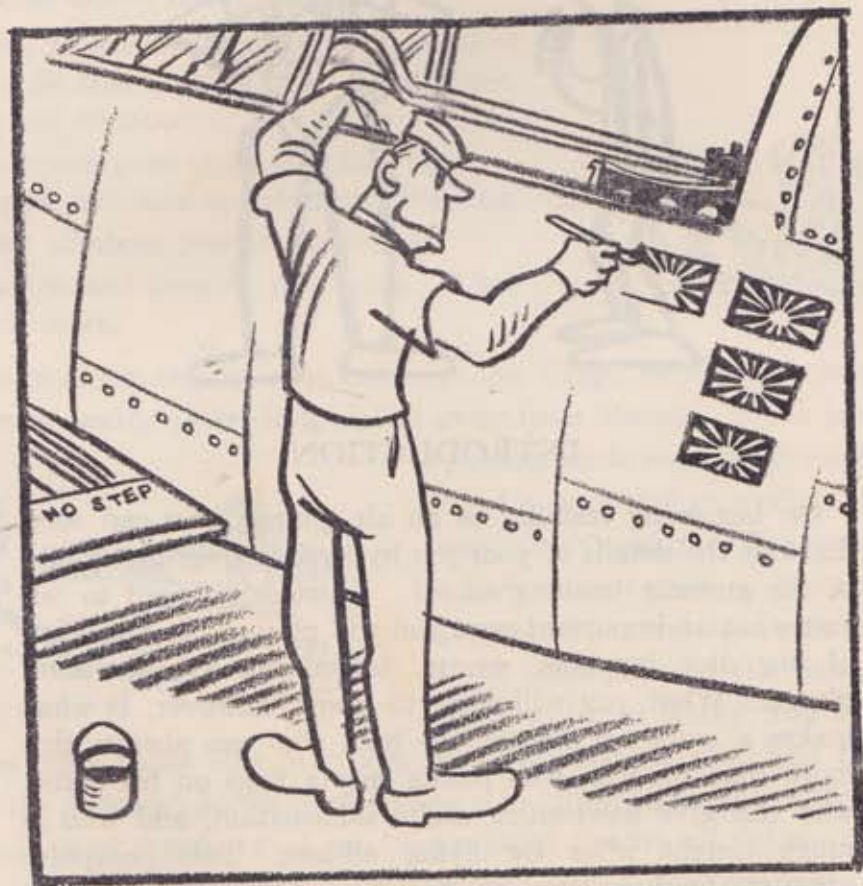


GUNNERY

SENSE

GUNNERY SENSE

Some Hints for Air Gunners



Issued by
Training Division, Bureau of Aeronautics
United States Navy

August 1942



INTRODUCTION

On beginning training as an air gunner, you can soon find out the details of your job by looking over the syllabi of the gunnery training school. There is no need to tell you what an important part you will play in the operation of our dive bombers, scouts, torpedo, and observation planes. What you will want to know, however, is what makes a *crack air gunner*, the man who can always give more than he gets, who paints enemy flags on his plane, who can give newcomers useful information, and who is much sought after by flying officers. This pamphlet attempts to show, step by step, how such men are made.

I. CLASSROOM AND RANGE

How To Be the Oldest Living Gunner.

1. Learn to recognize instantly *all* types of aircraft, and be able to judge their speed, direction, angle, and distance.
2. Know your guns and turret thoroughly—how they work and how to keep them working.
3. Know *all* about how to use tracer.
4. Practice and keep on practicing. Then *practice* some more.



As you go along, step by step, learning these things, be your own best judge of what you know, and be a stern judge. Get away from the idea, if you have it, that

a passing grade means that you have completed a successful gunnery course. Just passing isn't enough. The enemy doesn't care about your grades. But if you know how to put out the right amount of lead in the right place at the right time the enemy will care plenty, and so will you,

because the crack shots—the men who really understand guns and how to use them—are the men who do the damage and come through unscathed to tell about it. So if you aren't satisfied that you have grasped a point, ask to have it explained again, a dozen times if necessary. Tenacity is a virtue in air gunners.



