TEE EMM

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TEE EMM

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Pilot Officer Prune says— "Take Tee Emm *regularly! Prevents that Thinking feeling!"*

"I hope that these Training Memoranda will continue to be as widely read and studied as they have been during the past two years. It is impossible to exaggerate the importance of constant training in ensuring the highest operational efficiency."

Air Chief Marshal, Chief of the Air Staff

YOU CAN'T ALL HAVE BEST SUITS

A SMALL way in which you can all help on the war is by not " binding " too much and too unthinkingly. Grousing is all very well in its way : it lets off steam and doesn't hurt anyone much as a rule—but sometimes you are taken up in the wrong way by the wrong people. And that may not be a help to anyone.

For instance, everyone in the Air Force who is at all keen on winning the war wants the best of everything for his own Command, Group, Station or Squadron. He wants the best and latest aircraft, and the most up-to-date equipment, the newest tools, and all the latest devices, to help him get on with the job as efficiently as possible. And just because he is a keen type he grouses that he hasn't got them—and more particularly does he grouse when he sees or hears that some other Command or Station *has* got them.

It doesn't matter whether the grouse is from pilots in, say, Burma, who want the best fighters and hear that they are all being sent to the North Africa boys, or from a Fighter Squadron in U.K. who have got Spitfire V.'s and think they at once ought to have Spitfire IX.'s, and then they can stop raids on London suburbs. The real trouble is that all the suits in a wardrobe can't always be best suits. It's natural for a keen type to want the best suits but the suits have to be allocated where

the higher-ups—who, in spite of P.O. Prune's private opinion, aren't *all* fools—decide it is in the best global (we think that's the word) interest that they should go. And remember, too, that, even if you are the lucky one actually wearing the best suit, as soon as another new suit is turned out yours will no longer be " best." Nor will you necessarily be given that better one ; it's far more likely to go to the bloke who's still having to make do with patched grey flannel bags and a sports coat or to the fellow who, though reasonably dressed already, has to go on a special party.

The reason for all this outfitting talk ? It is this :

Those who run the war—or the wardrobe—do want to give everyone the best possible ; and even then they are fully aware that it's not good enough for those who are doing the actual fighting ; but *they* must decide. Everything can't be best ; *they* must, knowing all the facts, saw what is to go where.

And you can help, not necessarily by refraining from grousing altogether, but at least by not grousing in the wrong places. Newspaper men have big ears : they want stories, even sensations ; above all they like to unearth and air what they think are legitimate grievances. And they are not *always* concerned to get at all the facts. The public, too, are always ready to be stirred by any suggestion that their fighting men are not being treated right. They may even be made uneasy and develop misgivings ; thus while sometimes this airing of grievances may be all to the good, at other times it is not.

So remember when you are grousing be just a little careful who you grouse to and what you grouse about. Remember, for instance, that if all the latest fighters were detailed off to protect South Coast towns we should not have so many casualties in tip-and-run raids—*but* Rommel might well be in Tunis for another year or even back in Benghazi. Remember that if all the best equipment were allocated to North Africa and none, say, to Coastal Command, then the U-boats might easily prevent the R.A.F. in Africa getting most of it.

Remember that even in grievances there must be a sense of proportion.

SING A SONG OF SPITFIRES

Sing a song of Spitfires,
With cannon (Bore Two-O).
Four and twenty Messerschmitts,
We dive on down below.

We're sure they haven't seen us,
They have not done a thing,
Oh, isn't this a piece of cake
To put within the " ring."

The leader took the nearest one,
And blew it clean in two,
Whilst P/O Prune, who sings a tune,
Thinks—" Here, *I'll* get a few."

He dives his aircraft steeper,
The Hun is dead as mutton,
He tries a squirt, but does no hurt,
For " Safe " is on his button !

ARE YOU FIT FOR YOUR AIRCRAFT?

IN an aircraft there are masses of dials, gauges, gadgets and what-nots which tell you all about the heart-beats, blood-pressure and general fitness of your engine. On the aerodrome there are ground crews whose job it is to keep that engine fighting fit and tuned up to concert pitch. They have been expensively trained for this. They do their job and do it well.

