the only known possibility of chemical reaction between the walls and the gasoline. Regular checks have substantiated Major Weinand's belief that the concrete would not disintegrate or break down in any way from prolonged contact with the highly volatile fuel.

The tank is equipped with a mechanical system which utilizes a pair of coupled, synchronized pumps, one handling water and the other gasoline, commonly called the Aqua System. As gasoline is pumped out of the top of the tank, water is pumped in at the bottom so that the tank is always full of liquid and there is no opportunity for explosive fumes to form in the dome. When gas is pumped into the tank the procedure is reversed.

As the water level rises and the gas supply becomes low, a pair of Clayton No. 124 automatic float valves, hydraulically controlled, shuts off both pumps while there is still 18 inches of gasoline in the tank. Thus, no water can be pumped into the trucks which service the planes.

Operation of the tank is carried out from a small control house where pumps and switches are located. The installation uses Wayne Model 569 priming and air eliminating pumps powered by five-horsepower explosion-proof, three-phase electric motors capable of delivering 200 gallons per minute. All electrical connections and switches are spark-proof and electric light bulbs are equipped with vapor locks out of respect to the extremely high volatility of aviation gasoline. The whole installation is now operated by personnel of the 59th Sub-Depot at Lowry Field.—**Captain Robert W. Ray, 59th Sub-Depot, Lowry Field, Colorado.**

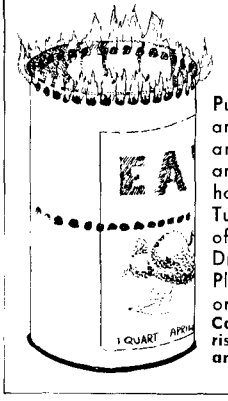
Two New Protractors

Two time-saving proctractors for measuring the degrees of "travel" of ailerons, flaps, elevators, trim tabs and rudders have been perfected by H. L. Blakley, 29th Sub-Depot aircraft inspector, and put to practical use at the Enid Army Flying School, Oklahoma.

The protractors not only speed alignment of movable parts but eliminate errors in calculation.

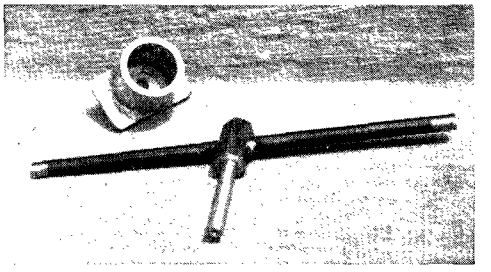
Formerly the required "travel" of ailerons, flaps, elevators and trim tabs was measured by means of a comparatively complicated protractor and an ordinary ruler which did not offer direct readings and could not be used on the underside of moving parts. With the Blakley protractor, direct readings can be taken either erect or upside down. It is produced at low cost at the Sub-Depot shops and it is now possible to supply each mechanic with his own instrument.

His other protractor computes the "travel" of rudders. Constructed entirely of plywood it also can be produced at low cost.— **29th Sub-Depot, Enid, Oklahoma.**



Tin Can Emergency Stove

Remove top of can. Punch holes completely around top rim. Punch another row halfway around at middle. Fill half full with gasoline. Turn side with mid-row of holes away from wind. Drop a match into can. Place vessel to be heated on top.— **Developed by Captain John How, Morrison Field, Florida, from an idea by Akel Wickfeld.**



Keeping Hot Pilots Hot

A simple device contrived by Staff Sergeant Frank E. Sugg at Hendricks Field, Florida, has cut untold hours from the maintenance time on B-17s. His invention of a glycol boiler "core puller" (above) has drawn immediate approval and is being manufactured for use at Hendricks.

When the B-17 on bombing missions flies for long periods at sub-zero altitudes it's important that the heating system for the cabin be operating properly. Briefly, the system works like this: glycol is pumped through a tubing circuit, gaining heat as it circulates about individual cores of three boiler units housed in an exhaust pipe and then passing on to the main heating outlet in the cabin. But glycol tends to carbonize on these cores causing proportionate loss of heat output until the system ultimately becomes ineffective. At this point the cores must come out and this is where Staff Sergeant Sugg's "core puller" comes in.

Previously extracting a core from its boiler meant removing the boiler first, actually the toughest part of the whole procedure. By the time all three cores had been taken out and cleaned and the boiler bolted back in place, a full day had usually slipped by.

Staff Sergeant Sugg, now a crew chief of a B-17 at Lockbourne Army Air Base, Ohio, subsequently fashioned a "glycol flushing system" which cleans the entire system and reduces to a great extent the chances for carbonization.—**Private Richard Eckman in the Hendricks Field Hi-Life.**

Synthetic Airplane Tires

After service-testing approximately 4,000 synthetic airplane tires, the Army Air Forces Materiel Center at Wright Field, Ohio, reports that synthetic tires are equal to, or may be superior to, natural rubber tires.

Natural rubber tires, however, are more adaptable to use in either extreme heat or cold; synthetic tires are not yet adaptable to both Arctic and tropical weather conditions. One synthetic process can make tires for use in extreme cold, while another process adapts tires for use in extreme heat. But as yet no process has been developed to make a synthetic tire suitable for both weather extremes. **—Wright Field, Ohio.**

What's your AIR FORCE I.Q.?

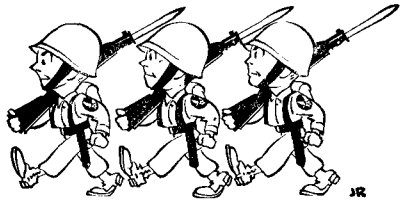
Grab the controls and take off on another flight with the Air Force Quiz of the month. Be light on the stick and watch out for a cross wind while landing. If your score is 100, you're perfect, as usual; 80 to 95, you're on the beam; 65 to 75, you're getting off course; 60 or below, you'd better check your bearings. Answers on Page 32.

1. *Anoxia is caused by*

a. High speeds
b. Insufficiency of oxygen
c. Rough weather
d. Bad diet

2. *An object can best be seen in very dim light by looking*

a. Directly at it
b. To one side of it
c. Steadily at it and blinking at four-second intervals
d. Steadily at it and blinking at eight-second intervals



3. *When marching at quick time, the length of the step should be*

a. 24 inches
b. 30 inches
c. 36 inches
d. 40 inches

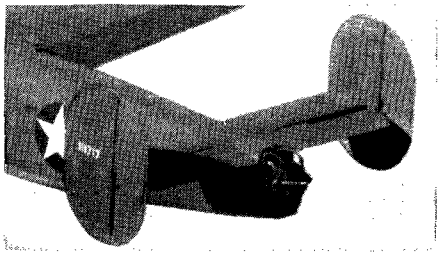
4. *A Thunderhead is a*

a. Pilot who loses his temper easily
b. "Dressing down" by the C.O.
c. B-24
d. Cloud formation

5. *Randolph Field is now*

a. An induction center
b. A preflight school
c. A basic training school
d. A central instructors' school

6. *Identify this plane:*

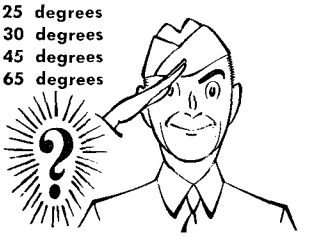


7. *Which of these words is inappropriate in this grouping?*

a. Altimeter
b. Micrometer
c. Bank indicator
d. Tachometer

8. *When rendering a hand salute properly, the forearm is inclined at an angle of*

a. 25 degrees
b. 30 degrees
c. 45 degrees
d. 65 degrees



9. *The props of an A-20 rotate in opposite directions*

a. True
b. False

10. *Arterial bleeding is indicated when the blood flow*

a. Is a slow steady stream; dark red or purple
b. Is oozing
c. Spurts; bright red in color

11. *In a P-39 Airacobra, the pilot sits*

a. In front of the engine
b. Behind the engine
c. Over the engine
d. Beside the engine

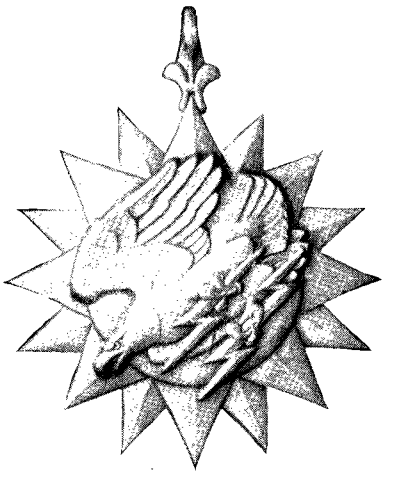
12. *The maximum amount of National Service Life Insurance available to an enlisted man is*

a. $3,000
b. $5,000
c. $10,000
d. $15,000

13. *The translation of the Technical Training Command's motto, "Sustineo Alas", means*

a. I sustain maintenance standards
b. I succeed in flight
c. Sustained combat will win
d. I sustain the wings

14. *Identify this medal:*

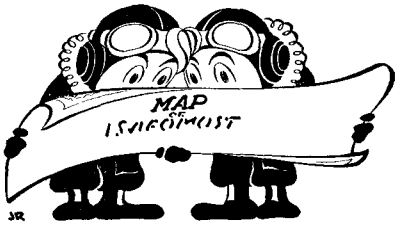


15. *The official colors of the Army Air Forces are*

a. Cobalt blue piped with golden yellow
b. Dark blue piped with light blue
c. Dark blue piped with white
d. Ultramarine blue piped with golden orange

16. *The props of a P-38 rotate in the same direction*

a. True
b. False



17. *Your map is said to be "Oriented" when the north arrow on the map points*

a. To the Orient
b. North on the ground
c. In the direction you want to travel
d. East to the rising sun

18. *What do the following abbreviations stand for?*

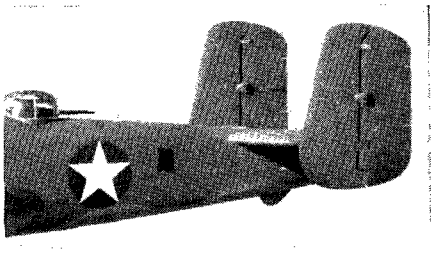
(one wrong is all wrong)

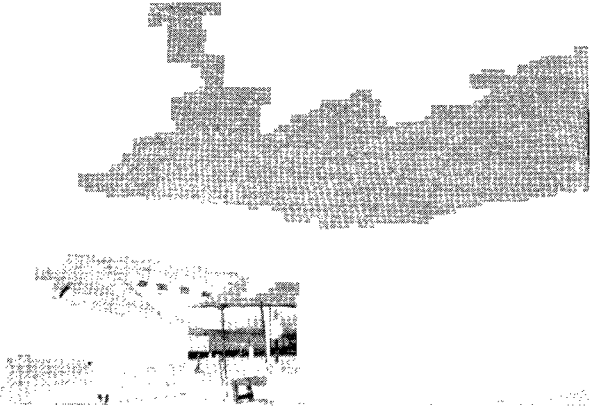
a. CQ
b. APO
c. BOQ
d. OCS

19. *The word Azimuth is associated with a*

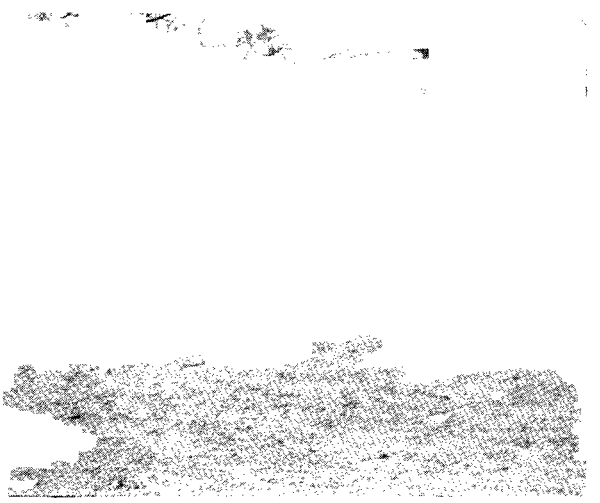
a. Rheostat
b. Altimeter
c. Compass
d. Oxygen mask

20. *Identify this plane:*



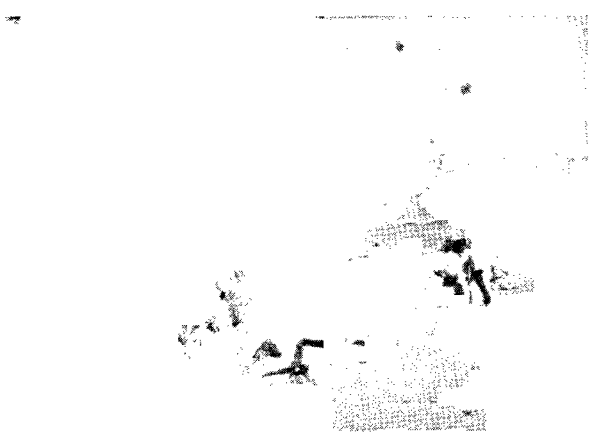


A cargo plane awaits a takeoff at one of the outlying airports along the Trans-African run.



The author gets a close-up of an all-purpose camel near an East African air transport base.

Above are typical houseboys hired by officers on the Gold Coast; the music comes with the boy. Below is one of the marketplaces near a base "somewhere on the African front".



IF YOU'RE GOING TO MID-AFRICA

By Major Stephen L. Gumport

FLIGHT SURGEON

BEING a doctor, I did not have to overtax my imagination to visualize the possible obstacles to be encountered in central and western Africa—ranging from jungle animals and snakes to sleeping sickness, leprosy and malaria. However, 24 hours in which to make all necessary travel arrangements (allotments, power of attorney, car storage, and so forth) and assemble 77 pounds of useful articles does not leave much time for wondering what lay ahead.

Actually, of the 77 pounds of baggage about 25 pounds could well have been dispensed with. Such items as soap, shaving cream, cigarettes and tobacco can be purchased locally at U. S. Army PXs or in stores throughout west Africa and the Anglo-Egyptian Sudan. Post Exchanges are set up along this route and sell standard U. S. toilet articles, insignia, clothing, candy and tobacco and cigarettes (six cents a pack).

Clothing, with the possible exception of a woolen uniform and lined trench coat, should all be washable if you are headed for this territory. Laundry service is easy to obtain but dry-cleaning establishments are much more difficult to locate.

I had expected to find this area of Africa one huge jungle. As a matter of fact, with the exception of Liberia, most of the bases from West Africa to the Sudan are located in open, semi-arid country that greatly resembles parts of Texas. Rain usually comes in one or two relatively concentrated periods during the year, with little or no precipitation during the remainder of the time.

Much to my surprise my blouse, trench coat and other woolens did not mildew even in the most humid places on the coast. Whenever possible, however, I hung them out to air during the day, and at night kept them in a closet lighted by electricity.

The natives throughout this area are friendly and helpful. As traders they know how to drive a hard bargain; about one-half to one-third of the asking price is what they expect to obtain for their wares. As houseboys they are very loyal and hard-working, as long as their employer exercises patience and realizes their limitations.

It is the custom in most fixed camps and bases along the central African route for these natives to do most of the menial work —including laundry, cleaning of barracks and other buildings, shining of insignia and the like. They have been brought up to respect the European and this respect should not be destroyed by over-familiarity, nor should the houseboys be spoiled by over-tipping. Local customs in this regard should be closely adhered to. Even though it might seem too trifling a sum, five shillings (about $1) a week is the standard tip in many places.

Along the west coast, natives speak a pidgin English and have many curious expressions. Some of the more familiar ones are:

"Dash" for tip.

To do something "one time" means right away.

"Go softly" is go slowly.

"Make big breeze" means to go fast.

To do something "proper" means to do it correctly.

"Chop" refers to food and meals (breakfast, lunch or dinner).

NATIVES in the bush-country are hospitable and helpful to pilots forced down, although they sometimes find it hard to believe there actually are men flying in the planes. The natives seem to accept aircraft as man-made birds but it seldom occurs to them that their makers are aboard. I have known of cases, however, where natives braved intense flames to rescue occupants of crashed planes.

Camouflaged planes frequently are difficult to locate if they are forced down in this area. It is always a good idea to open a parachute near the plane so your presence can be detected more easily from the air.

Of the many varied and interesting (to the medical mind) tropical diseases present in this area, there are really only three outstanding ones from the viewpoint of a soldier along the route: (1) malaria, (2) diarrhea and dysentery, and (3) venereal diseases.

Needless to say, such ills as sleeping sickness, leprosy, yaws and the like do exist, but although they are present among the natives, they are a rarity among even those Europeans who have spent years in the area. So from a practical point of view, they do not constitute a hazard to white populations living segregated from the native towns.

But the "Big Three" represent another question. They are decidedly important

Tips on how to make friends and influence people — including yourself — in this section of the dark continent.

factors to be coped with and it is a matter of not only the command but also of each *individual* putting forth efforts along simple and straightforward lines of public health and sanitation. When these efforts are forthcoming, the health—and morale—of commands in these tropical countries is the equal of that any place. But the reverse holds true when lack of interest and negligence prevails. And remember, a soldier can be as thoroughly incapacitated by any of these illnesses as by the enemy's bullets.

A word in brief about these three hazards:

Malaria is transmitted by the female anopheles mosquito. Group control of this disease aims at destroying the breeding places of the mosquito, swamp puddles and all kinds of standing fresh and even brackish water. (Other mosquito-borne diseases such as yellow fever, dengue and filariasis are likewise eliminated at the same time.)

Screening of quarters, netting of beds and spraying of quarters with insecticide should then be done in an effort to wipe out those mosquitoes that have succeeded in breeding out. All these elaborate precautions can be a total waste of time; their success depends on the cooperation of each man in staying in screened quarters after dark as much as possible; seeing that his bed net is kept in good repair and is lowered into place at least two hours before sunset; wearing long-sleeved shirts, long trousers and mosquito boots (high top) after dark; using head nets, gloves and, if possible, chemical repellents when he must be out and standing still (guarding planes); staying out of native towns after dark where infected malaria mosquitoes, not to mention other health risks, abound.