How To Be a Nuisance and Still Be Popular.

Very little second guessing goes on in air gunnery so don't try to do your training on guess-work. Start out by getting hold of the simple mathematics that come at the beginning of the syllabus. If you are shaky on things like triangles and velocities, keep working on them until you have made them your own. Don't wait for any lecturer to find out that you don't know. Tell *him*.

Get other fellows in the course to test out your knowledge, and help them test out theirs. Don't be satisfied just to know a thing when it is presented in one particular way; get them to change it around and disguise it, then shoot it at you suddenly to see if you can see through it and come up with the elementary truth.



"Shaky on Triangles"



"You're drowzy"

Classroom Handicaps.

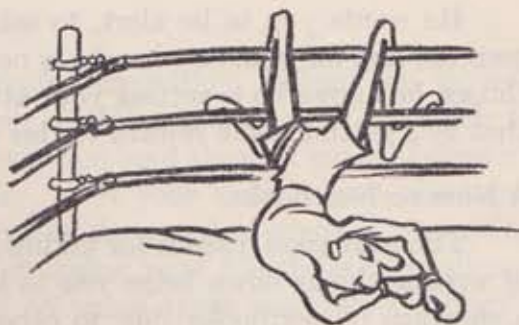
The best classrooms try to give you an idea of flight conditions by using various devices but none of them can actually reproduce the real thing. Sometimes the classroom seems to have no bearing on the real thing at all. The room is warm,

you're drowsy from a big lunch, the lecturer drones along—he shouldn't, but there it is—operational flying seems like so much Greek to you, and because you missed the last lecture, this one sounds like double-talk. You want to give up trying to understand. Your sole purpose is to stay awake until the bell saves you.

Now, at times like this there are two kinds of gunners in the room; those who aren't dozing and who are going to be successful gunners, and those who are nodding who will be just fair-to-middling. There may also be a few who would be down-right bad gunners, but they won't last beyond the early stages.

So try to see gunner school classrooms as something different from the classrooms of your school days. In the service, classrooms are hardworking and crowded. There are a lot more men behind you, eager to start their training. The lecturer hasn't time to give you all the individual attention he might wish. *Therefore he expects you to help yourself.*

From the moment the course starts, you are training for *war*. Air battles are tough. The winners are those who are most skillful, for example, Lt. Comdr. Butch O'Hare is a *good* shot, not lucky. So make up your mind early that you are going out at the end of your air gunnery course ahead of, and not behind, the syllabus. In your own mind, get a picture of the crack air gunner, keep it there constantly and make yourself be that crack gunner.



"You want to give up"



The Lecturer—He's Got Trouble.

The lecturer knows when the stuff he is trying to put across is new and difficult. Nothing worries him more than a fat, dumb, and happy class that sits there, asks no questions, and tries to put on an act of understanding instead of actually learning what he is teaching. He knows that his audience isn't listening properly. He knows the class isn't using its brains and intelligence.

He wants you to be alert, to ask him questions, to slow him down when he goes too fast for you, or when he is not making himself clear. When you do these things, he knows he is getting your attention, that he is holding your interest, and that he's getting some reward for his work—which is no soft job at best.

A Note on Notebooks.

There are good reasons for taking notes. In the first place, the painful process of writing things down helps you to learn them. Another reason is that there is a shortage of textbooks due to other wartime demands for paper and printing. A third reason is that your own notes are better reminders than any prepared syllabus ever written.

Note taking is an art; nobody will deny it. But nothing worth having was ever gained without taking pains. When you first open the covers of your brand new notebook, think of what you want it to be after a few months' time. First of all, you want it still to be in your possession; so put your name, and station on it in good solid printing and in ink. Next, think of the two kinds of notebooks you have seen—the catch-all type, full of scribbled notes on ragged-edged, loose pages; and the shipshape type, with neatly written notes on secure pages, compact and readable.