Remember, more than one person has acquired malaria at the same time that he exposed himself to a venereal disease.

The possibility of developing a drug that will actually *prevent* development of malaria is being worked on and may prove one of the greatest possible aids toward opening the tropics to white man. At present, however, most medical men feel that neither quinine nor atabrine when taken regularly in prophylactic doses will prevent a person from developing the disease. These drugs, taken in this manner, very possibly act as "suppressives" and may actually suppress the symptoms while being taken. However, soon after the medicine is stopped the individual may come down with malaria which actually was acquired weeks before. When these drugs are taken for this purpose they should be used regularly as it is not only useless but may actually be dangerous to use them off and on.

It should be borne in mind that the type of malaria (aestivo-autumnal or malignant tertian) most prevalent throughout this area differs greatly from the type of malaria (benign tertian) that occurs in the United States with its severe shaking chills, very high temperature and relatively sudden onset. The malignant tertian type is much more apt to have a quite subtle set of symptoms such as headache, backache, pains in the arms and legs, temperature about 101, and occasionally nausea and vomiting.

THESE symptoms, of course, may occur in a host of other diseases. The only positive proof possible is to find the parasite in a blood smear and see it under a microscope. And this is the way a diagnosis is made. Any person returning from Africa should be certain to tell his physician that he has been exposed to malaria if he is taken ill. Early treatment of this type of malaria is quickly effective. However, delay is very dangerous.

Diarrhea and dysentery in Africa—as in the United States—are transmitted mainly through food, water, milk, food handlers or by flies. At all our Army bases these factors are thoroughly controlled and supervised. But even in "nice" hotels and in the homes of civilians you might visit, the risk is present. Remember to avoid consuming salads or uncooked vegetables, untreated water, fresh milk and raw fruit, except thick-skinned fruit that can be peeled.

Venereal diseases are extremely prevalent throughout this area—and the hazards involved cannot be exaggerated. Enough said.

Various fungus diseases, such as athlete's foot and ringworm, as in all tropical countries, are easily contracted unless care is exercised. Daily showers, followed by thorough drying of the body especially between legs, toes, and so forth, is important. GI foot powder is a great help and should be used freely.

In certain of the drier areas, particularly the Sudan, extra salt should be taken daily in the form of salt tablets (or table salt, if tablets are not available). This helps make up the salt lost in profuse perspiration and prevents many of the milder symptoms caused by heat.

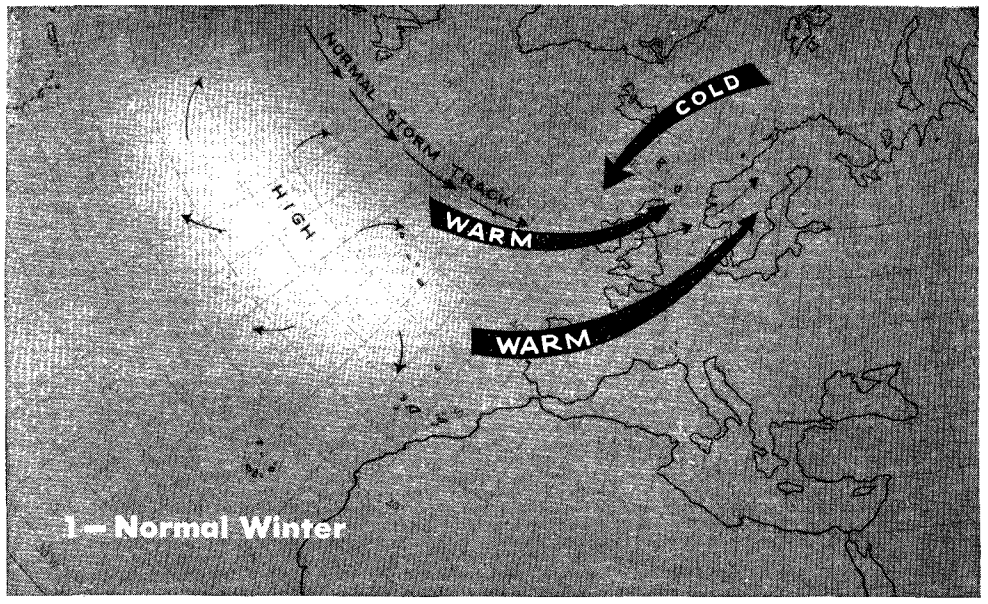
Amusements throughout this area are varied. Along the coast there is excellent swimming and in many places fairly good riding horses can be purchased for as little as $10 apiece. When time permits, personnel may engage in hunting and fishing. Then, too, movies arrive about three times a week by plane from the States. Mail service has been good, letters usually requiring between seven and ten days to go or come.

Most good times are self-made and the happiest individuals in the African tropics, as elsewhere, are those who put out the most work, and then make the most of their free time by following up their interests in sports and other recreations without fretting over things 10,000 miles away about which they can do little or nothing. ☆

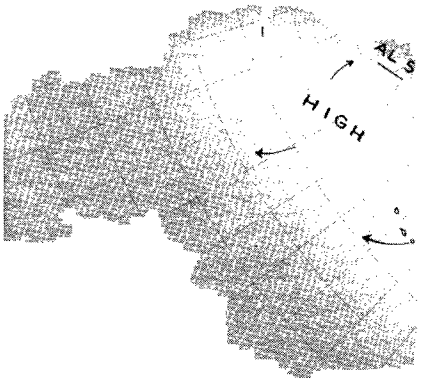
These big fellows are part of a group on guard duty day and night at an African Airfield.

On the edge of an East African airfield appears this contrast in modes of transportation.

Never drink water from native wells. This one is within inches of ground level and is the repository of assorted filth. Below is the interior of a typical transport on the African run.



1—Normal Winter



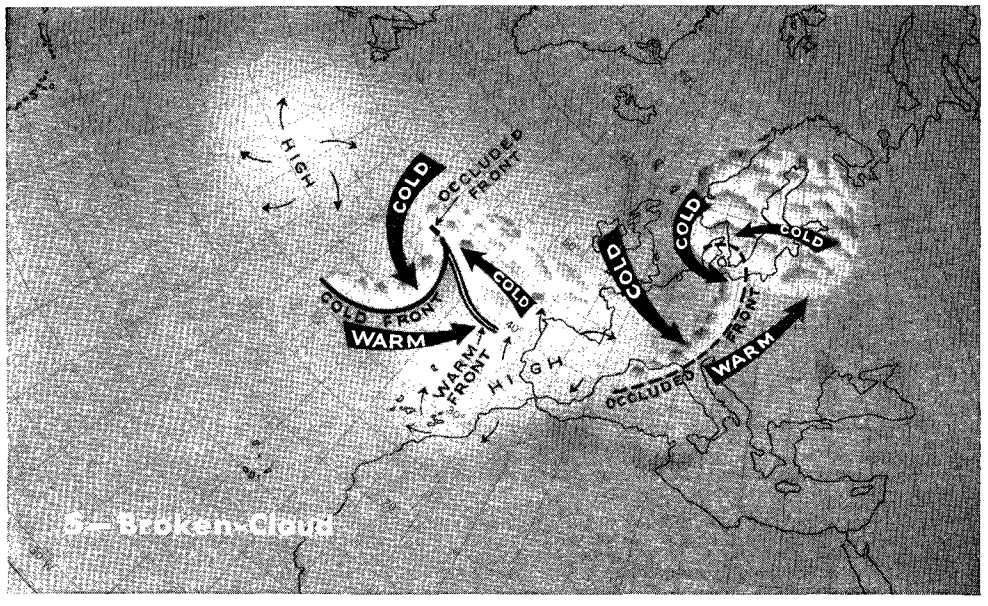
EUROPEAN Weather

By Major Joseph J. George

WEATHER INFORMATION SERVICE, HEADQUARTERS, ARMY AIR FORCES

SUMMER weather over England and Western Europe, bringing with it changes in aerial tactics, demands the studied attention of American airmen particularly since it differs a great deal from summer in the United States.

European weather is predominantly marine in origin and character. It moves onto the continent from the ocean without passing over any great mountain barriers—as it does on our own coasts—and thus is little transformed. Europe has lower average temperatures in summer, since the air flow is mainly from the north. Cold fronts are not followed simply by clear skies, as in most of America; passage of a cold front is generally pursued by broken cumulus clouds and showers. ☆



3—Broken-Cloud

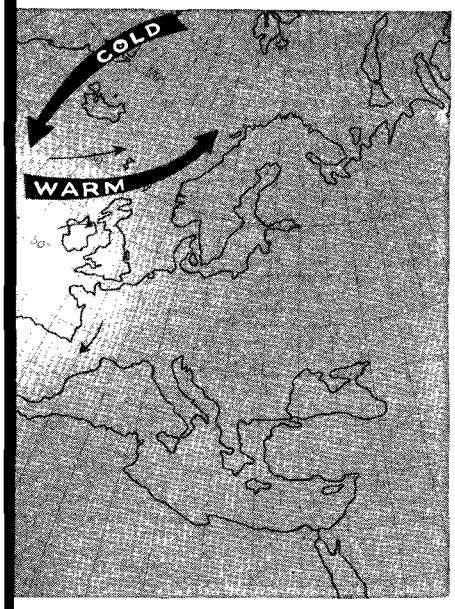
1 Normal winter air flow. Note that the average storm track lies directly over England.

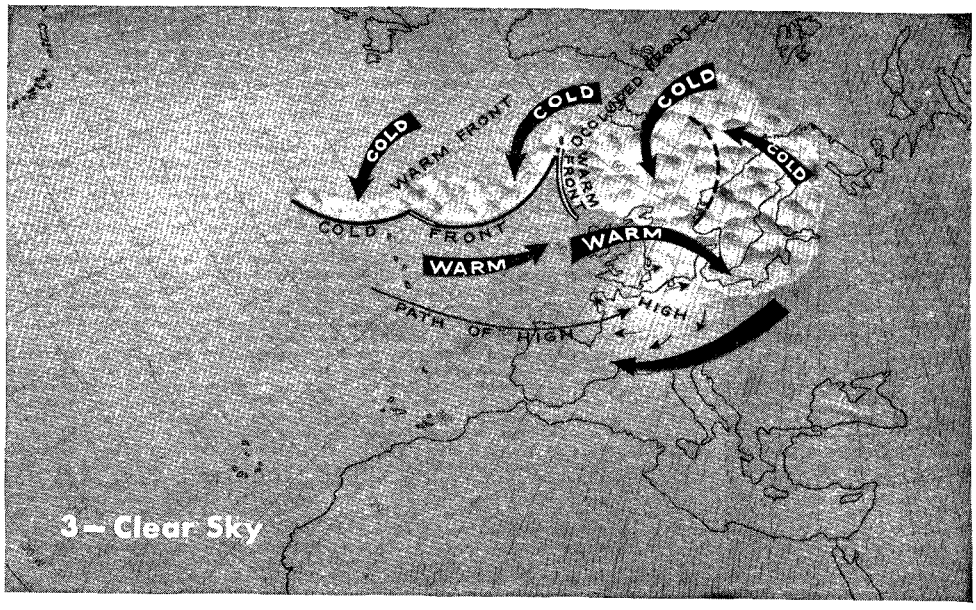
2 The average flow pattern during summer. The large "High" is called the "Azores High." Its eastern end moves north and south, and accordingly allows the storm track to do likewise. When the normal condition is present, as illustrated here, the storms move between England and Iceland with only the most vigorous fronts affecting southern England to a great extent. Occasionally the "High" axis shifts southward and allows storms to pass through the British Isles or the continent.

3 A typical summer weather situation which allows clear or nearly clear skies over most of England and the continent during the following 24 to 36 hours.

4 A bad weather situation. This pattern

Weather Charts by Te



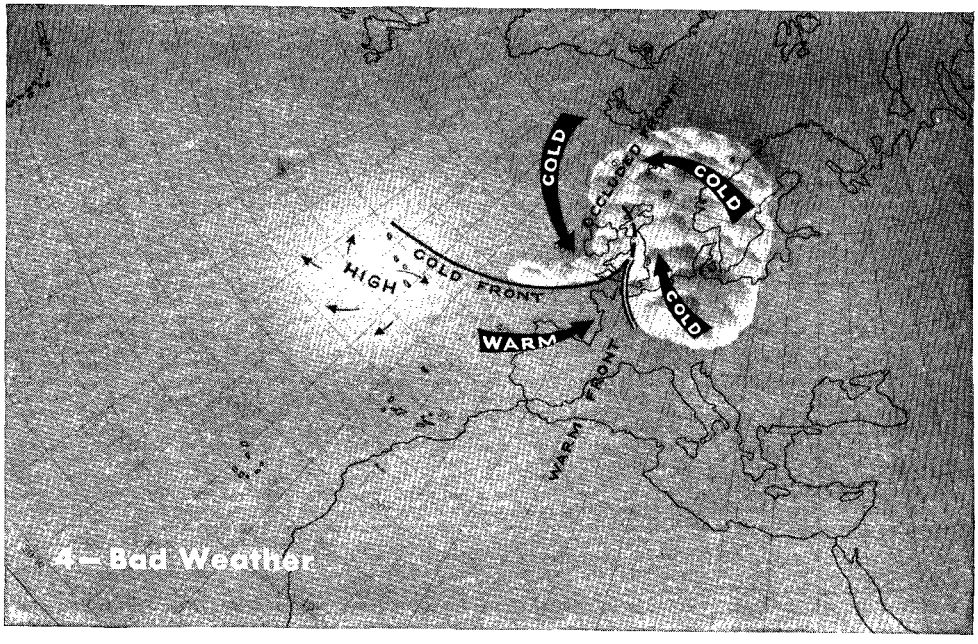


is generally unfavorable for flying. The thick low clouds and rain will persist over most of western Europe and England. Conditions will improve over England shortly after the cold front passes into the channel.

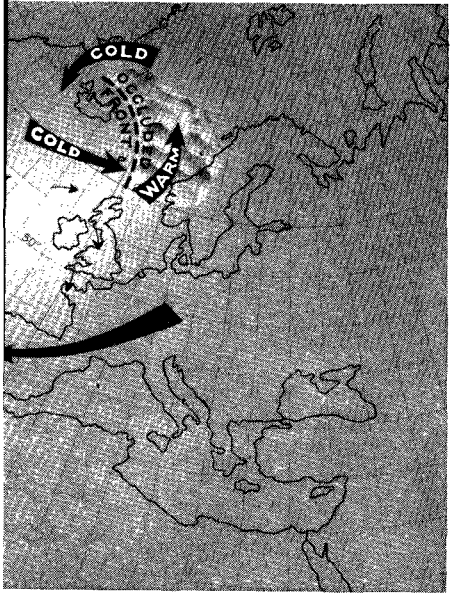
5 A situation which causes broken clouds over France and Germany with widely scattered thunderstorms especially in the mountains. Activity will diminish generally throughout the region as the front advances eastward.

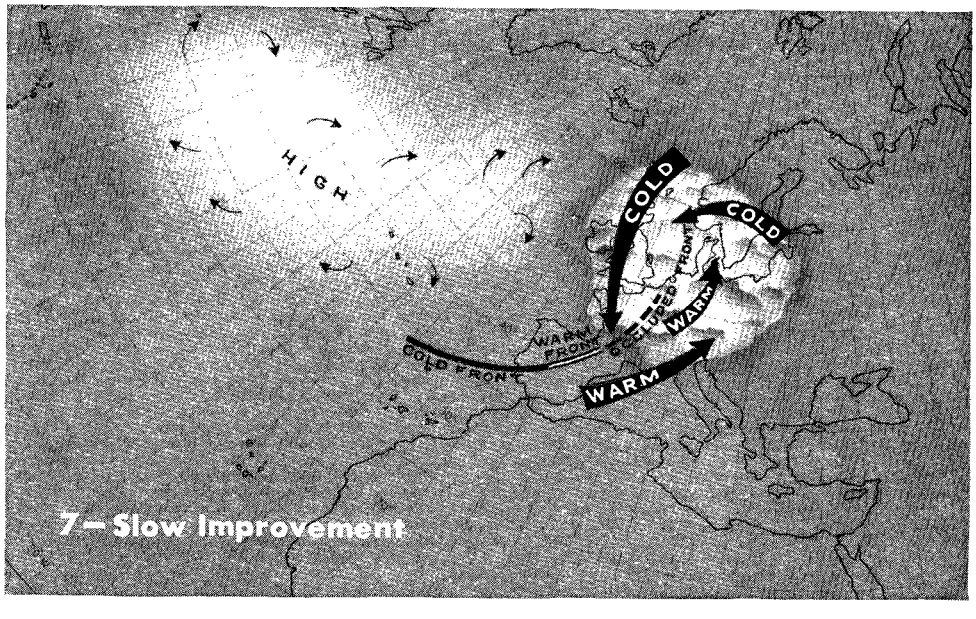
6 A good flying weather type characterized by a northeast-southwest orientation of the Azores "High".

7 An old "Low" has stagnated over the North Sea. Weather conditions will improve very slowly over the continent and the Azores "High" usually extends eastward assuming northeast-southwest orientation of good weather.



rgt. Ralston Crawford





ON THE LINE

It should be easy to find the mistakes pictured above. The errors stick out like a sore thumb.

The boners in this photograph were suggested by Master Sergeant J. A. Bergin who also obliged by posing. He's the NCO holding the light. Others from left to right are Staff Sergeants H. Piergallini and Harry C. Hartleben and Technical Sergeant E. T. Van Sickle. All four are members of Headquarters Squadron, Air Service Command Headquarters, Patterson Field, Ohio.

They cooperated to make this picture knowing that safe and correct maintenance procedure can be mastered only by following Tech Orders and service manuals to the letter.

M/Sgt. Bergin picks nine mistakes in the picture. Can you find more? Answers on opposite page.

A monthly maintenance round-up prepared in collaboration with the Air Service Command and the Technical Inspection Division, Office of the Air Inspector.

Did You Know . . .

That we comb the fields far and wide to bring you timely hints and interesting facts on maintenance? This is your column, mechs, and we need your ideas and suggestions to keep it alive and snappy, so mail some in to the Air Force Editorial Office, 101 Park Avenue, New York (17), New York. Especially would we like to get tips from you old timers ON THE LINE to pass along to the many, many younger ones. We promise to print as many as we have space for, giving full credit to contributors, unless you ask us not to. Your suggestions will help others.

This month's ON THE LINE maintenance items have come from men at various bases. Who's next?

Parachutes . . .

You can't exercise too much care in handling parachutes properly. Throwing them from the fuselage to the ground, leaving them on asphalt, cement and surfaces already soaked with grease or tossing them carelessly into bins is asking for trouble. You or your buddies in the flying crews may have to use them some day. See T.O. 13-5-2 for details on handling of parachutes.

A Good Motto . . .

One contributor points out that: A good mechanic is never careless—and a careless mechanic is never good.

Ball and Socket Joint Bolts . . .

Bolts in ball and socket joints of engine controls that become extremely loose cause excessive wear and creeping controls. Proper adjustment can best be made by disconnecting the linkage on either side of the joint assembly, and then adjusting to secure snug sliding fit of ball in its seat without binding at any position. The ball seats in these ball and socket joints are comparatively shallow and if the ball does not seat snugly, excessive wear of the parts will result. Reference: Par. 1, T.O. 01-1-80.

On Locking Controls . . .

Neglecting to lock controls when leaving aircraft, causes serious damage to aircraft control surface, etc., because of exposure to high winds or propeller blasts from other airplanes. On airplanes having internal surface control locks, the locking devices should be engaged whenever both pilots' seats of dual control airplanes, or the pilot's seat of single control airplanes are unoccupied. On airplanes having external control locks, the locks should be installed at any time the airplane is left unattended. Reference: T.O. 01-1-29.

Salvaging . . .

One of the many interesting maintenance stories to come out of the South Pacific is about the salvaging of four P-40s by the men of an AAF Service Squadron.

The P-40s had run out of gas and crash-landed on an out of the way, "hard to get to" island. The pilots were safe.

In order to salvage the valuable plane parts, so difficult to replace in remote areas of the South Pacific, a ramp lighter, a jeep and other supplies including machine guns were loaded on a small steamboat and the picked crew set out for the island.

There they found the planes on a jungle-covered 900-foot plateau almost directly off the beach. Natives, fascinated by their first sight of a truck of any kind, helped in the salvage work just to get a short ride in the jeep.

Two of the planes had crash-landed in good shape, but the other two were damaged severely. Wings, fuselages, motors, guns, radios and other parts were loaded on the jeep and carried to the beach.

There, during the high tide, the heavy parts were put on the steamer by the ramp lighter, while the light parts were carried through the heavy seas in native outrigger canoes. The landing job took three days.

Hats off to a tough job—well done by the mechs of the Air Forces!

(T. O. No. 01-60GB-1)

Be sure area under plane is clear before you open or close bomb doors!

Costly and lengthy repairs, both mechanical and physical, result from carelessness in this respect.

Propeller Time Extension . . .

Did you know that the operating time on most propellers has been extended? See T.O. 03-20-5 revision dated April 2, 1943.

MISTAKES ON OPPOSITE PAGE

Reading from left to right

1. Wait a minute, get that jack clear of the wing before you try to push it down. Do you realize that if the oleo were to lose its pressure or the tire go down, the jack shaft—and your hands—would be shoved right through the wing skin? Reference: Common sense.

2. Hey, you up there on the nacelle, get your foot off the de-icer boot. It wasn't made to stand that kind of treatment. And are you responsible for that piece of cowling and the toolbox on the wing? Looks like they're digging into the de-icer boot, too. And how about that piece of cowling on the floor? Did it fall?

3. And say, buddy, we sure hope you aren't the same mech the camera caught smoking in "What's Wrong With This Picture?" in February.

4. Sergeant, you know better than to use that type of light; according to AAF Regulation 85-6 you should be using a vapor and explosion-proof lamp assembly.

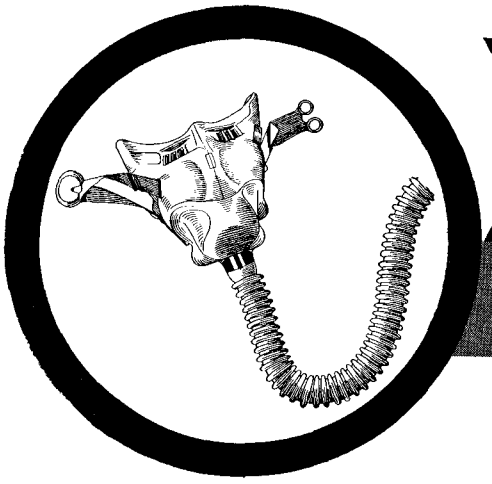
5. And what about that parachute? It's a double mistake. Common sense tells us that it is poor practice to let a chute lie on the floor in the dirt, oil and grease. And T.O. 13-5-2 explains that the main riser webs must never be wrapped around the pack and used as a carrier.

6. Don't use that oil cooler scoop or any other part of the airplane as a rag bin. Aside from the possibility of forgetting to remove the rags before take-off they are a definite fire hazard in the hangar. Reference: Common sense.

7. Never, never place cowling up there in the ring cowl. Besides bending the cowl if it falls, numerous other parts can be damaged or broken.

8. Is that step ladder broken? If it's not, open it up; if it is, get a good one. You are putting a severe strain on the propeller and showing very little consideration for your own safety. And by the way, where's your crew chief stand?

9. Last but not least, why not reel in the trailing antenna before someone hits his head on the fish or tears the wire loose?



OXYGEN IS YOUR LIFE!

By Brigadier General David N. W. Grant

THE AIR SURGEON

FAMOUS last words: "This is just a routine hop so you needn't check the oxygen cylinders. I won't need them."

This pilot's comment is about on a par for common sense with that of the anti-submarine patrol crewmen who insisted they had no reason to learn how to use oxygen equipment because they never flew over 100 feet. And so saying, they were transferred to combat only to discover they were to fly their first mission at 28,000 feet.

It happens every day.

You never know when you are going to need oxygen, so have your equipment ready at all times and on all missions, and *know how to use it.*

Not long ago two bombardiers died needlessly from want of oxygen — and they weren't in combat either. They were on a routine practice flight when they suddenly struck bad weather and had to "go upstairs." These officers did not know how to use a simple piece of equipment, one which, in a matter of seconds, became so important that it meant life or death to them. They are just as dead now as if they had been machine-gunned by the enemy.

Then there is the report of the "wise guy" who thought he knew all about oxygen equipment. But he borrowed a new type of mask from one of his fellow pilots one day and took off in his P-38. After no little difficulty he managed to get the mask on and turned the little red knob on the regulator, not noticing it was marked "emergency." You turned knobs on the old regulator, didn't you? His oxygen was exhausted at 30,000 feet, much to his surprise, and down he came for relief. How fast he came down no one will ever know for by the time he realized what was going on, he had to pull out so tightly his ship came apart all over the landscape. You're skeptical? All right, ask a certain officer in a photo-reconnaissance outfit who pulled the same stunt not many days later but lived to tell the tale. What he knows about oxygen *now* practically makes him an expert.

But that's learning the hard way.

The best scientific minds in the country have devised the best oxygen system in the world for the Army Air Forces. When used properly, it will insure an adequate oxygen supply on flights as high as 40,000 feet. But remember, a piece of equipment is only as good as the man who uses it. Know your oxygen equipment. This means every combat crew member, commissioned and enlisted personnel alike.

The type of oxygen equipment now most widely used in operations is the so-called "demand" type. Unlike the older types in which oxygen came from the regulator at all times and the flow had to be increased with altitude, the demand type provides oxygen only when you inhale. When you exhale, the flow stops. Furthermore, the demand type does not need adjustment with altitude; it is automatic.

ON the side of the demand regulator is a little handle which controls the "Auto Mix." It has two positions, "On" and "Off." When the handle points to the "On" position, you get a mixture of oxygen and air. As you gain altitude, you get more oxygen and less air. This mixture is automatically controlled by the regulator. In the "Off" position you get only oxygen—but all you need. Unless otherwise instructed, use your regulator with the "Auto Mix On."

Now, that red knob marked "emergency". Use it only for that if the "demand" mechanism fails or your mask leaks badly, *open the emergency knob,* but remember, you're then using your oxygen so rapidly your supply will soon be exhausted.

1. This is the new A-10 (Revised) oxygen mask, scheduled for widespread use among flying personnel by June 1. Like the A-10, it operates with the Demand Regulator but fits more snugly and is attached to the helmet.

The demand mask must fit perfectly. It must not leak since the pressure changes that occur during breathing control the regulator. See that your mask is fitted for you and checked often by someone who *knows* how. This someone is your unit oxygen officer.

Oxygen officers are being assigned to each combat squadron to see that officers and men use and understand new oxygen equipment.

For many months, the Aero-Medical Laboratory at Wright Field has been developing new oxygen devices for AAF planes. These projects have provided greater flexibility, economy and dependability in oxygen equipment. They have made it possible for combat crews to move about freely during long flights with portable equipment, "walk-around bottles", and for fighter pilots to bail out from high altitudes with oxygen in a portable flask.

Research during the development of these devices has established the desirability of using oxygen at all altitudes from the ground up on night flights. This research has shown that night vision stays constant at all altitudes if oxygen is used, but that when it is not used, night vision drops approximately one-fifth at 5,000 feet and one-half at 15,000 feet.

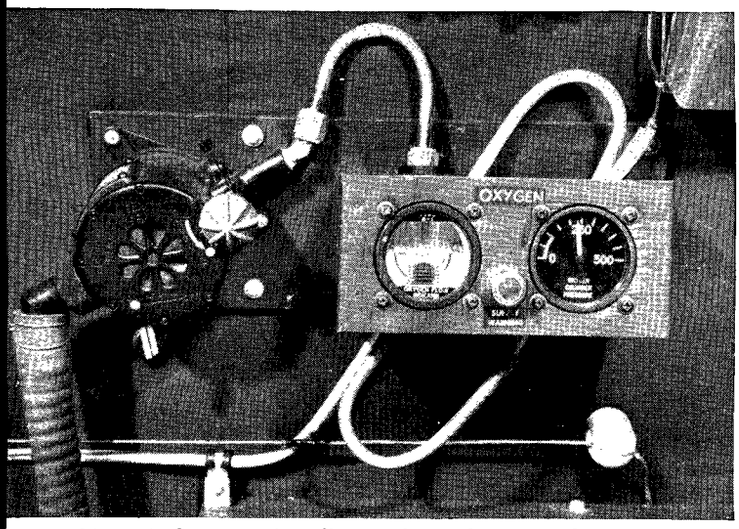
Other equipment developed includes a mobile oxygen generating plant, a dryer to remove excess moisture which could form ice in the oxygen system, and special vehicles which carry large master cylinders to fill up oxygen tanks in the planes.

These developments have added complexity to the oxygen systems. So special officers have been trained to show you how to handle your oxygen equipment skillfully and intelligently.

Take good care of your mask, too. Rubber is as difficult to get for their manufacture as it is for tires.

In addition to the oxygen officer, your flight surgeon is always ready and willing to advise you in any oxygen problems you may have. Check in with these officers and get checked out properly on oxygen equipment.

It may mean your life someday. ☆



2. This typical oxygen installation shows the Demand Oxygen Regulator, with auto-mix turned "ON", and the oxygen instrument panel, consisting of the A-1 type flow indicator, in which the bouncing ball shows the flow of oxygen with respiration, and the K-1 type pressure gauge to measure tank pressure.

4. Above is pilot in a multi-place plane equipped with A-10 Demand Oxygen Mask. Similar precautions must be exercised in avoiding leaks with the revised A-10 as with this mask in order to insure proper regulator operation.

USE OXYGEN INTELLIGENTLY

DO

Use oxygen above 10,000 feet on all flights.

Use oxygen from the ground up at night or on rapid ascents to high altitude.

Breathe normally.

Adjust your mask carefully and eliminate leaks before take-off.

Be thoroughly conversant with your oxygen equipment and the reasons for its use.

Report faulty function of oxygen equipment promptly.

Check your oxygen equipment before take-off and frequently during flight.

DO NOT

Do not fail to insure full cylinder pressure and an adequate supply of oxygen for your mission.

Do not fail to use your own fitted mask and necessary connecting tubing.

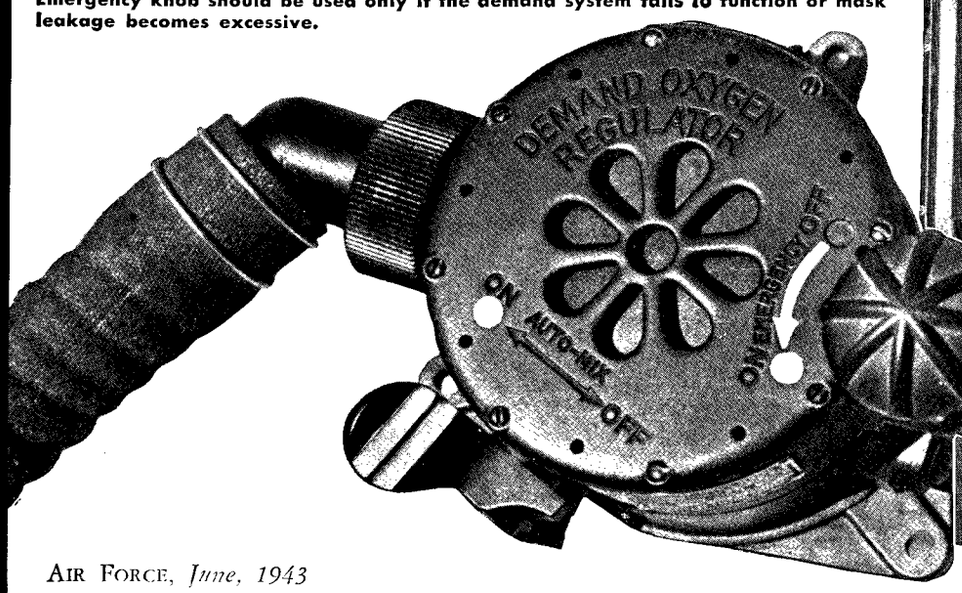
Do not leave your walk-around and bail-out oxygen bottles in your locker. You may need them.

Do not waste your oxygen supply by needlessly high flows.

Do not take liberties at high altitude by walking about the aircraft without portable oxygen bottles, or by failing to turn on the oxygen supply in time.

5. This crew member displays good sense by using the portable oxygen unit, known as the walk-around bottle, while moving about in a plane at high altitude. The equipment is used with the A-10 mask and provides a 4- to 8-minute supply of oxygen, depending on the altitude and the activity of the user.

3. This close-up of the Demand Oxygen Regulator, used with both the A-10 and A-10-R masks, shows the auto-mix lever in the "ON" position. Here the regulator furnishes the proper mixture of air and oxygen on demand at all altitudes. Starting with little or no oxygen at sea level, the mixture becomes enriched until 100 percent oxygen is supplied at about 30,000 feet. If the auto-mix handle is placed on the "OFF" position, the regulator gives pure oxygen on breathing at all altitudes. The Emergency knob should be used only if the demand system fails to function or mask leakage becomes excessive.



THE WAY TO EFFECTIVE TEACHING

By MAJOR LYMAN I. COLLINS

CHIEF, OPERATIONS SECTION, AAF TRAINING AIDS DIVISION

HIDDEN away in the squadrons over the country are thousands of good training ideas that never get out, and there are training officers everywhere who could and would use them if they had the chance.

This is a situation which implies both difficulty and promise. Individual initiative and independent achievement have been encouraged in the Army Air Forces from top to bottom. Both officers and enlisted men have responded. Now the need for coordination, the bringing together of the mass of developments, has become important. This is a function of the Training Aids Division. In an effort to see that what is known *anywhere* about training aids will be known *everywhere*, AFTAD liaison officers have been assigned to cover ten of the key AAF units in the United States.

As the Army Air Forces has grown, so has the number of instructors. And as combat conditions have become more varied, the problems of training have multiplied in number and complexity.

Teaching and learning come best when there is a union of patient, informed instructors, eager students, time and necessary equipment. Note the last two. At the moment time is precious and new equipment needs are just being discovered and developed. Emphasis must be on speed. Review and repetition are the luxuries of a more academic peacetime. What is taught must be absorbed immediately. Otherwise, the casualty lists grow longer.

UNQUESTIONABLY the lecture—the oral explanation—is not by itself the best teaching instrument. The man in front of a class must supplement his words with life and substance. He must find and use all the concrete aids possible. He must show what he talks about. He must demonstrate. He must have student participation. He must provide materials for out-of-class study.

What is needed and what is available for effective teaching?

1. Where the subject matter is static (the nomenclature of instruments, the items in a kit, the organization of a unit, etc.) posters and film strips are immediate helps in economizing the learning effort.

2. Where the subject matter is dynamic, where action and performance count, where attitudes are to be inculcated, as in "Learning How to Salute," "Removing the Engines from the C-46," "How to Fly the A-20," "Beyond the Line of Duty," or "Mr. Blabbermouth," moving pictures are invaluable in conveying the ideas, and in preserving the interest and attention of students.

3. Where basic facts and doctrine must be learned until awareness of them is instantaneous and where problems must be worked out, manuals, handbooks and study guides become the "bibles" of those eager for proficiency.