Make it easy on yourself by making your notebook something you *want* to read. You wouldn't read a dirty, dog-eared library book, badly printed and with pages mixed up and missing. So don't let your notebook get that way or it will wind up in the trash basket. The Government wants to salvage scrap, but that shouldn't mean your notebook.

So keep a blotter in your notebook; carry a full fountain pen and a sharp pencil. Keep your notes in ink in the classroom and pencil in the diagrams lightly so that you can go over them later in ink and colored pencils.

Do not scorn to take notes on simple subjects. If you know them, be proud of it; but remember that some day, maybe sooner than you think, you may be instructing on these very subjects. Then they won't seem as simple as they do now, and you'll be glad of the records you kept about them.



"The catch-all type"

Aircraft Recognition.

There is no short cut to learning aircraft recognition. There are various systems, but they are only methods of grouping information, pegs on which to hang the hat of knowledge. You can't sit down and read through pages of description and expect to learn about aircraft that way. Get your knowledge in short and



"Friendly aircraft, huh?"

frequent doses. And make it interesting by dragging your friends in to challenge you to name types and spans correctly from test charts, photographs, and silhouettes. The crack air gunner must recognize friendly and enemy aircraft at long as well as short ranges, gaging its speed, direction, and angle.

Get good enough at this so you are willing to bet with your friends on how well you can identify friendly and enemy aircraft. *Your pilot is going to have a heavy bet on you when you go into action.*



It Don't Pay to Spray.

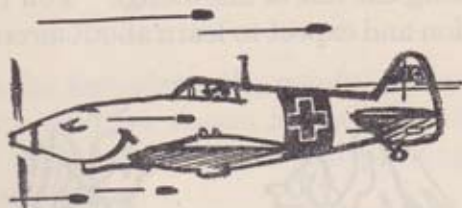
At first, the sights may seem to be some arm-chair aviator's theory that won't work out in practice. You may think secretly that in action you can just point the gun at the target—sleeve, enemy aircraft, whatever it may be—press the triggers, and let the tracers come spraying out like a stream from a firehose. That

ought to build up "lethal density," a funnel of bullets that the enemy can't possibly escape. The only trouble is, it doesn't! These things you might just as well learn right now:

1. This kind of gunnery is dangerously wasteful of ammunition.

2. You have to hit the enemy solidly several times in the same place to bring him down.

3. Enemy aircraft have the bad habit of coming through hose-pipe fire without a scratch.



FROM YOUR CLASSROOM WORK, GET THESE MUSTS FIRMLY IN MIND:

You *must* be able to RECOGNIZE an enemy aircraft instantly.

You *must* be able to judge his SPAN AND LENGTH.

You *must* be able to PLACE HIM CORRECTLY IN YOUR SIGHT with regard to speed, direction and angle of approach.

You *must* have the GUTS AND CONFIDENCE TO WAIT until he closes to decisive range.

THEN GIVE IT TO HIM!



Fix these musts in your mind, and from the first classroom days and first air practices on the sleeve, never depart from them. Make a promise to yourself to use no other method, and although sometimes your results will be disappointing, you will learn and improve from those very disappointments. For example, accurate application of tracer theory which leaves an absolutely clean sleeve has taught many an air gunner that *daily* boresighting by himself and nobody else is one of the secrets of crack air gunnery.

II. PRACTICE AND PREPARATION

Who Said, "Practice Makes Perfect"?

Whoever it was, said a mouthful. The New York Yankees wouldn't be up there without constant practice. As good as they are, the Chicago Bears have to run through their plays day after day. Joe Louis might be good enough to stay on top without training; he doesn't take any chances—he trains!

And so it is with the crack air gunner. If you are going to land in the championship class and stay there, you have to devote hard thought and painstaking attention to your job. You can't just learn how things work and then go straight to a combat zone. You have to practice, day after day and every day, because there is more than a title at stake in this war. So when practice and drills get tedious and dull, try to get the spark back by seeing the reason behind them all.



"Get the spark"

Magazine Drills.

You may or may not go to a squadron whose guns are magazine-fed. So when you come to a magazine-fed gun in your training, tell yourself that there's a chance you may go to a squadron equipped with them; then, if you do, you'll be at the top of your form.

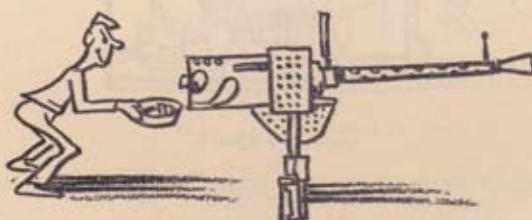
Quick magazine changing is a most important part of the gunner's art. Cold, wearing thick gloves, strapped in but still being bumped around, and being fired at by enemy machine guns—these are extreme conditions under which he may have to engage the enemy. Develop a routine. Little details like making it a habit to change the magazine with your right hand while holding a full one in your left may save invaluable seconds.



“. . . practice, practice, and practice . . .”

So practice, practice, and practice until your magazine drill gets to be a quick-change act worth bragging about. Skill in magazine changing, gained in the classroom and on the ranges, may save an American airplane and crew and rob the enemy of an equally valuable fighting team and weapon.

The Care and Feeding of Machine Guns.



The concert violinist sets considerable store by his instrument. Warren Wright is said to pamper “Whirlaway” quite a bit. The acrobats of Ringling Brothers’ circus are inclined to see to it that their gear gets all the care it deserves and a little bit more. So it had better be with you and your guns.



Learn to handle them naturally and firmly, with all the precision and skill of a great musician. As much as you can, make them an extension of yourself—a part of you. At first, all good gunners look upon their weapons as cumbersome things that crash and vibrate, feel awkward and unwieldy. They also had the inward feeling that the guns, and not they themselves, were in charge. But as they learned to give their guns close personal attention and firm handling, their guns gradually turned into useful friends and allies.

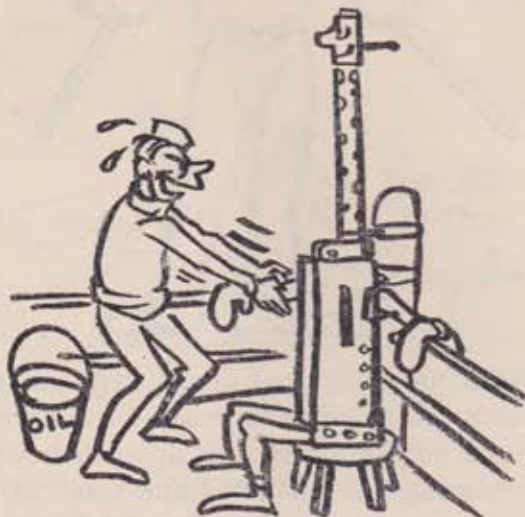
Therefore, clean your own guns; boresight your own guns, handle the guns as often as possible, not only by looking, but blindfolded as well. Practice with full flying suit on, and with the minimum movement of your arms and head, until you know every bulge and groove and lever by instinct, and can carry out all gun operations at high speed *under flight conditions* without looking or fumbling, and with the least possible effort.

Your gun is a highly efficient weapon. The minute you press the trigger, it develops full power. You fight the enemy with your guns, and you need not

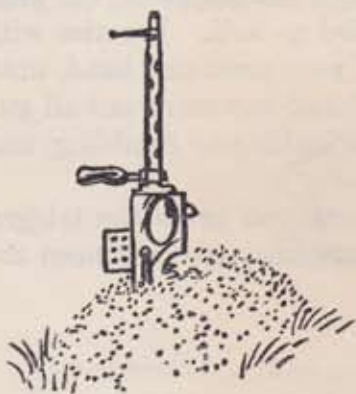


“At ease with your gun”

use force. You can bend your barrel casings if you use them as levers to test your mountings, so look after them and use them only for fighting. If you expect your gun to stand by you in battle TAKE CARE OF IT.



“They ain’t laid a glove on us”



“Grit never helped a gun”

The best gun in the world will cease firing temporarily or become jammed altogether if it is fed by a magazine or belt that has been dented, warped, or clogged by careless handling. Treat magazines and belts as you would a new watch. Don’t leave them where they will collect grit, mud, and leaves or grass. This applies right now, in the classroom, at the cleaning bench, and on the range. For what you do now, (with or without conscious thought) you will do by force of habit later.