4. Where the acquisition of skills of all sorts is required, students have to "feel" and try out what must be known. It is a practical axiom that a man who is to know how to fly blind or shoot a machine gun has sooner or later to be put in a cockpit to go through the actual performance.

HOWEVER, the supply of ammunition and the number of planes are not inexhaustible. Even more important is the safety factor. When beginners are given highly complex machines to be put through difficult maneuvers there is always the possibility of injury. To eliminate such hazards as well as effect savings in material, synthetic training devices—substitutes which permit actual participation—have long since proved their worth. So rapid has been the development of these devices that one can now fly a 1,000-mile bombing mission, shoot enemy planes in transit, take pictures of enemy concentrations, compute the navigational data en route, and sight and bomb the objectives—without leaving the ground.

The Training Aids Division serves as a clearing-house of information and advice concerned with the acquiring and listing of all films, film strips, manuals and handbooks, posters and synthetic devices now in use by the Army Air Forces.

AFTAD liaison officers have the task of telling directors of training what is available and seeing that devices and guides developed locally and used effectively are procured for others who could use them.

These liaison officers have authority to give immediate approval to the organization and use of all training aids developed within the Commands and Air Forces. Each officer is charged with responsibility of transmitting descriptions and, where practicable, copies of training aids developed within his jurisdiction to AFTAD Headquarters, and from there information is channeled to the other liaison officers, to be passed on to C.O.s in their respective unit areas. They are given advance notice of the publication of catalogues and lists and are kept advised of the progress on new projects. They know through AFTAD of the obsolescence of training materials. Working through their individual headquarters, they learn of pressing needs for certain kinds of equipment; then working with AFTAD they seek to expedite the effort to procure that equipment.

When special aids are needed on loan for short periods, they may often be obtained through AFTAD. On occasion, when charts, posters, models, manuals and the like, fail to reach those who need them most, liaison officers are available to assist in new requisitions.

To accomplish this job liaison officers from AFTAD are now on duty at the following headquarters:

Anti-submarine Command, New York City; Air Service Command, Patterson Field, Fairfield, Ohio; Flying Training Command, Fort Worth, Texas; Materiel Command, Wright Field, Dayton, Ohio; Technical Training Command, Knollwood Field, Southern Pines, North Carolina; 1st Air Force, Mitchel Field, Hempstead, Long Island, New York; 2nd Air Force, Ft. George Wright, Washington; 3rd Air Force, Tampa, Florida; 4th Air Force, San Francisco, California; Flight Control Command, Winston-Salem, North Carolina.

SYNTHETIC COMBAT

By LIEUT. CHARLES S. KOPACZ
AAF TRAINING AIDS DIVISION

HE had chased that enemy plane all over the sky, had done very well with his rudder and stick. When the enemy streaked through his sight, he fired away. But his aim was bad. That blasted buck-tooth was making a monkey of him.

Coming out of a turn, the enemy momentarily flitted into the fighter's sight. The kid was thinking better now. He started to pull the triggers, hesitated, thought. He touched the controls lightly, and aimed not at where the enemy was, but at where he would be in a moment.

The guns chattered. There was a bright red flash in front. He had hit and the fight was over.

The kid looked a little sheepish as he stepped out of the cockpit and faced the captain. He knew what was coming.

"Well, you finally got him, son." Here was the dressing down. "Good thing you weren't in the sky for that performance. Pretty rotten, wasn't it?"

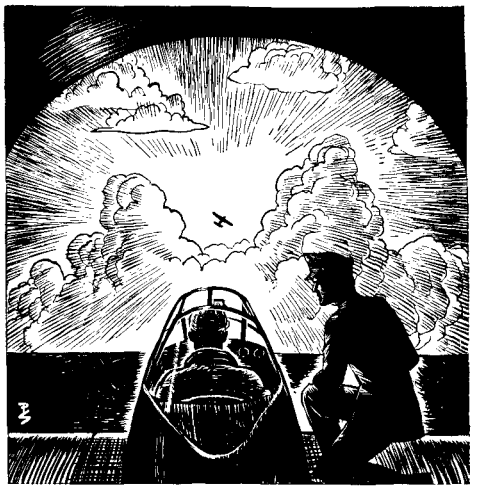
The kid admitted it. The captain softened.

"Don't let it worry you. I'm glad you don't have to get off the ground to do your practicing."

THE kid had been operating a standard synthetic contraption. Before he got the feel of the thing, he had made mistakes that might have cost his life if he hadn't had a ground buggy to practice in.

The entire combat situation was there—that is, everything except the hazard to life and aircraft. He had all the controls to operate while he manned his guns. The targets had flitted about in a make-believe sky, as elusive as enemy planes would have been in the real show.

This kind of training could go on twenty-four hours a day if necessary and at any place where there is a live wall socket to plug in the gadget.



There isn't any argument about training of this sort. With synthetic devices the student learns by doing. They give him the feel, but they save lives and planes and guns and gasoline. Bad weather needn't keep novice pilots out of indoor cockpits.

These gadgets aren't for the fighter pilot alone.

A student gunner practices in a synthetic bomber turret for all the world like the real thing. He can be made to feel that the enemy is attacking from all directions. If the gunner's hands are skillful, the turret responds properly.

There are equally effective devices for the navigator, radio operator, flight engineer, bombardier, photographer, meteorologist and armorer. They range from simple, home-made gadgets to elaborate and expensive factory-produced devices.

The genius of the whole Army Air Forces has gone into the development of synthetic training devices. The results are found in jeep gunnery ranges, link gunnery trainers with BB guns, radar trainers, photographic trainers and navigation trainers, literally hundreds of contrivances remarkably like the things they simulate.

To coordinate the development, procurement and distribution of these devices, a Synthetic Training Section has been set up as part of the Training Aids Division. The first job of this section, obviously, was to find out what synthetic devices already were in use or in process of development. Every activity of the Army Air Forces, the Canadian and British air forces, and the Navy were asked to report on their activities in the synthetic field. The replies brought a wealth of information.

The reports were classified and listed for use in a catalog for distribution throughout the Army Air Forces. To keep all AAF activities current on synthetic devices, supplements will be issued from time to time. Through this method, the Training Aids Division hopes to make each AAF unit's efforts available to every other unit.

INDEPENDENT initiative in developing synthetic training appliances is encouraged. In the Training Aids Division, the AAF inventor has an agency to which he can send his inquiries about whether a particular device is in existence, how to get one, or—if the project is still in development—the status to date.

Many times, adjoining fields have developed similar devices independently. It is the function of the AFTAD to prevent such duplications of effort, to make possible an effective pooling of energy and talent.

Every activity has its problems with synthetic devices. A function of the Training Aids Division is to disseminate generally the information on how these problems have been solved locally.

At one station, a link gunnery range officer observed recently that there was a high percentage of misses. Investigation disclosed that firing while skidding was the chief cause. His department tried in vain to foolproof the trainer. The problem was placed in the hands of experts and was solved immediately. They fixed the trainers so that the guns would not fire unless the turn-and-bank indicator ball was centered.

An AAF station needed large computers for classroom demonstration. The sub-depot built one, consuming valuable time needed on other tasks. Investigation would have shown that suitable computers were readily available commercially.

Often the solution of these problems is more difficult. It may require consulting the Experimental Laboratory, civilian scientists, the Signal Corps, the Navy Bureau of Aeronautics or the RAF. The Training Aids Division has the job of finding the answers.

WHAT THEY'RE READING

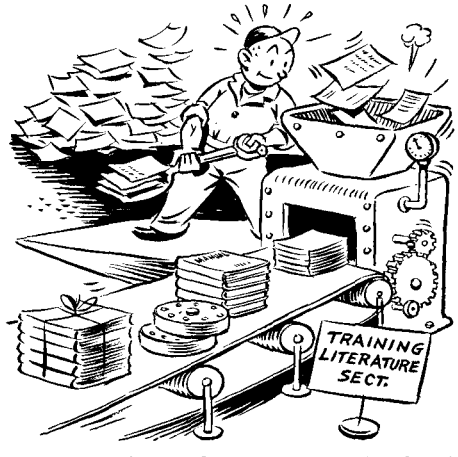
By LIEUT. JAMES GOULD COZZENS
AAF TRAINING AIDS DIVISION

DURING the winter of 1778-79 the American Army's first piece of training literature was composed. The work was undertaken by a foremost authority on military training but he found it difficult because he did not know the English language. He did know French of sorts, so laboriously he put his ideas into French. Then it took three members of his staff, in turn, to convert the work into literal French and eventually into the "King's English." On March 29, 1779, *Regulations for the Order and Discipline of the Troops of the United States* was published by Act of Congress at Philadelphia. The author was Baron von Steuben.

This new publication, called the military blue book, became the bible of the Continental Army. Part of it was a drill manual, but the Baron attempted a great deal more than merely to prescribe formations. He meant to cover, as well as it could be covered in a book, what strategists call technique. He explained specific military jobs. He also told the men how to be good soldiers and good officers.

That the Baron imagined his blue book, or any other book, was going to make the reader a finished soldier is unlikely. Finished soldiers are made by fighting, not by reading; but, then as now, there were important things that could be learned from a book by anyone of reasonable intelligence. In fact, some points could be better learned from a book, for the alternate instruction came in the form of bitter combat experience. The purpose of the Baron's blue book was to teach men their military jobs the easy way. That is still the purpose of training literature. Soldiers cannot go into combat with a field manual in one hand, but they can go into combat with the manual lessons in their heads.

The Training Literature Section of the Training Aids Division supervises the production of training literature for the Army Air Forces. Its specific functions include, besides the actual writing of training literature, approving and coordinating the development, distribution and use of material from all sources, eliminating duplication of effort, reviewing and editing and acting as a clearing house and information center where all branches of the Air Forces can find out what literature is available.



The weapons of the Air Forces are complex and complicated, and miles of type and hills of paper are devoted strictly to technical instructions for using and caring for this equipment. This mass of technical material clears through AFTAD.

This also is true of manuals on the tactics and technique of air fighting, of air attack, of torpedo and incendiary bombing; on flexible gunnery; on emergency procedures; on the duties of combat crew members, of officers in tactical squadrons and groups, in base operations, in air depots and service centers.

Making such manuals available presents problems. For one thing, any manual dealing with tactics deals with something that, in the Air Forces at least, is constantly changing. Yesterday's tactics are often ineffective today and perhaps suicidal tomorrow. Baron von Steuben's material might have had to be translated from the German in which he thought, to French, to English, but at any rate the points to be made did not change as fast as he wrote them down.

Not only does the content of a manual have to be authentic and properly prepared, but the treatment of this material must be considered. This depends largely on the type of manual being compiled. In the case of such subjects as Elementary Physics for Air Crews, or Mathematics for Bombardiers and Navigators, it is plain that no amount of art or artifice in presentation will teach physics or mathematics without effort on the student's part. A man who takes up either manual does so because he has to master its information before he can go on with his job.

On the other hand, such field manuals as a forthcoming one on Local Ground Defense of Airdromes can be made more interesting and even more instructive by profuse illustration. In a few instances—for example, a new Air Forces handbook on physical fitness—something approaching the painless technique of the comic strip will work. ☆

WHERE TO GO

Information on the availability of training films and film strips, aircraft recognition materials, synthetic training devices and training literature may be obtained from the Training Aids Division, Army Air Forces, No. 1 Park Avenue, New York, N. Y. (Formerly located in the Florida Bank Building, Orlando, Fla.—Ed.)

FLORIDA'S COMBAT THEATRE

(Continued from Page 9)

Ground crewmen at the same time will be learning to overcome problems they will be called upon to face in these same theatres. The AAFSAT training course lasts for one month. Then your cadre will return to its parent training Air Force, where the remaining personnel required to round out the new bombardment group will be assembled. Officers and men who have been to AAFSAT then will pass along to the rest of the group tactical combat pointers taught them in Florida, before departing for overseas duty.

This same procedure is followed by fighter, air support and air service cadres, all of whom get their own academic instruction, then join in framing demonstration missions.

To carry out both the instruction and tactical developments missions, each of AAFSAT's Departments operates as a normal tactical command with an academic section superimposed upon it. Let's take the Air Defense Department as an example.

The Fighter Command this Department represents is composed of the Orlando Air Defense Wing, with a Wing Headquarters, a Fighter Group, an Air Warning Battalion, two Night Fighter Squadrons and two Fighter Control Squadrons. This setup involves a standing personnel of approximately 3,000 officers and men, who operate some 125 tactical aircraft. In addition, the academic section consists of the necessary supervisory personnel, school troops and instructors.

A BRIEF breakdown of typical courses offered in the Air Defense Department will be of interest to personnel engaged in the several phases of fighter aviation training.

A course is given for communications officers and enlisted men in radio maintenance and the operation of radio equipment in fighter control squadrons. In another course, officers are instructed in controlling fighter aircraft in flight from the ground. This course covers controlled interception, both synthetic and actual, navigation, weather and identification of aircraft.

The Signal Corps handles courses for personnel trained in the Aircraft Warning Service. These include filtering information derived from radio locator points scattered throughout the AAFSAT theatre of operations, the inspection, operation and maintenance of special radio locator equipment, the recognition and reporting of aircraft by ground observers, and the theory and tactical employment of signal communication system as it pertains to A.W.S.

The Coast Artillery instructs Coast Artillery officers and men assigned to the Air Forces in the employment of searchlights and anti-aircraft artillery in a unified air defense system.

These courses, it may be noted, are in addition to the academic and tactical training of fighter pilots, and administrative and service personnel in fighter group cadres. Included in this part of the Air Defense Department's responsibility is the training, activation and commitment of night fighters.

An example of the tactical adaptation of academic courses may be found at the outlying bases of the Air Support Department.

At one airdrome specially equipped A-20s practice the employment of minimum altitude bombing tactics (sometimes called buzz- or skip-bombing), developing refinements of a technique employed so successfully in the Bismarck Sea engagement last March. Dive bombers at this same field blast targets in practicing dive-bombing techniques — some of them established in actual combat operation, others developed by instructors and students at this base.

SEVERAL miles away, at another airdrome, paratroops, glider troops and other airborne personnel work out under simulated battle conditions, dropping behind imaginary lines and capturing an "enemy" base in the prosecution of a special field problem. From yet another base, planes take off for a sector and try to rout ground troops with tear gas. Other aircraft, ranging from liaison Cubs to the speedier P-39s and A-20s, are used in special observation problems.

Just as the bombardment and fighter personnel receive plenty of synthetic training before heading for outlying bases, Air Support students are given similar academic preparation by working out problems around sand tables supporting miniature villages and "enemy" terrain.

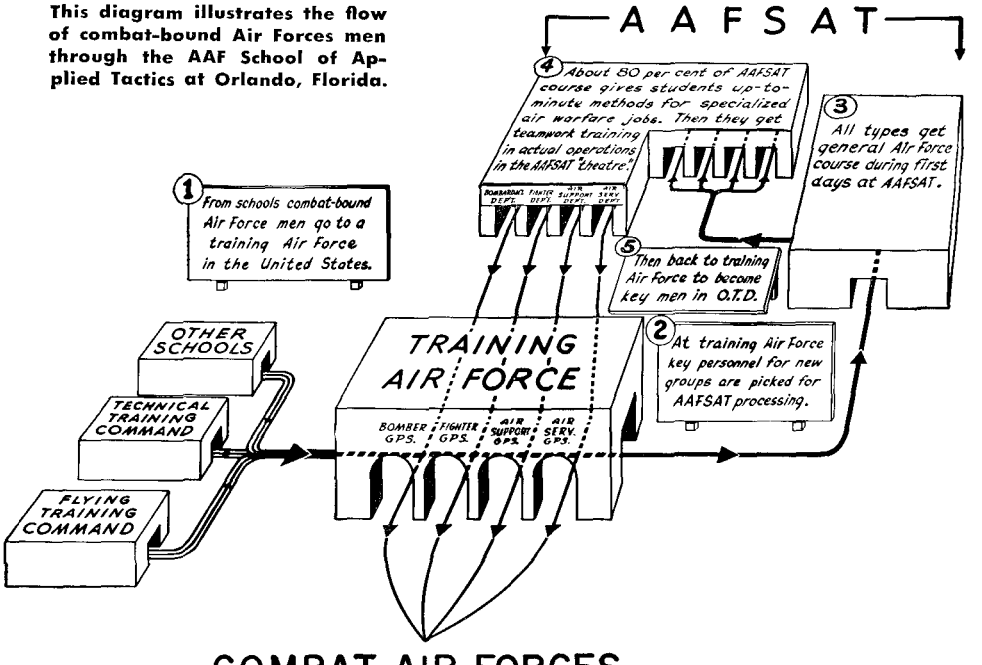
Aside from its vital role in academic instruction, the Air Service Department is charged with responsibility of supplying and maintaining active combat units in the AAFSAT theatre airdromes. Actively aiding in the supervision of this mission are specialists from the Quartermaster Corps, Signal, Medical, Ordnance, Chemical Warfare and Engineer Corps, who have been assigned to the Air Forces. They augment the staff of Air Corps maintenance, technical supply and administrative personnel.

From the standpoint of organization, AAFSAT consists basically of four "directorates", an air staff and four Departments. Brigadier General Gordon P. Saville, former Director of Air Defense, Headquarters, Army Air Forces, is the Director of Tactical Development; Colonel H. W. Holden, the Director of School Activities; Colonel C. W. Lawrence, Director of Academic Training, and Colonel R. A. Day, Director of Operations and Facilities. Colonel Day also serves as Chief of the Air Staff.

Staff members are Major C. H. Ferguson, A-1, Lieutenant Colonel E. F. Luna, A-2, Colonel A. H. Foster, A-3, and Colonel C. C. Berry, A-4.

The Department heads, who also are commanding officers of the corresponding Commands in the field, are Assistant Commandants of AAFSAT. They are Colonel E. W. Barnes, Air Defense, Colonel H. G. Montgomery, Jr., Bombardment, Colonel M. H. McKinnon, Air Support, and Colonel J. M. McCulloch, Air Service.

This diagram illustrates the flow of combat-bound Air Forces men through the AAF School of Applied Tactics at Orlando, Florida.



COMBAT AIR FORCES

You officers and men who are assigned to AAFSAT for training should bear in mind that you are coming to a theatre of operations. You must be prepared to live and operate under circumstances similar to those experienced from day to day by Air Forces personnel already in combat theatres. Don't bring along your families, automobiles and household belongings. You will have little or no opportunity for personal, domestic interests, and you will only add to the already over-crowded living conditions in the Orlando civilian area.

It is important that you come to AAFSAT not merely with an open mind but prepared to ask questions and plenty of them. One question asked or one problem posed by you may result in the development of a technique which can be employed to good advantage against the enemy. ☆

CONGRESSIONAL MEDAL OF HONOR

BRIGADIER GENERAL Kenneth N. Walker*. **COLONEL** Demas Thurlow Craw* (Also Purple Heart*).

DISTINGUISHED SERVICE CROSS

MAJORS: John R. Alison, John W. Mitchell. **CAPTAINS:** William E. Dyess, Elbert O. Meals, Victor Emanuel Walton. **LIEUTENANT** Jack W. Hall. **TECHNICAL SERGEANT** Arthur G. Kelly*. **STAFF SERGEANTS:** Albert L. Catallo (Also Purple Heart), Doyle Kimmey*. **SERGEANT** Stanley A. McLeod*. **CORPORAL** William T. Anderson.

DISTINGUISHED SERVICE MEDAL

MAJOR GENERAL Robert Olds. **COLONELS:** Orrin L. Grover, Robert F. Tate.

Oak Leaf Cluster to Distinguished Service Medal

BRIGADIER GENERAL Alfred J. Lyon*.

SILVER STAR

COLONELS: Truman H. Landon (Also Distinguished Flying Cross), Homer L. Sanders. **LIEUTENANT COLONEL** Horace M. Wade. **MAJORS:** Alexander G. Evanoff, Elbert Helton (Also Purple Heart), George T. Ingram, William E. Kinney (Also Oak Leaf Cluster to Silver Star, Distinguished Flying Cross with Oak Leaf Cluster and Oak Leaf Cluster to Air Medal), Frank J. Puerta (Also Distinguished Flying Cross), Robert B. Sullivan (Also Distinguished Flying Cross and Air Medal with Oak Leaf Cluster), Jack A. Wilson. **CAPTAINS:** Richard H. Beck, William A. Brown, Walter Clark, Paul E. Cool, Charles W. Dunning*, Charles A. Fletcher, Jr., Robert J. Hughey, Mark T. Mooty, Christian Petri, Jr., Albert W. Schinz, Donald A. Simpson, Raymond A. Sloan, William Taggart. **LIEUTENANTS:** John D. Bailey, William L. Baker, Roy R. Bright, Charles S. Brown, Charlie Bull, Frank C. Busbee, James W. Cain, Hans C. Christiansen* (Also Purple Heart*), Paul E. Dawson, Henry P. Elias*, Edgar G. Gammon, Jr., Elmer G. Ghram, Robert T. Golberg, Donald A. Graham, Samuel C. Grashio, Walter E. Gurley, Sanford W. Hickey, Michael Joseph Ingelido, Henry A. Keel, John D. Lombard, Jack C. McIntyre, Leonard P. Marks, Edward M. Nollmeyer, Bernard J. Oliver, Charles W. Peterson, Russel K. Pierce, Jr., Victor J. Poncik (With Oak Leaf Cluster), Gustav H. Radebaugh, Francis D. Riggin, William R. Rodgers, Alexander R. Salvatore, Walter T. Schmid, Vernon L. Scott, Philip K. Shriver, Henry M. Sparger, Roderick M. Stewart, Earl R. Stone, Jr., Richard C. Suehr, Euel A. Travis, Alden N. Wood, James L. Yelvington (Also Purple Heart). **MASTER SERGEANTS:** Thomas J. Crumley, William F. Myers. **TECHNICAL SERGEANTS:** Walter V. Cheek, James F. Shoup. **STAFF SERGEANTS:** Norman K. Frost (Also Purple Heart), William T. Jent, George A. Kielbasa (Also Purple Heart), John E. Lillback, John J. Meehan, Donald T. Ostlund (Also Purple Heart), Burnell Walker. **SERGEANTS:** Charlie Barnes, A. G. Blackwelder, Jr., Robert H. Burns (Also Distinguished Flying Cross), Calvin W. Croom, Lewis DeSimone (Also Distinguished Flying Cross), Perry Doty, Alfred H. Fawe, Ray D. Holcomb, Kenneth L. House, Daniel J. Keller, Henry P. McNeill, Jr., James W. Miller, Guy E. Reynolds, Thomas E. Ross*, John R. Walker. **CORPORALS:** Francis R. Neis, Albert F. Osterhaus, Robert D. Smith, George R. Zenz. **PRIVATE FIRST CLASS** Mack B. Anderson. **PRIVATES:** Wiley O. Cart, Otto Russell.

Oak Leaf Cluster to Silver Star

CAPTAINS: John Herbert Posten, Robert E. Thacker. **LIEUTENANTS:** Feaster A. Norwood, Adrian J. Sampeck, Edward R. Yerington. **TECHNICAL SERGEANT** Bernardino O. Tortora. **SERGEANTS:** Claude J. Fraley, Regis D. Weinfurther.

* Posthumous

Lt. Wm. L. Baker

Col. C. B. Overacker,

Capt. Richard H. Bec

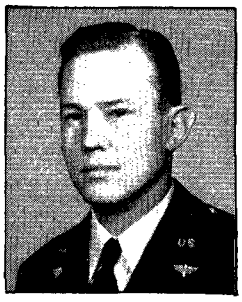
Lt. Elsie S. Ott

ROLL OF HONOR

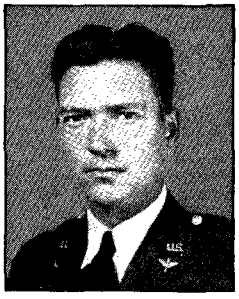
T/Sgt. J. Marling

Capt. Warren A. Beth

ol. Robert F. Tate



Maj. J. R. Alison



Lt.Col.J.W.Chapman,Jr.

Lt. John D. Bailey

Maj. Frank L. Puerta

Sgt. W. T. Majewski

Lt. John J. Boll

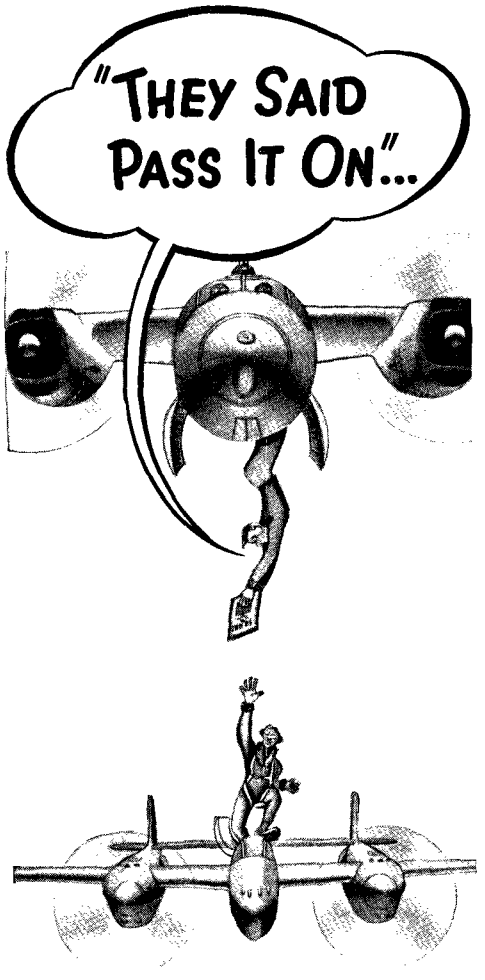
Maj. Gen. W. H. Hale

Sgt. Lee E. Nelson

apt. R. C. Lycan

PURPLE HEART

MAJOR GENERAL Willis H. Hale. **BRIGADIER GENERAL** Howard C. Davidson. **COLONELS:** William L. Boyd, William C. Farnum, William J. Flood, Clarence S. Thorpe, Leonard D. Weddington. **LIEUTENANT COLONELS:** Brooke E. Allen, James W. Chapman, Jr., Ted S. Faulkner (Also Distinguished Flying Cross), Ralph F. Friedenthal, Fernando Green, Andrew A. Meulenberg. **MAJORS:** William G. Benn, John E. Dougherty, Edward V. Hughes, William H. Monay, Raymond E. Nelson, John J. Thornhill (Also Distinguished Flying Cross and Air Medal), Francis C. Tremayne, Ralph M. Wanderer. **CAPTAINS:** Haley W. Aycock, Harvey C. Bauss, Frank P. Bender, George A. Blakey, James G. Carroll, Gerald J. Crosson, Maurice W. Dale, Oliver C. Doan, William S. George, Jr., Max Goldman, Denver D. Gray, Ralph J. McBride (Also Air Medal), John C. Nissen (With Oak Leaf Cluster), George Rawlins. **LIEUTENANTS:** Bernard E. Anderson, Alfred Asch, Melvin E. Brown, Malcolm J. Brumwell*, Norman Bryant, Ralph C. Carey, Linden W. Cochran, James A. Daughtry (Also Air Medal), Clyde E. DeBaun, Harry E. Erickson, Fred N. Featherstone, Jr., John G. Foster, Richard Booth Gardner (Also Air Medal), Balfour C. Gibson, John G. Glover, Johon S. Greene, George L. Hasik, Herbert N. Henckell, Jr., Robert J. Hinson, Richard R. Hopper, Lyle G. Karnath, Aleron H. Larson, Virgil B. Lindsey, Daniel A. McColl, John B. McManus (Also Air Medal), Edgar V. Markley, Lee N. Minor, Jay E. Pietzsch*, John F. Twilley, Leland A. Walker, Jr., George A. Whiteman*, John P. Wright, Howard N. Young, Melvin D. Zajic. **MASTER SERGEANT** Stanley A. Hunt. **TECHNICAL SERGEANTS:** John T. Brogan, Victor J. Cozza, Donald E. Hiatt, Herman C. Reuss*, Garland B. Smith, Pete M. Vasalie. **STAFF SERGEANTS:** George M. Ashe, LeRoy H. Blonshine, Felix Bonnie*, John W. Carney, Harold C. Elyard, Paul V. Fellman*, Norman Holm (Also Air Medal), James A. Malone, Ralph E. Nau, Julius Schellenberg, William P. Wallen. **SERGEANTS:** Theodore L. Billen, Andrew H. Burnett, Harold O. Christiansen, John R. Conklin, Guy E. Dority, Patrick L. Finney*, Edward M. Jones, John B. Kraft, Edward B. Malinay (Also Oak Leaf Cluster to Silver Star), Robert H. Martin, Murel A. Murphy, Carson C. Richardson, Leland E. Taylor, Henry Wojciechowski (Also Air Medal), Rufus W. Youngblood. **TECHNICIAN FOURTH GRADE** Oliver T. Beyer. **CORPORALS:** Woodrow W. Brakefield, Richard A. Dickerson*, Edward P. Dwelis (Also Air Medal), Howard N. Lusk*, Walter B. Morrison, LaVerne J. Needham*, John M. Norquist, William H. Offutt*, Watson F. Parker, William F. Swain. **TECHNICIAN FIFTH GRADE** Clair E. Burt. **PRIVATES FIRST CLASS:** Raymond A. Chamberland, Eugene B. Denson, William C. Dryman, George F. Howard*, Sherman Levine, Richard E. Livingston*, Durward A. Meadows*, Sam C. Peticolas, Thomas E. Schofield, Ralph S. Smith, Johnnie F. Specht, Jerome J. Szematowicz*. **PRIVATES:** Manfred C. Anderson*, Gordon R. Bennett, *(Continued on Next Page)*



Sure, we said pass it on, but that's sticking your neck out a bit too far. We don't recommend it. But we do recommend—when it's safe—passing AIR FORCE on as soon as you've read it. By sharing a copy with as many men as possible, you will give everyone at your station an opportunity to read the official service journal.

William J. Brownlee, Concetto Castagna, Jr. (Also Air Medal), Frank B. Cooper*, Richard L. Coster, Phillip A. Cratch, Charles R. Deeter, Robert C. Duff, Jr.*, Lyle O. Edwards, Arnold E. Field*, Archie R. Gurkin, Guy H. Hand, Alfred Hays, Earl A. Hood*, Charles L. Hrusecky*, Joseph H. Jencuis*, John W. LaBar, Jr.*, Daniel Powloski, Allan G. Rae*, Michael V. Repko, Bertram J. Robas, Stanley J. Rykulski, Paul L. Staton*, James E. Strickland*, Ernest M. Walker, Jr.*, Robert H. Westbrook, Jr.*

Oak Leaf Cluster to Purple Heart

PRIVATES FIRST CLASS: Charles J. Correll, Morris Moskowitz.

DISTINGUISHED FLYING CROSS

LIEUTENANT GENERALS: Frank M. Andrews, Delos C. Emmons, George C. Kenney. **MAJOR GENERALS:** Ralph Royce, Clarence L. Tinker*. **BRIGADIER GENERAL** Joseph H. Atkinson. **COLONELS:** George F. McGuire, Charles B. Overacker, Jr. **LIEUTENANT COLONEL** Paul F. Davis. **MAJORS:** Albert J. Baumler (Also Air Medal), John D. Bridges, Russel A. Cone, James R. Dubose, Ben I. Funk, Cecil S. McFarland, Robert J. Mason, Paul H. Payne (Also Air Medal with Oak Leaf Cluster), Joseph A. Thomas (Also Air Medal). **CAPTAINS:** Frederick L. Andrews, Warren A. Beth, Bert M. Carleton, John W. Carpenter 3d (With Oak Leaf Cluster), John W. Fields, Vernon F. Newton, Richard D. Salter. **LIEUTENANTS:** Lester M. Chancellor, John J. Cook*, Dan M. Erickson*, Lawrence Gardner, James A. Gibb, Jr., Edward H. Higgins, Harvey Dalton Johnson*, Kenneth C. Jones, Richard W. Kimball, Hubert Smith Mobley (With Oak Leaf Cluster), James L. Regan, Francis X. Schwarzenbek. **TECHNICAL SERGEANTS:** David G. Dixon, James A. McVicar, Joseph H. Marling. **STAFF SERGEANTS:** Fred S. Croyle, Paul H. Dortch (With Oak Leaf Cluster), Orin W. Hawkins (Also Oak Leaf Cluster to Silver Star), Douglas H. Logan, Henry B. Pecher, Roscoe P. Rogers, Nicholas V. Stashuk (With Oak Leaf Cluster), Sam Tower, Jack L. Woody. **SERGEANTS:** Sheldon D. Beaton, Carl M. Biehn, Dan Ehrheart, James R. Mathewson, Robert K. Palmer, Elwyn O. Rahier, Lloyd D. Whipp, John J. Wilfley. **CORPORALS:** Harold E. Guse, Henry C. Nosalik, John A. Straight, Jr. (With Oak Leaf Cluster). **PRIVATES FIRST CLASS:** Floyd E. Marshall, Herbert M. Wheatley, Jr.

Oak Leaf Cluster to Distinguished Flying Cross

LIEUTENANTS: Theodore J. Boselli (Second Oak Leaf Cluster), Carl E. Epperson. **STAFF SERGEANTS:** John F. Clark, John C. Haddow.

SOLDIER'S MEDAL

LIEUTENANTS: Frederick R. Beal, Fred W. Edwards, James A. Estes. **STAFF SERGEANTS:** George B. Kirkpatrick, Rodney M. Stone. **SERGEANTS:** Elvin M. Lee, Gordon F. Willis. **CORPORALS:** Henry M. Thomas, Eugene B. Thompson, Jr. **PRIVATE FIRST CLASS** Robert J. Meikle. **PRIVATES:** John F. Hayes, Ivey I. Oakley, Wilbur R. Perkins, Emil R. Popovitch.

AIR MEDAL

MAJOR GENERAL James H. Doolittle. **BRIGADIER GENERAL** Caleb V. Haynes. **COLONELS:** James E. Briggs, Robert Oswald Cork, Emmett O'Donnell, Jr., Stanley T. Wray. **LIEUTENANT COLONEL** Jack N. Donohew. **MAJORS:** Rudolph E. Flack, Kenneth H. Gibson, Isaac J. Haviland, Jr., Gregory F. Keenan, William A. Lanford, Walter Y. Lucas (With Oak Leaf Cluster. Also Oak Leaf Cluster to Silver Star and Two Oak Leaf Clusters to Distinguished Flying Cross), Paul W. Tibbets, Jr. (With Oak Leaf Cluster), James W. Wilson, Victor S. Zienowicz. **CAPTAINS:** Virgil C. Alleman, Pat Martin DeBerry, Howard Bowman, Donald S. Dunlap, John D. Eiland, Jr., Richard F. Ezzard, Ernest G. Ford, George W. Gillett, R. C. Lycan, Phillip A. Sykes, Edward F. Tindall, John M. Yancey. **LIEUTENANTS:** Joseph D. Abell, Kenneth W. Ambrose (With Oak Leaf Cluster), Stanley M. M. Anderson, Gene L. Arth, Robert D. Bailin, David F. Barnett, Jr., Harold E. Blanksma, John J. Boll, Elsie S. Ott, William Hughes Young. **WARRANT OFFICER** Lester R. Dowell. **MASTER SERGEANTS:** Edward Maciag, John G. Yates. **FIRST SERGEANT** Bernard I. French. **TECHNICAL SERGEANTS:** Herbert B. Daly, Walter A. Gilbert, Jarvis E. Hall, Stanton E. Hendricks, Stanley C. Jackola, John M. Lambert, Charles Y. MacPherson, Edgar A. McCunney, Karl L. Masters, Michael J. Morrissey, Aaron F. Moses, Robert G. Mumaw, William L. Nisbett, Arvle D. Sirmans, Earle K. Smith, Richard L. Walker, Pete T. Zychal. **STAFF SERGEANTS:** Walter S. Ahrens, Frank L. Batterson, Clair K. Benser, Jack Craig Boyd, Earl J. Deroche, William H. Forrester, Roy H. Gibson, Braden C. Griffin, Conrad A. Handon, James M. Hobbs, Arthur B. Smith, Francis Sulcofski, Lucius W. Treat, Douglas J. Upton, Lewis C. Williams, William E. Williams, J. L. Wiseman. **SERGEANTS:** Alfred Armand, Amos H. Behl, Lorin E. Blanchard, James R. Boyd (With Oak Leaf Cluster), Chester D. Cahill, Stephen M. Cooper, Joseph F. Cummings, Jack F. Delaney, Abraham A. Ehrenreich, William T. Majewski, Lee E. Nelson, Richard A. Williams (With Oak Leaf Cluster), Howard V. Wilpur. **CORPORALS:** Grady W. Anglin, Arthur G. Campbell, Earl A. Hollar, Jack E. Leverone, Frank A. Licordari, Stanley S. Seger, Lester A. Smith, Werner G. Wallace, Elbert C. Wright. **PRIVATES FIRST CLASS:** Eugene Burchard, Robert L. Parks, Glenn C. Richards, Charles H. Torrence, Jack L. Warren. **PRIVATES:** John M. Bowden, Ivan W. Graves, Lloyd D. Moran, Henry J. Schloer, Lloyd A. Shinn, Claude R. Taylor, William H. Yoakum.