Fuselage Drills.

The dullest, most monotonous routines in the world are fuselage drills—unless you go into them with the proper attitude. If you figure out *why* you are doing them, you'll go through them not only willingly but happily.

There are very good reasons why a lot of valuable equipment in every flying unit is reserved for fuselage drills. For instance, there is the case of two planes that collided during air firing practice in fine weather at a safe height over the sea. All eight occupants were killed or drowned because not one of them had made any serious attempts to practice parachute or life-raft drills as crews.

Hundreds of incidents like this have proved that considerable practice in fuselages is necessary if parachutes and life rafts are going to save lives. Take a lesson from the surface ships and their lifeboat drills; they don't wait for the ship to collide or capsize before they start sorting themselves out.

It is *not* enough to know where the parachutes and rafts are stowed and to practice using them once. You have to know how to lay hands on them quickly and instinctively, in the dark, in freezing cold, in the excitement of any emergency, hampered by gear stowed in confined spaces, dressed in full flying suit and connected by safety belt, interphones,

and oxygen tubes to the plane. It is this business again of making mental pictures of what may happen, and preparing for it in advance down to the last detail. A great war captain once said, "If I always appear prepared, it is because before entering upon an undertaking I have meditated for long and have foreseen what may occur. It is not genius which reveals to me suddenly and secretly what I have to do in circumstances unexpected by other people; it is reflection, it is meditation." His name was Napoleon.



First, learn all the rudimentary drills. Next, ask yourself a hundred questions:

Would I wear my parachute when flying in a mist at 800 feet?

How long would I have to get out if I had to jump at that height?

How do I get clear of oxygen and radio leads quickly?

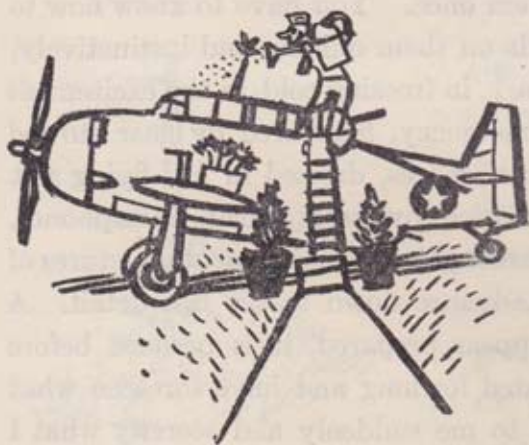
When crash-landing on the water, where do I stand? Which way do I face? What do I hang on to?

Is the raft cast off to windward or leeward?

In the dark, how do I tell which is windward and which is leeward?

As a crew, have we decided what each of us does (and when) to break out the raft and other gear?

Find the answers to these questions, and all the others you can think of. Then practice in full flying suit against a stop watch. This kind of thoroughness already has saved hundreds of lives in this war.



Make Yourself at Home.

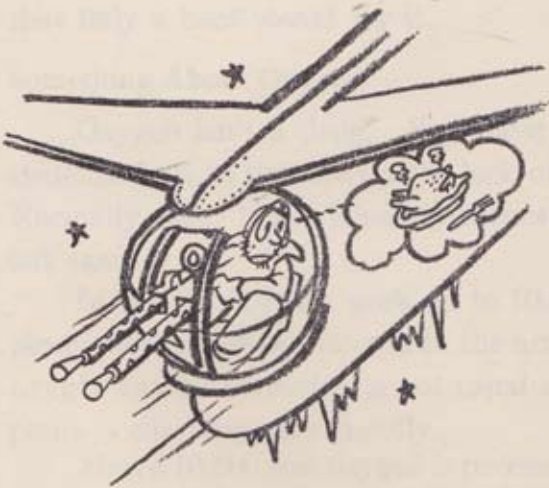
Even with training airplanes, in which you may fly for only a few weeks, make it your personal business as early as possible to know it from top to bottom. Even on a very large flying boat like the PBY's you can do the whole tour in less than an hour, and you'll be surprised at what you can learn in this time. What will also surprise you is that you'll soon come to be known as an authority on the type. Then you'll get really interested and begin

to learn something about the jobs of other people aboard. Before you know it, you'll be as much at home in your plane as your are—well, at home.