*Posthumous

PICTURE CREDITS

8: AFSAT, Orlando, Fla. 14-15-16: Sacramento Air Depot; Hendricks Field, Fla.; AAFTTC. 17: Consolidated Aircraft Corp. 18-19: Major Stephen L. Gumport. 22: Air Service Command, Patterson Field, Ohio, 25: AIR FORCE. 30: Associated Press. All other photographs secured through official Army Air Forces sources.

ANSWERS TO QUIZ

on page 17

1. (b.) Insufficiency of oxygen
2. (b.) To one side of it
3. (b.) 30 inches
4. (d.) Cloud formation
5. (d.) A central instructors' school
6. B-24
7. (b.) Micrometer
8. (c.) 45 degrees
9. (b.) False
10. (c.) In arterial bleeding the blood spurts from the artery with each pulsation of the heart; bright red in color. (Blood from the veins flows in a steady stream; dark red or purple. Capillary bleeding is an oozing of blood from a cut surface.)
11. (a.) In front of the engine
12. (c.) $10,000
13. (d.) I sustain the wings
14. The Air Medal
15. (d.) Ultramarine blue piped with golden orange are the Air Forces colors. (Cobalt blue piped with golden yellow—Chemical Warfare Service; dark blue piped with white—Judge Advocate General; dark blue piped with light blue—Inspector General Department.)
16. (b.) False
17. (b.) North on the ground
18. (a.) Charge of Quarters
    (b.) Army Post Office
    (c.) Bachelor Officers Quarters
    (d.) Officers Candidate School
19. (c.) Compass
20. B-25

HIGH LEVEL JUMPING

(Continued from Page 13)

available. Since the walk-around cylinder can be used without removal of the oxygen mask, it is in some ways superior to the bail-out bottle in the case of emergency. It could be employed at least up to the point of clearing the ship.

Even with this emergency equipment, however, free fall still remains one of the best answers in parachute escape from high altitudes. The accompanying chart shows the comparative rate of descent between free fall and open parachute fall. It is readily seen that an airman's exposure to low oxygen tensions and extreme cold of higher altitudes is drastically shortened if free fall is employed until he reaches lower levels.

Simulated free-fall parachute descents in a low-pressure chamber have shown that descent from 40,000 feet can be carried out without loss of consciousness or use of any oxygen equipment, if a deep breath of oxygen is taken prior to the start of the fall and held for as long as thirty seconds.

If this provision is not met, a brief span of unconsciousness will result. This period of unconsciousness is very short and, except in the case of an injured man, it is believed that recovery can be made in plenty of time to allow for the opening of the parachute. In fact, most flyers probably wouldn't recognize that they had had a lapse of consciousness due to lack of oxygen.

In a series of laboratory tests at Wright Field in which the conditions of loss of consciousness at altitudes of from 30,000 to 36,000 feet were simulated, the subjects "free fell" and all recovered sufficiently to pull the rip cord between 2,200 and 25,000 feet. The average pull was made at 14,000 feet.

The effect of free fall on the ears is great and rupture of the eardrums may occur unless the parachutist is able easily and readily to clear his ears. Still, the danger of rupture is not so great if free fall is employed only at higher altitudes and is stopped by opening the chute at about 15,000 feet. Moreover, it should be borne in mind that although they are painful and temporarily incapacitating as far as flying is concerned, the prospect of ruptured eardrums should not be given too much consideration when an emergency parachute escape is involved.

Aside from its tendency to forestall loss of consciousness in high altitude escapes and the protection it affords from quick-triggered adversaries, the free-fall procedure has other advantages. In leaving a high-speed fighter plane, the pilot may experience difficulty in getting out and the speed imparted to the falling body may snap the parachute shrouds if the chute is opened too soon. Free fall should be employed in such cases until the velocity imparted by the plane is materially lessened. This, of course, is dependent on the altitude at which the pilot has bailed out. It is recommended, whenever possible, that fighters be pulled almost to a stall before pilots leave them.

Then, too, there is always the danger of the parachute becoming fouled with the falling plane if it is opened too soon. Here again, common sense must be exercised.

There is at least one case on record where even the exercise of good common sense on the part of the pilot almost failed to separate his free-falling body from the falling aircraft in time to permit the safe opening of his chute.

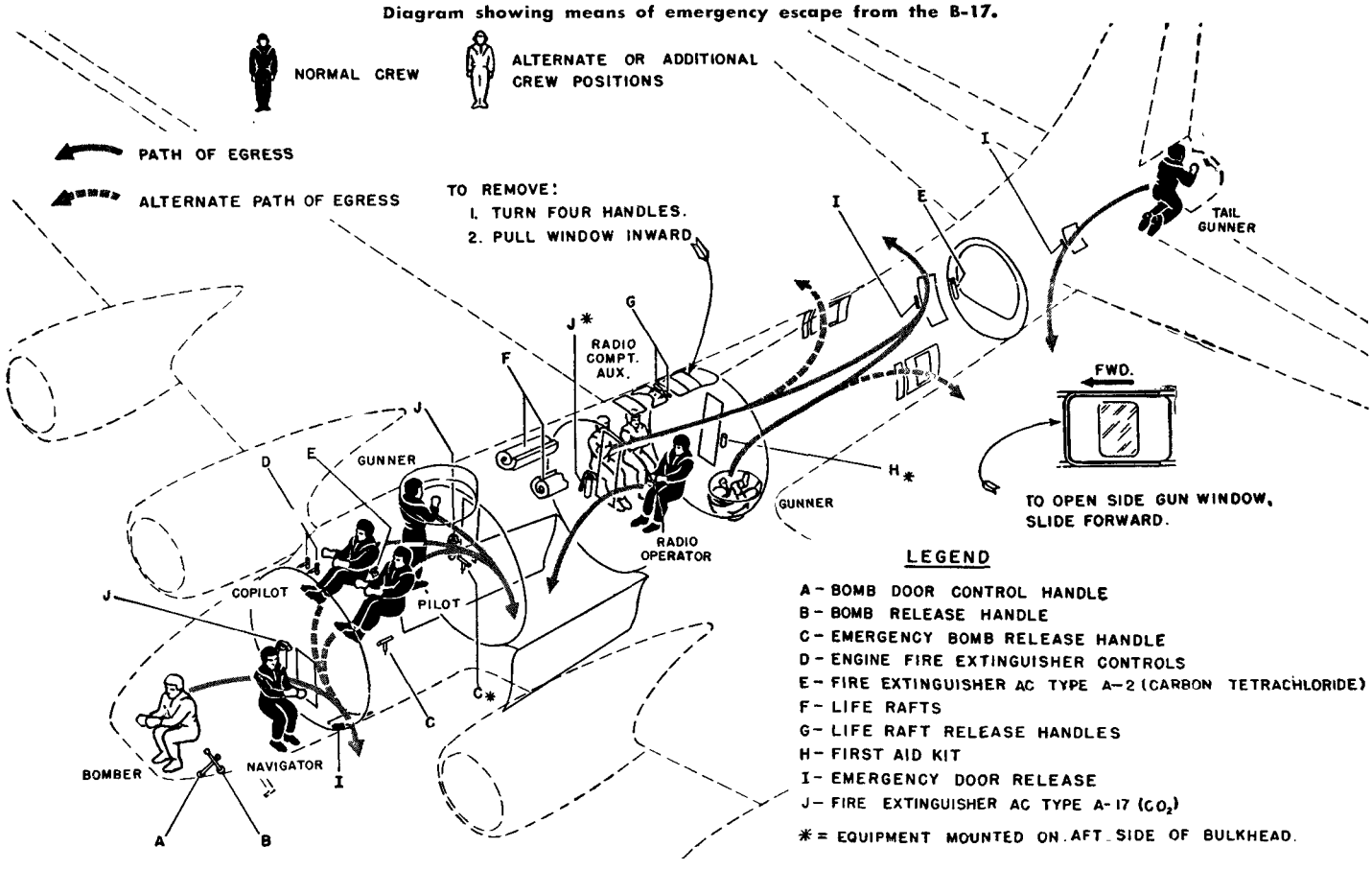
In this case a fighter plane went into a spin, completely out of control. The pilot decided to abandon the ship and attempted to crawl out on one wing so he would be thrown clear. He pulled himself a few feet along the wing surface and slipped off.

Seconds later with plane and pilot at about 3,000 feet, a portion of the whirling plane struck him on the side of the head and scraped some skin from his back. Although he feared he might lose consciousness, the pilot wouldn't open his chute because the falling plane was still above him.

The plane was still above the pilot at 1,200 feet but he decided it was about time to check on the chute. He felt for it but it wasn't there. He fumbled for the chute and found it tangled around his ankles. The chute had been knocked down by the impact of the plane.

By the time the pilot had his chute under control, he had dropped to about 600 feet. But the plane was still overhead. Nevertheless, his one chance was to pull the rip cord and cross his fingers. The parachute responded immediately, although in opening it bounced off one wing of the falling plane. The fabric was ripped a bit in the collision but the pilot landed safely. It was a rather rough initiation into the Caterpillar Club, but it goes to show that a lot can happen after a bail-out and still find you alive to tell about it. ☆

Diagram showing means of emergency escape from the B-17.



PREPARE FOR TROUBLE!

Your knowledge of emergency equipment can mean the difference between life and death.

PREPARED BY THE ARCTIC, DESERT AND TROPIC INFORMATION CENTER, EGLIN FIELD, FLORIDA

SPECIALIZED studies in the technique of forced landing procedure and survival in non-temperate zones, made by the Arctic, Desert and Tropic Information Center of the AAF, reveal that an all-important factor in survival is the proper selection and use of Emergency Kits. It is the purpose of this discussion to present the picture of Emergency Kits as it currently exists.

Air Forces Emergency Kits have been designed and assembled by the Materiel Command to fit the special needs dictated by the character of the flight and the type of terrain over which it is made. Because the decision as to what type of emergency equipment is to be carried rests eventually with the individual pilot and crew, it is to the interest of all flying personnel to know what emergency equipment is available.

To begin with, it will pay to learn and practice these three cardinal principles:

➔ Select the Emergency Equipment you intend to carry on the basis of the nature and requirements of your mission, as well as on the weight and space allowance of the aircraft. Consider all the factors: whether you will operate over water, whether you may be forced down in enemy territory, etc.

➔ Check the equipment carefully before your takeoff. Understand its use. See that it's all there. Test it to make sure it will work when you need it.

➔ Keep your emergency equipment readily accessible (strap on the kits intended for carrying on your person); keep the other kits within reach, where you can put your hands on them instantly in an emergency.

Let's look over the Emergency Equipment set-up. At present, there are three main categories available. They include:

1. *First-Aid Kits.* These include emergency medical first-aid equipment. Two such kits are available—see descriptions below.

2. *Flotation Equipment.* This equipment is carried in aircraft for use in the event of emergency on overwater flights. It includes a pneumatic life preserver vest and a variety of life rafts—see descriptions below.

3. *Sustenance and Implement Kits.* These kits fall into four groups: (a) parachute back- or seat-pad Emergency Kits; (b) Personal Kits—these are attachable to, or can be carried on the person of pilots and crew members; (c) Airplane Kits which are carried in the aircraft; and (d) Dropping Kits transported by plane to the disaster—see description below.

The chart which accompanies this article indicates the Emergency Equipment and Kits currently available, and shows the zones and purposes for which they are intended. Detailed descriptions of the current Emergency Equipment follow:

FIRST-AID EQUIPMENT

First-Aid Kit, Aeronautic: Installed in all aircraft, based on the use of one kit for each two men. Components: surgical dressing, sulfanilamide powder, sulfadiazone ointment (for burns), syrettes morphine tartrate (hypodermic to relieve severe pain), scissors, adhesive bandages and iodine swabs for care of minor wounds.

First-Aid Kit, Parachute: A compact package that is either tied to the chute harness or carried in the pocket. Components: dressing for wounds, syrettes, tourniquet.

FLOTATION EQUIPMENT

The "Mae West": A pneumatic life preserver vest, well-known to all personnel.

Pneumatic Life Rafts: Six types are currently in use by the Army Air Forces—*Type A-2* (1,000 pound capacity), *Type A-3* (1,000 pound capacity), *Type B-3* (500 pound capacity), *Type B-4* (500 pound capacity), *Type C-1* (250 pound capacity), and the One-man Parachute-type Pneumatic Life Raft.

Types A-3, B-3, B-4, and C-1 are of an early design and are being superseded by types A-3 and the One-man Parachute Rafts. The *A-3 Raft* is used on all airplanes having crews of more than three men. Crews of 4-5 men use one A-3 raft; crews of 6-12 men use two A-3 rafts; crews of 12-15 men use three A-3 rafts. The Type A-3 five-man pneumatic life raft is designed for storage in the raft compartment of airplanes. It can be automatically inflated by means of control cable, hand releases, or manually by release cords. The following accessories are included in secured pockets and containers:

It is the function of the Arctic, Desert and Tropic Information Center (Headquarters at Eglin Field, Florida) to prepare and disseminate information on all aspects of Air Forces operations (maintenance, health, shelter, clothing, etc.) in non-temperate zones. Information on forced landing procedures, survival and Emergency Kits is a major interest of this organization. The ADTI Center welcomes inquiries from all branches of the Air Forces, concerning problems relating to operations in Arctic, Desert and Tropic areas.

pyrotechnic pistol and distress signals, seven 12-ounce cans of water, three sea markers, flashlight, scout knife, police whistle, first-aid kit, two emergency fishing kits, shade and camouflage cloth, combination signal, watercatching and sail cloth, two oars, hand pump and hose, bailing bucket, repair kit, four bullet-hole plugs, 40 feet of cotton cord. The container also has provision for housing radio apparatus.

The One-Man Parachute Raft is designed to supplement the seat-type or back-type parachute, and occupies whichever position is free. The raft is automatically inflated in a few seconds by a carbon dioxide infiltration cylinder when the attachment cord is pulled. The One-man Raft is equipped with a sea-anchor, a bailing cup, two hand paddles, a first-aid kit, a can of drinking water, two bullet-hole plugs, patching material, a can of fluorescein dye (to be spread on the water as a distress signal marker), a waterproof cloth (for use as a shade cloth, water-catching, signal, sail, or camouflage cover).

Sustenance and Implement Kits

Alaskan Emergency Kit, Type B-1. For personnel flying in the north. A back-pad kit designed to take the place of the conventional back pad on the parachute. Contents: cooking kit, match case, emergency rations, gloves, mosquito headnet, pocket knife, fishing equipment, insect repellent, bouillon cubes, and camphor gum.

Jungle Emergency Kit, Type B-2. For personnel flying in the tropics. A back-pad kit designed to replace the conventional back pad on the parachute. Contents: compass, emergency rations, match case, flare, gloves, mosquito headnet, machete, sharpening stone, fishing equipment, insect repellent, and first-aid kit.

Basic Parachute Emergency Kit, Type B-4. This kit, designed for both Arctic and tropic use, will replace the B-1 and B-2 kits when the present supply of those kits is exhausted. Consists of a seat or back-pad type kit, approximately 15 inches by 13 inches; has felt inset with cutouts for holding components; enclosed in a zipper-fastened canvas cover. A one-inch thick pad serves as a cushion. The kit may be used as a knapsack after landing. Contents: signal flares, machete, signal panel, special parachute kit ration unit made up of Field Ration "K" components, match case with matches, cooking pan, compass, pocket knife, fishing kit, can of solid fuel, first-aid kit, mosquito headnet, goggles, and gloves.

Personal Kits

Emergency Sustenance Kit (Escape) Type E-3. Designed to be carried in the pocket and used when forced to bail-out over enemy territory. Packed in cloth bag, twelve inches by 6 inches (may be used later as a water container). Contents: matches, compass, hacksaw blade, halazone tablets, benzedrine tablets, Field Ration "D", dextrose tablets, bouillon powder, chewing gum.

Emergency Sustenance Kit (Individual Bail-out Rations) Type E-6. Supplies additional rations; can be snapped on chute harness before bailing out. Contents: two units of Field Ration "K".

Emergency Sustenance Kit (Individual Bail-out Water) Type E-7. Provides two cans of drinking water (boiled and pasteurized) to be snapped on chute harness.

Airplane Kits

Emergency Sustenance Kit (Rations) Type E-1. Intended to provide rations and miscellaneous equipment for flying personnel in northern climates. One kit is carried for each two men in the crew. Packed in a fibrepax drum, 11½ inches by 19 inches. Contents: U. S. Army Mountain Rations, drinking water in two-pint cans, match box and matches, hunting knife, mess kit, mosquito headnet, mosquito repellent, canvas gloves, Mukluks, ice crampons, solid fuel and grill, sewing kit, and FM 31-15.

Emergency Sustenance Kit (Implements) Type E-2. Intended to supply the necessary implements for use in northern climates. Housed in a metal container which will also serve as a wood stove. (Designed for use with food components of the Type E-1 kit.) Contents: combination .22 caliber and .410 gage gun, ammunition, matches in match box, camphor (Continued on Page 38)

ARMY AIR FORCES EMERGENCY EQUIPMENT AND KITS

TYPES OF KITS	ARCTIC	DESERT	TROPIC	OVERWATER
FIRST-AID	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness	FIRST-AID KIT (Aeronautic) Basic medical first-aid kit—carried in the airplane—one kit for each 2 men FIRST-AID KIT (Parachute) Minimum essentials—carried on person or tied to chute harness
FLOTATION	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories	MAE WEST Pneumatic life preserver vest A-3 5 MAN RAFT Complete with accessories ONE MAN PARACHUTE RAFT Seat or back type—with accessories
BASIC	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*	B-4 BASIC PARACHUTE KIT Seat or back-pad type*
PERSONAL	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER	E-3 ESCAPE KIT For bail-out emergencies in enemy territory E-6 BAIL-OUT RATIONS E-7 BAIL-OUT WATER
AIRPLANE	E-1 ARCTIC RATIONS E-2 ARCTIC IMPLEMENTS E-4 COOKING UNIT	E-8 DESERT IMPLEMENTS E-9 DESERT RATIONS E-4 COOKING UNIT	E-8 TROPIC IMPLEMENTS E-9 TROPIC RATIONS E-4 COOKING UNIT	E-5 OVERWATER IMPLEMENTS AND RATIONS E-9 RATIONS
DROPPING	E-12 ARCTIC AERIAL DELIVERY KIT Rations, shelter, clothing, etc.	E-10 DESERT-TROPIC AERIAL DELIVERY KIT Rations, shelter, implements	E-10 DESERT-TROPIC AERIAL DELIVERY KIT Rations, shelter, implements	E-11 OVERWATER AERIAL DELIVERY KIT Rations, implements

*B-1 and B-2 kits will be used until present supply is exhausted.

AERIAL TORPEDO Attack

By Captain J. P. Muri

TORPEDO attack is a difficult form of aerial warfare.

There is the torpedo itself. When operating with regular bombs against land targets, you can generally utilize every virtue of your airplane—its speed, ceiling, maneuverability and so on. You can plan the attack on the basis of your aircraft's particular abilities.

But the torpedo is an involved mechanism. It has certain characteristics which govern the manner and speed and height of its launching if a high probability of success is to be assured. Thus, your flying technique must be suited principally to the projectile, rather than the plane.

The enemy, familiar with these characteristics, knows just about how you will attack.

Torpedoes of all nations are similar. Naturally, the technique of launching them from aircraft is similar the world over—except for minor variations. Commanders of enemy warships are thoroughly schooled in such knowledge. Aware of the altitudes and distances from which torpedoes may be effectively released, they can plan their own gunnery fire and other protective measures accordingly.

Lastly, you must outwit a moving target. This requires, above all, an exhaustive knowledge of the enemy. You must be able to recognize quickly the type of ship you are attacking and to know its possible speed, type of armament, weaknesses of armor and other data. For it is such things which should determine your own approach and getaway.

Despite these difficulties, the air-launched torpedo has demonstrated itself to be one of the war's deadliest weapons.

A torpedo hits big ships where they are most vulnerable, below the waterline, and where the force of the explosion is confined and concentrated.

Incidentally, this article concerns only torpedo attack by land-based aircraft—principally medium bombers. No attempt will be made to describe the tactics and training of Navy fliers equipped with seaborne planes. It should be borne in mind that various means are employed to diversify the enemy's protective fire and thereby assure a greater degree of fatal damage to him.

The modern torpedo is a self-propelled, self-controlled underwater missile with a heavy explosive charge. It is about 13½ feet long, over 20 inches in diameter, weighs approximately 2,000 pounds, carries TNT in the nose, or "warhead," will travel long distances, will find and hold a pre-set depth, and will maintain accurately the course upon which it is launched or may be adjusted so as to start on that course and later turn on a pre-determined angle for purposes of deception.

A TORPEDO has four main sections—warhead, airflask, afterbody and tail.

The warhead, made of thin reinforced steel or bronze shell, carries the explosive, a detonator and a mechanism which renders the charge harmless until the torpedo has run a few seconds.

Back of this is the airflask. Made of high alloy steel, it carries a sufficient supply of air to support combustion. Ends of the airflask are closed with steel bulkheads. Behind the aft bulkhead is a section to hold water and fuel.

In the afterbody are situated the turbines and controlling instruments of the torpedo.

In the tail are mounted rudders, counter-rotating propellers, vertical and horizontal stabilizers.

When a torpedo is dropped air pressure from the flask opens starting valves, air is released into a combustion pot, fuel is forced into the combustion pot by a stream of air while still another jet strikes a cap on an igniter, causing it to burn.

Thus, in a combustion chamber there is flame, air, and a spray of fuel. Resulting gases are forced through nozzles to a pair of turbines mounted on concentric shafts. After imparting their energy the gases pass out through the tail to the sea, making the characteristic parallel wake of the torpedo. The turbine wheels drive propellers which, in turn, drive the projectile through the water.

Obviously, with such a fine mechanism, the manner of launching becomes the all-important factor in an attack.

The depth at which you want the torpedo to travel is determined beforehand and an instrument setting made. Should your target call for a different setting, this can be accomplished from within the plane while flying. The direction in which the torpedo should travel is governed by a special sight.

In launching a torpedo, there is a vital matter known as the "entrance angle."

When a torpedo is dropped correctly, you will see a white circle on the water, then a straight white line like a piece of string being drawn across a blackboard. This means that gyros, rudders and depth controls are operating properly.

But frequently a torpedo will "porpoise"—that is, skip sharply right or left or even out of the water for several yards. This can occur because of a too shallow depth setting or, more often, because of a bad entrance. Usually, the gyro will correct a "porpoise" and return the projectile to its pre-set course but this variation of twenty-five yards or so may result in a miss fore or aft of your target. If the entrance has been really bad, the torpedo may even sink.

There is only one answer to the entrance problem—proper flying.

Experience has shown that the best torpedo entrances are made when a plane is flying absolutely straight and level at an altitude depending directly on the plane's speeds.

It is apparent that, with a land plane, one of the chief problems is to slow down. And to slow down without becoming too much of a "sitting duck" target.

To carry out an attack of this sort, it is clear that a rugged airplane with good evasive action and protective guns is required.

ILLUSTRATED BY
CAPTAIN RAYMOND CREEKMORE

The Commanding Officer of an AAF torpedo squadron describes the use of one of the war's most deadly weapons

Torpedo tactics as taught now are a far cry from the instruction earlier in the war. When we went out at Midway we had had four days practice in torpedo work. About all we knew was to come in toward the bow of a ship, to duck and dodge, and to keep out of crossfire. We ran into about 40 ships and there was no remote hope of keeping out of crossfire.

A lot has been learned since then, however, and the experience of pilots from the Aleutians to the Solomons is embraced in the training course now given.

The course naturally consists of both lectures and practice. First, flight crews are given extensive information about the torpedo itself—what it can do, what kind of missions it should be used on, its mechanical operation.

From this they go on to study the technique of dropping, the principles and procedures of torpedo runs, and ship structure and identification. Then comes the tactical details—how to take evasive action; how to attack; how to change formation; how to take advantage of weather and natural elements, such as making dawn and dusk approaches, keeping darkness or coastline hills in the background to minimize detection, and so forth.

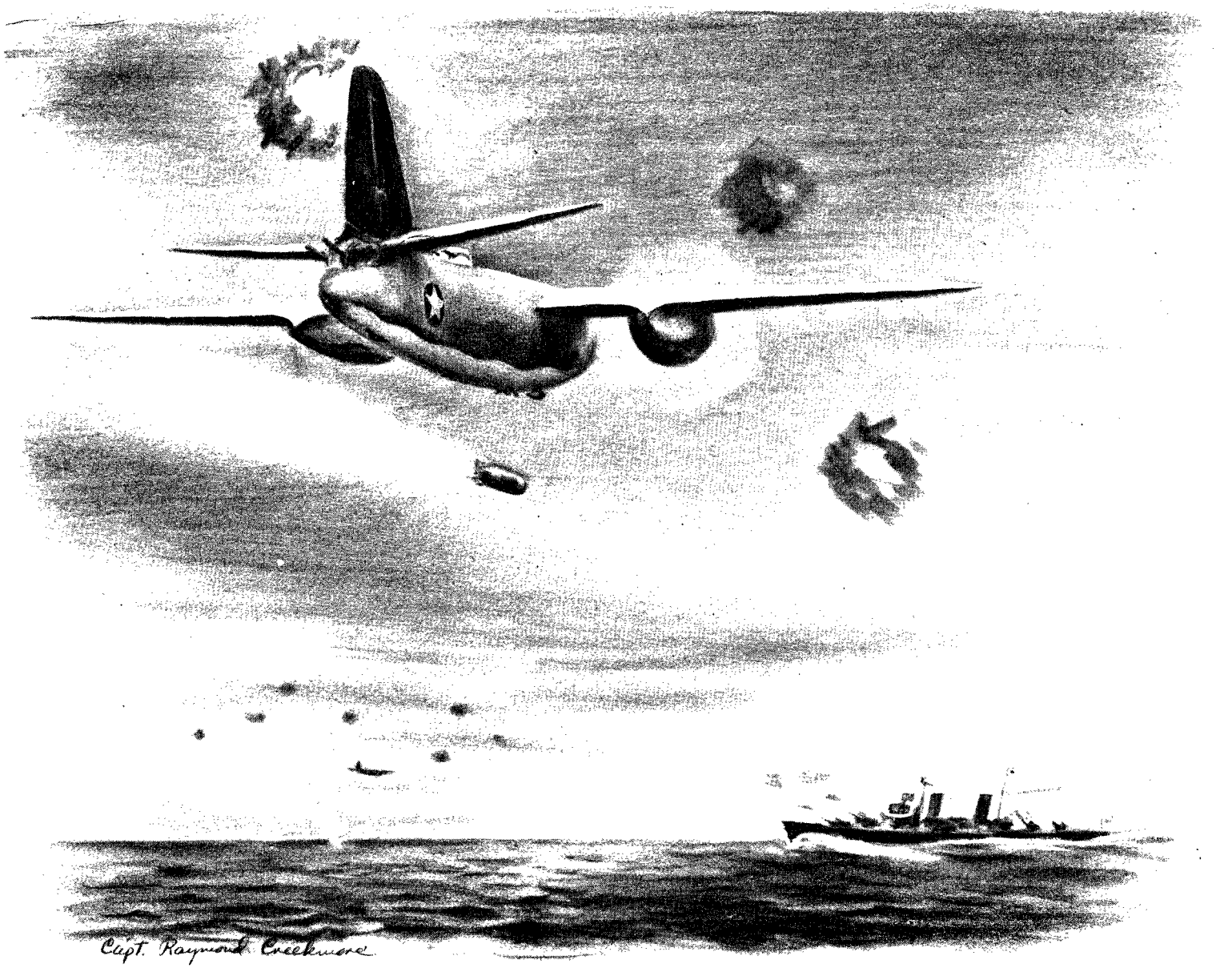
DURING the course, much attention is given to dry runs in a hangar with a machine that simulates flying, like a Link Trainer. This battery-operated device is mathematically set up with sights allowing for distance, altitude, and other factors. On this machine, bomber crews learn the all-important knack of "leading the target," a process similar to shooting skeet and, in torpedo work, quite as essential to success.

Following instruction of this nature comes actual flying over water. There are many hours of straight formation flying at low altitudes — legalized "buzzing" — so that crews can learn the very difficult art of estimating distance on water and get accustomed to certain other problems, for example, the general inaccuracy of altimeters in low, over-water flight.

Then there are camera runs on targets, with the camera revealing the angle from which an attack was made, the distance and altitude of the drop, and the probability of a hit or miss.

Lastly, there are actual runs on a target boat with dummy torpedoes. These projectiles are the same weight and size as regular torpedoes, the only difference being that the warhead is loaded with water instead of TNT.

To supply this latter form of training, the training base maintains an 83-foot, speedy target boat and a diving outfit with the function of retrieving all torpedoes. Operations of these Army "sailors" provides bomber crews with the most realistic torpedo practice possible. ☆



ANGELS DON'T SHOOT GUNS

(Continued from Page 12)

stubborn .50 caliber. "I can shoot them damn Jerries down with one gun just as well as two. I'll even go up without any guns."

Shorty and his guns went, of course, and before they reached France both guns were working. On the way in the bombardier spotted two FW-190s coming in head-on and called out the direction of the attack.

"I turned my turret to the front and raised my guns," Shorty says. "Then Lieutenant Cunningham pulled up the nose so I could get at them and there was an FW about 100 feet away. His wings looked like they were on fire because all his guns were going at once. I thought I was a goner then but I got in a quick burst. He flipped over as he went past. I tried to swing after him and get in another burst but he was going too fast. He was only 50 feet away and I got a glimpse of the pilot in the cockpit.

"He was wearing goggles and a leather mask over his face. He was looking at me and I was looking at him. That's all there was to it. But I was damned scared at the moment."

Shorty Gordon went cold all over in that split second he was looking into the eyes of the enemy. But it was a thrill. It was what he had joined the U. S. Army Air Forces for. It was that sort of excitement he craved when he was risking his neck as a "gow" driver back on the flat desert race tracks of his sunny California, roaring along behind the wheel of a souped-up little Model A. It was the kind of adventure he had hoped to find as a gunner in the RCAF before the U. S. got into the war, but the recruiting officer told him he was one inch too short for the job.

Shorty had doubted whether he could find excitement in the U. S. Army Air Forces because his country was then at peace. But he took a chance on it October 22, 1940, at Fort MacArthur, California, and got into the 9th squadron of the 7th Bombardment group.

When the 7th left Salt Lake City for foreign service in November 1941, Shorty was left behind—in the guard house. An MP had accused him of being improperly dressed, and Shorty, with his love for casual dress—and fighting—had . . . well, three months at hard labor didn't dim his appetite for the Air Forces. In fact, Shorty claims he had a wonderful time in the guard house, especially after he became a parole prisoner and was free to carry on a lucrative little beverage trade with the Sergeant of the Guard.

ON the last day of his sentence he was planning to ask for a transfer to the Philippines. From there he intended to hop to Burma and join up with the Flying Tigers as a ground man. But on that day he heard about Pearl Harbor. That was all he wanted. He got into the first heavy bombardment group he could find, left his job as an armorer to take up gunnery, and found himself between a pair of fifties in the ball turret.

So now he's over German-occupied Europe, spinning his turret and searching forward . . .

This is not all there is to the story of a ball turret on a Flying Fortress. Nor is it much of a piece on that bloodthirsty, thrill-seeking, iron-gutted, lovable little man whom you may now be calling a devil, or a hero. Unless you have been squeezed into a small glass ball for four or five hours at 20,000 feet, it's hard to understand what happens when the cold and the cramps and the fighters set in.

Some ball turret gunners will tell you of the time the door on the turret opened and left them literally hanging on to their guns against a 160-mile-an-hour wind.

Others may tell of the discomfort of the electric suit when it gathers up in a fold on their groin and blisters them with heat. The heat makes them urinate, and that freezes their clothes to the turret so they couldn't fall out even if they wanted to.

They'll tell you of that sickening feeling that comes when your guns freeze up, or jam, and you have to stay in the turret, turning the useless weapons at the fighters to make them think you're still in action.

And some will tell you of their pals, bunk dreaming, who see fighters coming at them, with wings afire, and flak bursting around so thick you can walk on it . . .

It's a good thing that all gunners tell each other they're "flak happy". Because joking about it eases the strain.

Shorty Gordon eases his nerves after a mission by taking a triple Scotch, "and more if I can get it."

Then he might go off on a 48-hour pass to see his girl. The one he's going to marry after that 25th mission. ☆

Since this story was written, Shorty Gordon has been reported missing from a raid on Germany. Crews in other ships of his formation saw his Fortress go down, one white parachute billowing out above the plane. Shorty was wearing his chute on that trip. They believe the one they saw was his.

PREPARE FOR TROUBLE!

(Continued from Page 35)

cubes, generator-operated flashlight, candles, compass, frying pan, stew pan, large spoon, butcher knife, cooking oil, machete, fishing kit, and signal flares.

Emergency Sustenance Kit (Cooking) Type E-4. An emergency cooking unit employing a pressure type gasoline stove burning 100 octane gasoline. Includes: two stew pans, frying pan, fabric gasoline bag.

Emergency Sustenance Kit (Overwater) Type E-5. Designed for carrying in large aircraft operating mainly over water. Contents: Field Ration "K", drinking water in cans, flashlight, compass, matches, knife, hand-axe, mirror, candles, fishing kit, flares, paulin, bailing bucket, sea markers, rope, tomato juice. This kit is used in addition to the kit supplied in the life raft.

Emergency Sustenance Kit (Desert and Tropic Implements) Type E-8. For desert and jungle use. Contents: combination .22 caliber and .410 gage gun, ammunition, generator flashlight, machete and sheath, flares, paulin, mirror, first-aid kit, sewing kit, soap, and sunburn ointment.