Be Ready, and Be Fit.

Even experienced crews are caught off base sometimes because it takes longer than they expect to prepare for a flight. Write down sometime the number of things you have to do for even a simple local flight; it looks like a morning's work in itself, and it just about is, if you have to go any distance in the plane. *Allow plenty of time and take your time when getting ready for a flight.* It is easy to get that hot-and-bothered feeling, but it won't do your flying practice anything but harm.

It's not a bad idea to take a look at yourself from time to time and make sure that you're as fit as your machine guns. Don't fall for the idea because an air gunner spends most of his time sitting down on the job that plenty of demands aren't made on his stamina. Struggling across an air base on a windy night, in full flying suit, carrying a parachute and a few hundred rounds of ammunition soon screens out the flabby from the fit. So does keeping a keen lookout for hours on end when you're cold, cramped, tired, hungry, and bored. So put as much physical reserve into yourself as you can by getting into good condition and staying that way. Think of the training a boxer or a rowing crew goes through for events that last only a short time. Your event is a lot more important than anything they do.



Compete in games you like; that adds much to what you can get out of them. Ball games are best for gunners, because they give you useful eye training. Skeet shooting is excellent, because it combines business with pleasure. The man who can gage the flight of a ball, and can lead a target in flight, is a good gunner to have around when there are enemy planes in the air.



III. AIR GUNNERS SOMETIMES FLY

What the Well-dressed Gunner Will—and Won't—Wear.

Flying suits are expensive. Unless you are used to buying clothes of woven gold cloth with buttons by Tiffany, they are the costliest suits you have ever worn. What is more, they are hard to replace. So take care of those electrically heated clothes, that valuable parachute and harness (it don't mean a thing if it ain't got that string) and remember that flying boots are for flying, not for keeping your feet warm on the ground. Water ruins them, and wet boots increase the danger of frostbite when flying in really cold weather. One other tip: Don't walk around in flying boots just to impress nonflyers on your station. It has just the opposite effect, because they know that only a boot would try it.



Something About Oxygen.

Oxygen isn't a drug. You have to have it to breathe and all that aircraft systems do is to balance up the lack of oxygen at high altitudes where it is scarce. Normally, your blood is nearly saturated with oxygen, and any extra is breathed out again.

In the air you can work up to 10,000 feet with only a slight drop in your efficiency because of less oxygen in the atmosphere. Because only a limited supply of oxygen can be carried it is not usual to use oxygen below that altitude unless the plane is climbing very rapidly.

Above 10,000 feet oxygen is necessary for efficiency. Above 15,000 feet oxygen is necessary for safety.

At 10,000 feet, without oxygen you will find that you can do 25 percent less than you can at sea level. At 20,000 feet, your efficiency will drop 65 to 90 percent. Lack of oxygen prevents you from thinking quickly, you feel cold more keenly, and suffer frost-bite more readily. You can't help it, so there is nothing brave or tough in doing without oxygen when it is required. To do so is just plain foolishness.

Lack of Oxygen.



Here is what lack of oxygen does to you:

1. Kills your power of self-criticism, giving you unjustified self-confidence; reduces your power to concentrate, reason, and coordinate your movements.

2. Affects your vision and ability to see in the dark.

3. Makes you sleepy and dopey; cuts down your power to move quickly. This is dangerous, since in war rapid movement and a good look-out are essential.

4. The last stage is complete collapse. Yet it comes over you so stealthily that healthy, experienced crews who have been taken to the point of fainting through oxygen lack have expressed themselves as perfectly able to go right ahead with the experiment. The fainting spell usually leaves no after effects, and many times the victim won't even believe it ever happened.



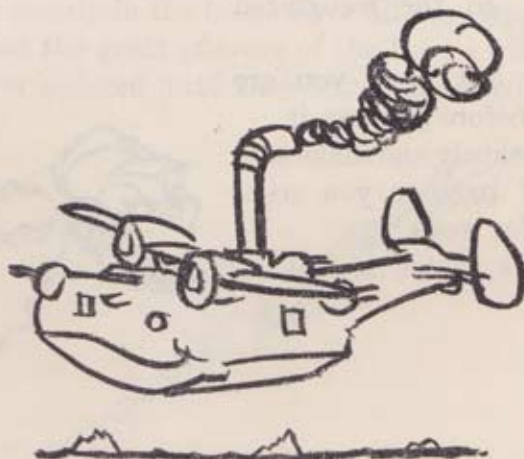
The great danger of oxygen lack is that its effects can often pass unnoticed by the victim who becomes very absent-minded. It may seem funny, but you must guard against it with great vigilance or you'll drown in mid-air.

Care of Ears, Nose and Throat.

At high altitudes frost-bite can be easily contracted but it can be just as easily avoided—and it had better be. Frost-bite is more likely if your clothes or skin are moist and if your general physical condition is below par. Before high-altitude flying have a good warm meal but lay off alcohol because it gives you a false sense of warmth and lessens your resistance to cold. For long flights take hot drinks in thermos flasks with you.



See that your underwear, socks, and gloves are thoroughly dried and warm. Don't walk in flying boots over a wet field on your way to the plane, and don't hurry so much that you perspire. You will do well to study the heating system of your plane when you have a chance, and take a personal interest in its maintenance. Properly looked after and handled, airplane heating systems keep the temperature pleasant even in Arctic flight conditions.



Broken English.

If the interphone system is wrongly used, you may get—

1. What seems like a thunderstorm, with noises from the pilot now and then that sound like Donald Duck.
2. Light chit-chat from other planes.
3. Jack Benny.
4. Nothing.

You may also be ruining normal intercommunication in other planes by radiating your own conversation loud and clear. When the pilot begins to sound like Donald Duck, you may take it for granted that you sound like D. D. to him.

The results may be only annoying; on the other hand, they may be downright disastrous if messages passed over the phone are misunderstood. More than one plane has been lost before now because the observer said two degrees and the pilot thought he said ten—and nobody bothered to double-check.

From this, learn some important lessons:

1. Study the interphone system until you know it backwards.
2. Stick to the recognized patter.
3. Think out what you are going to say before you say it.
4. Say it slowly and make sure it is repeated back to you accurately, word for word.
5. Be sure switch is on I. C. S., *not* radio.



A Lesson Out of the Past.

The great fighting pilots of what we used to think of as a World War differed from one another as much as any other random collection of men of different races and nationalities. But if you read the story of their lives, you will find that they had one great point of similarity.

Each of them began his flying career as a fighting pilot with a period of frustration, in which he was cramped by the difficulty of adjusting himself to the conditions of his job. Once this first trouble was overcome, he felt his skill as a pilot, his resourcefulness and resolution as a fighter, to be sufficient to give him success in battle.

Yet there followed in each case a period of disappointment in which all of them had nothing to show for their efforts but a series of dismal failures and which they were at a loss to understand.

It was at this point that every World War ace made the discovery that led to his success: *Victory in battle is possible only to an expert shot using an efficient gun.*

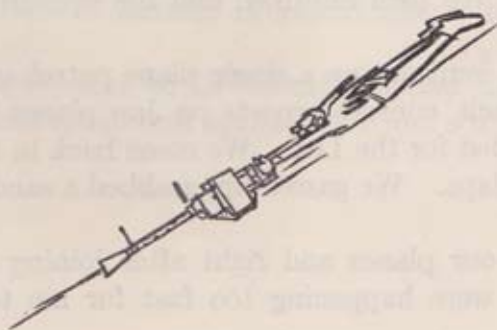
Thereafter they all spent endless time, indeed every minute of their spare time, practicing firing, boresighting their guns and working out various technical and mechanical aids to accurate gunnery. Success came to them only when they woke

up to the realization of what the gap in their efficiency was.