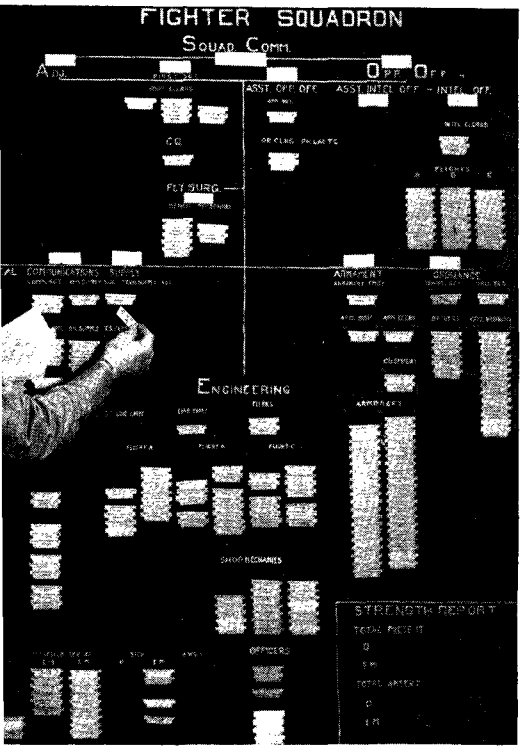
Emergency Sustenance Kit (Desert and Ocean Rations) Type E-9. Contains the necessary rations for desert, jungle and ocean emergencies. Contents: drinking water in cans, Field Ration "K", paulin, and sun hats.

DROPPING KITS

Emergency Sustenance Kit (Tropical Aerial Delivery) Type E-10. Intended for use in tropical areas for dropping the necessary rations and equipment to aircraft personnel stranded in the desert or jungle. Contents: Field Ration "K", drinking water in cans, tent, sun hat, neckerchief, paulin, solid fuel and grill, insect repellent, generator flashlight, mirror, flares, combination .22 caliber and .410 gage gun, ammunition, scout knife, compass, sewing kit, machete and sheath, atabrine tablets, benzedrine sulphate tablets, soap, tea tablets, matches, and sunburn ointment.

Emergency Sustenance Kit (Shipwreck) Type E-11. Designed for carrying in patrol planes. Intended to offer temporary relief, pending rescue, to victims of a disaster at sea. Packed in a free-falling container. Contents: drinking water in cans, Field Ration "K", Very pistol, matches, heat pads, first-aid kit, sea markers, police whistle, bailing cup, flares, sponge, mirror, fishing kit, knife, water bag, paulin, compass, blankets, cloth helmets, channel swimmers' grease.

Emergency Sustenance Kit (Arctic Aerial Delivery) Type E-12. Intended for use on the Greenland Ice Cap and in similar desolate Arctic areas. Designed for dropping by parachute to help sustain life of stranded aircraft personnel until rescue arrives. Contents: 2 parkas and 2 trousers, 2 sleeping bags, 2 one-man tents, pneumatic mattress, gasoline stove, 2 one-gallon gasoline containers, ice saw, ice-axe, 2 pairs crampons, intrenching shovel, goggles, 4 pairs mittens, 6 pairs socks, 2 pairs wristlets, 2 mufflers, Type E-1 Ration Kit, and Type E-2 Implement Kit. Implements and rations are dropped in a chute container; clothing, sleeping bags, etc., are free-falling. ☆



A squad board simplifies the morning report.

THIS QUESTION OF MANPOWER

A study of personnel problems and techniques in the Army Air Forces.

By
Lieut. Matthew Huttner
STATISTICAL OFFICER OF A FIGHTER GROUP

PRIVATE X enters the squadron orderly room. He salutes smartly. On the desk of the personnel officer lie his service record and AGO Form 20. They have been carefully scrutinized to determine his fitness for classification and duty assignment.

"Did you ask to be trained for the job of teletypewriter operator?"

"No, sir", he replies, "I'd like to be in the kitchen cooking. I used to be a butcher and a cook." (Form 20 corroborates this.)

He is asked why he was sent from group headquarters as a TWX operator.

"They needed one, sir. So they told me I was to learn operating", he reveals.

Further examination shows him to be valuable as a cook, less so as a TWX operator. Fortunately, one of the present cooks is classified as limited service, awaiting transfer. Private X is placed in the mess hall under supervision. The mess sergeant reports favorably on his work. Obviously the right thing to do is to recommend him for reclassification as a cook to the base reclassification board, transfer the limited service overage, and everybody is happy.

But suppose he had not been reclassified. Then he would have been like hundreds of others who pass through the Army Air Forces groups every month, shuttling back and forth between feeder and combat units until they find the right spot.

More than the other arms and services, the Army Air Forces is composed of individual specialists, making more complex its problems of personnel. A single fighter squadron like ours contains sixty different types of specialists ranging from the commanding officer down to the lowest basic. This, in a unit of less than 275, places a heavy premium on the proper classification and duty assignment of each man. The efficiency of a squadron, or of an Air Forces unit, depends immeasurably on getting the right man in the right place.

Malassignment and maldistribution are haunting problems. But accurate records and prompt recognition of the personality and training necessary for each squadron specialty can aid inestimably in the elimination of these two bugaboos.

Take the case of Corporal Y. When our squadron was activated he became a heavy refueling unit operator, assigned to that specialty because they needed one. By virtue of his training and interests, Corporal Y was obviously equipped to fulfill a specialty much higher than the one he occupied. Yet the necessity of the moment ordained otherwise. It came to the attention of the personnel officer that this soldier was using his spare time to observe the mechanics at work. On one or two occasions he even diagnosed the trouble to the amazement of those present. An alert crew chief perceived Corporal Y's interest and ability and advised him to see the personnel officer at once. A brief interview resulted in the reclassification and reassignment of Corporal Y. Today he is one of our most industrious and capable crew chiefs.

Then there was Sergeant J, an excellent sheet metal worker, but also a crack mechanic. Although he was classified as the former, the engineering officer wisely realized that it takes much longer to train a highly skilled AM than a sheet metal worker. Today Sergeant J is a flight chief, an asset to his outfit.

The record is replete with such instances of malassignment and reclassification. Because the Army Air Force has grown by leaps and bounds, its rapid expansion has created problems in personnel which are now apparent.

Prompt action at the squadron level can correct waste. How? Well, let's try to visualize what happens to a soldier from the time he reports for squadron duty until he is efficiently located in his proper capacity.

Upon reporting, each man presents his service record, AGO Form 20, and allied papers (compliance with AR 345-125, Change 9, dated November 28, 1942, is important). These records are carefully studied by the personnel officer and the man is interviewed.

The importance of this first interview cannot be overstressed. What is the man's personal appearance? Is the salute military? How does he answer questions? Do his personality and overt intelligence compare favorably with his AGCT scores? Did he choose this specialty or was it imposed upon him? A chance question may unfold an experience which will change the soldier's Army career. Is he interested in OCS? What is his "overseas" attitude?

THIS interview may reveal, and frequently does, that War Department objectives and aims as outlined in AR 615-25, 615-26, 615-28 and 605-90 have been thwarted. It may show that some of these men are unfit for training in a unit preparing for overseas combat, because the personality, the psychological and physiological format of certain of these individuals render it unwise to waste time and money on their training.

Assuming that the interview results in a proper classification and duty assignment for the soldier, and that his records are in order, he will begin his training. Very few of the enlisted men reporting are at once equipped to function in a "trained" capacity. Most are graduates of some Air Force technical school, some are christened in their specialties, others inherit them like the meek. They must undergo a lengthy period of departmental training, gradually accomplishing the transition from "in training" to "trained" over a period of months. (Note: In our squadron the number of men equipped to function at once in a trained capacity was only four per cent, discounting the original cadre.)

Some men need additional technical training. Suppose, for example, orders should be issued to change from a liquid-cooled aircraft engine to the radial engine. This involves additional schooling for nearly all the engineering specialties and added education for numerous specialists from supporting departments such as armament, ordnance, communications and supply.

Once safely launched on their departmental careers, the men must be trained rapidly but efficiently in the art of their specialty. A man is not "trained" in our squadron until he can perform his operational duties without supervision. But he may never be trained, even after the achievement of technical perfection, unless he knows how to work with his fellow soldiers. The person-

ality element is vital in overseas combat. "Keeping 'em flying" is not accomplished by mere technical skill alone. The will to win and the ability to withstand pressure under fire are equally important.

One of our squadron department heads outlined what he thought were the foremost criteria in judging a man's fitness for the position he holds:

I. *Proficiency* of man in his particular craft, skill or endeavor (including manifested interest therein).

II. *Military aptitude, demeanor* and *bearing*.

III. *Reliability, integrity* and *fidelity*.

IV. *Resourcefulness* and *perseverance*.

V. *Personality* (i.e. the degree of success in relationships with superiors, subordinates and other associates).

Compare these with the principles laid down in a training directive of our parent group:

A. *Discipline* that permits unquestioned obedience under battle conditions.

B. *Health, strength* and *endurance* to withstand the rigors of global warfare.

C. *Technical proficiency* to the extent of not only knowing your equipment but to improvise ingenious substitutes when normal sources of supply fail.

D. *Initiative* enough under abnormal conditions and emergencies to start proper action in the absence of orders.

E. *Leadership* to control subordinates.

F. *Teamwork* to work harmoniously in achieving tactical proficiency and the ultimate success of the unit in combat.

G. *Responsibility* for assigned materiel and personal acts.

H. *Tactical proficiency* in ground and air combat.

The progress of the specialist is charted in many ways. The Army Air Forces recognizes the importance of combat training and wisely provides for its recording by a number of personnel techniques, including:

A. AAF Forms 127 and 128.
B. AAF Forms 125 and 126.
C. The service record and AGO Form 20.

To these, the squadron has added:

D. The weekly department roster.
E. A squadron board.
F. Squadron Form 20a (used when AGO Form 20 is not at hand).

Such mimeographed devices as departmental assignment and transfer slips, work orders, training charts, ground and air echelon rosters based on the T/O are also employed whenever necessary.

TO BEGIN a discussion of all these techniques is in itself material for a lengthy article. However, a number of interesting facts present themselves in connection with the use of the various forms:

I) *AAF Forms 127 and 128*—present an excellent and accurate bi-weekly birdseye view of squadron personnel, revealing the percentage of trained and untrained men and the shortages and overages as well as promotion potentialities. Form 127 is the most important personnel report in the Army Air Forces because it is useful in all echelons. It should be prepared with painstaking accuracy and should reflect authoritatively the training progress of every unit. Guessing destroys its aims and purposes.

To make it more scientific, a weekly departmental roster such as used by our squadron is suggested for adoption. Prior to every Tuesday at 1200 each department is required to submit a personnel roster by name, rank, serial number, "trained" or "in training", duty rating, and section assignment (Flight A, B, C or Headquarters). This simple device enables the 127 to reflect a true picture of squadron personnel achievement. Up to the minute cooperation from group and wing results in prompt transfer of overages and equally prompt fulfillment of shortages.

II) *AAF Forms 125 and 126*—In an effort to improve its personnel setup the Army Air Forces initiated the Macbee keysort system consisting of Forms 125 (Officer) and 126 (EM) accompanied by a pick and punch and metal container, a strange but effective assortment. Like many novel devices, its debut was greeted with some skepticism and there had been little training in its use. But properly employed, it has advantages for Army Air Force use over the AGO Form 20. Since the Macbee system contains all the necessary information in a simple form, it is practical to use and easy to teach. And, its simpler operation makes it easier to keep up-to-date. Furthermore, the fact that the forms coincide in format with the arrangement of Form 127 makes their use doubly valuable. Statistical control units and statistical officers rely on the Macbee system to streamline the personnel setup of the Army Air Forces. And in big business it has already proved itself an adequate proving ground for the Army Air Forces.

III) *Squadron Board*—Using a "visual morning report" or squadron board enables you to determine the immediate classification, duty assignment, and present status of every individual in the unit 24 hours a day. Inspector Generals have been cautioned to quiz soldiers and to examine carefully unit personnel records to detect disparateness in classification and duty assignments. When you have the whole picture before you at all times such differences are easily detected and may be promptly remedied. You can also determine at a glance what personnel are assigned to each flight and headquarters, who is on furlough, who is sick, who is attached, AWOL, and what have you. Particularly is this helpful for flying commanding officers who must devote smaller periods to the study of administrative and personnel problems.

Construction of a squadron board is not difficult. One such as that used by our squadron and pictured on the preceding page can be built by the unit carpenter in no time. It pays dividends. And keeping it up-to-date is easy. Just have the clerk face the board with the report of change cards in one hand and with his other hand free to switch the cards accordingly. And there you have the morning report etched before your eyes.

IV) *Higher Echelon Devices*—Group and wing have created helpful personnel devices which are refinements of the basic forms. All of these aid in streamlining the personnel setup and help to project the intricate organizational process in camera form for higher echelon purposes. Where this is overdone there results needless duplication and overburdening in lower echelons.

In the last analysis, regardless of the various techniques available, the secret of personnel success rests in the efficiency of the basic unit, the squadron. And in that connection a number of "don'ts" and "do's" are in order:

1) *Don't* treat human material lightly just because there seems to be plenty of it around.

2) *Don't* misuse the power of transfer and separation because a soldier lacks the expected qualities necessary to perform his immediate duty. There is great salvage value in human material.

3) *Don't*, on the other hand, retain highly undesirable individuals where they reveal gross limitations in the performance of any duty. Loyalty is no substitute for competence.

4) *Don't* label a man as incompetent because of a low AGCT score. He might have been full of typhoid and tetanus vaccine and have lacked sleep when he acquired that brand.

5) *Don't* withhold opportunity from a man when he can better himself. No one is irreplacable — and the Army Air Forces nearly always benefits.

6) *Do* put the power of classification and reclassification in the hands of an officer trained for that purpose. Haphazard use of these techniques results in waste and inefficiency.

7) *Do* strive to upgrade personnel. Retention of capable men in "lower" skills is detrimental.

8) *Do* take full advantage of the Army Air Forces technical training program. Education brings out the best in your men. But avoid careless selection of students. Some men are simply not cut out for school.

9) *Do* promote men as rapidly as they deserve. There is no formula for promotion; it varies with the individual. However, it is a good rule to provide some measure of promotion incentive at all times.

10) *Do* maintain the reporting system up-to-date. The Army Air Forces is such a vast organization and is growing so rapidly that inefficient reporting causes "bugs" in the personnel setup.

Far be it from these to serve as the Army Air Forces' personnel "Ten Commandments". The number of "don'ts" and "do's" is endless, proving that personnel is as complex a problem as the human being. (And the ability to understand the human being is basic for the comprehension of the vast problems of personnel.) But the problems of personnel are of prime importance, for in manpower, properly equipped, lies the key to an efficient combat force and to ultimate victory. ☆

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Do It Now!

It's so easy to provide for your family TODAY . . . don't wait until the last crowded minute before embarkation to apply. For the security of your family and your own peace of mind, get the MAXIMUM amount of

NATIONAL SERVICE LIFE INSURANCE

This is Government Insurance—it protects you and your family against your death from any cause, including the risks of war. Your dependents are protected no matter where you are—here in training or overseas in battle. The premium rates are low and can be paid automatically by allotment; your premiums CANNOT lapse.

REMEMBER: You can get maximum coverage **WITHOUT A PHYSICAL EXAMINATION OR PROOF OF INSURABILITY** if you act by August 10, 1943. **DO IT NOW!**

A NATIONAL SERVICE LIFE INSURANCE policy of $10,000 would pay to your beneficiary:

. . . If under 30 years of age, a monthly income for 20 years of	$55.10
. . . If 30 years of age, a monthly income for life of	39.70
. . . If 40 years of age, a monthly income for life of	45.00
. . . If 50 years of age, a monthly income for life of	53.90
. . . If 60 years of age, a monthly income for life of	68.10
. . . Increased benefits for higher ages.	

Payments to beneficiaries of ages not shown in above table would vary in proportion to age.

National Service Life Insurance costs the serviceman less than any other kind of insurance. Monthly premium rates for a $10,000 policy are as follows:

Age	Rate	Age	Rate	Age	Rate
18	6.40	29	7.00	40	8.50
19	6.50	30	7.10	41	8.70
20	6.50	31	7.20	42	8.90
21	6.50	32	7.30	43	9.20
22	6.60	33	7.40	44	9.50
23	6.60	34	7.50	45	9.90
24	6.70	35	7.60	46	10.30
25	6.70	36	7.70	47	10.80
26	6.80	37	7.90	48	11.40
27	6.90	38	8.10	49	12.00
28	6.90	39	8.30	50	12.70

SEE YOUR SQUADRON C.O. TODAY

TO THE OFFICERS AND MEN OF THE ARMY

In order to furnish maximum protection for members of the Army and their dependents, the Congress provided National Service Life Insurance. It is to the personal advantage of every officer and man to have this protection. The cost is small, and with present pay rates every soldier should be able to carry the maximum amount authorized.

—Henry L. Stimson, Secretary of War.

OUR COMBAT SPIRIT

The outstanding impression gained during my visit to the African, Middle East, and Far Eastern Theatres was that every young officer and enlisted combat crew member had the utmost confidence in himself, in his fellows, and in the equipment he was using so effectively.

Every Army Air Forces man preparing for combat should gain increased inspiration from the supreme confidence and fighting spirit of our comrades overseas.

Those who have fought the enemy have no doubt as to the outcome of this war. Combat crew members know they can meet any enemy on equal terms. They praise their equipment and would not exchange types of airplanes. Their intense loyalty and mutual confidence is everywhere apparent.

I proudly commend the glorious combat spirit of Air Forces fighting men overseas. Their admirable example should inspire every officer and enlisted man to new zeal and greater enthusiasm for the challenging task ahead.

H. H. Arnold

GENERAL, U. S. ARMY
COMMANDING GENERAL, ARMY AIR FORCES