This stands out so clearly in the histories of all the famous fighters of the past that we can be sure that the great *gunners* of the future will pass through it, and that they too, will never succeed until they have converted a weakness into their greatest strength.



A sense of frustration



IV. THE REAL THING

We like to know what the men on the job think about it, so here is the first-person story of a young gunner, 19-year old John Liska, Aviation Radioman 3c, who flies with Lieutenant (jg.) John Leppla. Their Douglas Dauntless carries seven Japanese flags that show what good gunnery in a dive bomber can do against Zero fighters. Upon his return to the States here is what Liska said, very modestly:

"Our scouting squadron took off from the Lex. on May 7 on what I thought at the time was a routine patrol flight. Not long after leaving the ship, I received contact reports on the radio, and then we sighted the Jap fleet with a carrier a few miles behind it.

"Our planes started peeling off and the Jap ships scattered. The carrier was the main target, and I could see several near-misses splash in the water close to her. As Lieutenant Leppla pulled out of this dive I looked back and saw that our bomb had landed close off the carrier's port quarter.

"All the while the Jap ships were sending up a terrific antiaircraft fire, and there was a squadron of Zero fighters on our tail. They followed us all the way down in the second dive. We leveled off and turned loose a heavy bomb at a cruiser, but by that time the Zeros were on us, and I was a little too busy to see whether we hit it.

"There were two Zeros on our tail, and every time they came in I gave them a burst. My gun jammed momentarily, and when it was cleared I found that there was only one Zero behind us. Lieutenant Leppla saw the first Zero crash in the water, so I suppose I got him. As we pulled up, a Zero crossed our path and the Lieutenant gave him a burst and that was one less Jap to worry about.

"I fired a burst into another Zero—the tracers were plainly visible—and he disappeared. Perhaps the pilot was wounded, for I could see no other reason for him to quit the fight. We then reformed and the squadron started back toward the Lex.

"The next day we went out on a single plane patrol and didn't run into anything. On our way back, contact reports on Jap planes kept coming in on the radio. They were headed for the Lex. We came back in to find the other planes had gone out after the Japs. We gassed up, grabbed a sandwich, and left for more patrol.

"Soon we sighted our planes and right after joining them we hit the Japs. From then on, things were happening too fast for me to remember just what

occurred. It was the biggest melee I've ever seen, with planes all over the sky. I have mental pictures of several Jap planes crashing into the sea, and of one of our planes crashing. In between bursts from my gun, I heard Lieutenant Leppla's guns spitting."

"After getting back to the ship and totaling the scores, I found that our plane received credit for seven planes in the two days. Lieutenant Leppla shot down four of those, so I must have gotten the other three."

HOW TO LOSE FRIENDS AND ANTAGONIZE PEOPLE

Cracks that get trainees bilged out of the gunnery fraternity



"Training? Not Me! I'm with an operational squadron now * * *"

"You never see anything on these trips, so I just take a copy of Life along * * *"

"How was I to know anything was wrong with the turret? Somebody else is supposed to inspect it, isn't he?"

"I never make testing bursts. We have to clean our own guns."

"Well, you see, nobody knew what it was. We were all having our sandwiches at the time."

"I didn't bother about it because it looked like it had Navy markings on it * * *"

"I secured my guns because we had already sighted our carrier * * *"

"Sometimes I sit and think, and sometimes I just sit."

TO THE MIKADO FROM U. S. NAVY GUNNERS



Six Mitsubishiis—all set to dive—
Blip went a Browning—then there were five.



Five Jap marauders—thirsting for gore—
One crossed a ring-sight—then there were four.



Four grinning Nippies—over the sea—
Rip went the tracers—then there were three.



Three yellow perils—to carrier and crew—
One little cannon—cut 'em in two.



Two toothy sons of—the rising sun—
Expert free gunning—reduced them to one.



One Skibbie bomber—left all alone—
In the part of the ocean—we want him to own.



(The Bottom)