You, on the other hand, as a member of an air crew, have been even more expensively trained. During that training you weren't only taught to fly, or navigate, or handle wireless, guns or bombs; a lot of your time was "wasted" on drill and physical jerks. Or so you perhaps thought. Actually, the wise guys responsible for making you what you eventually became, knew that you *could* only be good enough for your aircraft and on a level with the ground crew who keep that aircraft fit, if *you* also were fit, and kept yourself fit.

We are not saying that you can't fly your aircraft if you happen to be constipated or have liverish electric eels in front of your eyes. But we will say that if you aren't quite up to the mark you won't have that little extra something which enables you to be right on the top line when the Huns are about, or which keeps you alert on the longest sorties.

Now, just as the ground crews on the Station are provided with the best of tools to keep your aircraft fit, so are you provided on the Stations with the best of tools to keep yourself fit. These are the various and numerous facilities for recreation of all kinds, and if you don't take advantage of them you're on the way to becoming a clot.

And don't think that just once in a way is good enough. Violent exercise in spasms is useless—even harmful. It's the *regular* stuff that does the trick.

You got into the flying game because you were active and fit; but—funny though it sounds—flying is really a sedentary job. It does nothing to *keep* you fit, so you have to try something else. That is why Stations provide facilities. It's also why they expect you to use them.

Keep active on the ground!

Keep fit!

Prune keeps fit while flying.

A FLIGHT WITH P.O. PRUNE

WE travelled as an invisible passenger in an aircraft with P.O. Prune the other day. He was taking up an Anson on an instructional flight. We don't mean to say that Prune was actually instructing—that'd be too much of a good thing; he had a screened observer and a screened W/Op. with him to push the gen out to the two pupils.

Prune arrives at dispersal a bare five minutes after the authorised time of take-off, and having signed the 700 twice —once in the wrong place—rapidly turns the kite into wind, and takes off.

Almost immediately Prune applies hard left rudder and brake in order to avoid the Aerodrome Control Pilot's Caravan, and, as we pass, a frightened face appears

in the cupola. Prune gives it the victory sign, obviously hoping the A.C.P. will mistake his meaning. We pass over No. 4 hangar with quite 12 feet to spare, when a vigorous thump on Prune's back seems to suggest warning of an imminent collision with at least a Stirling. It is, however, merely the screened W/Op. announcing the absence of his pupil, so Prune executes a tight circuit at 50 feet, lands and collects the wretched fellow, who points out he had been just about to get in when Prune started off. The second take-off is accompanied by a veritable barrage of "reds" from the Watch Office, but none of them hit us. Overhead, a Blenheim appears to be going round again. Prune seems to be wondering how the devil it got there.

At 2,000 feet Prune announces the height and an I.A.S. of 130. The navigator pupil demands 135 to conform with his flight plan, and has to be persuaded that the kite won't cruise any faster. He shouts an apology, explaining that it was the wrong flight plan anyway, but now he is ready.

The great flight begins, and the W/Op's begin to search the ether with dexterous fingers, confident that somewhere within range, there must be at least one station offering dance music. After five minutes the screened observer sitting beside Prune awakes from the profound contemplation of his left flying boot, the sole of which is secured by an orderly room elastic band, and screams, "Where are we?"

His pupil hurriedly finishes writing "AIRBORNE" in his log, leaps from his chart table and peers out of the port side. He glances at his map and then dives into his satchel, triumphantly emerging with the correct map. Good show!

"There," he says, "just there,"

" Who cares about Q.D.M.'s when we've got Henry Hall? "

with a non-committal jab of a gloved finger, encompassing 64 square miles.

The screened observer seizes his own map, and peers into the gloom. His face reflects something of the weather's characteristics as he turns to Prune, enquiring our position.

" Don't ask me! I thought you were map reading."

" Me? No, I thought you were."

" Oh! "

They share the search, until he gets a pinpoint (technical word for guess) on a railway, dimly seen in the increasing murk. The navigator pupil joins them and they unanimously agree upon the position. While Prune does a spot of Bradshawing, the observers argue as to whether the approaching front is hot or cold. Prune suggests " tepid," but they take a dim view. One of them has found a met. report on the floor, but it is abandoned when they find it bears the previous day's date and a Syko message on the back.

A large town appears, and at once they deduce that (*a*) it is a mirage, (*b*) it has just been constructed by the Americans or (*c*) they're on the wrong railway. The last is regretfully adopted, and they set out to identify it.

Peering over the side, Prune goes into a wizard 60 degree turn. The compass spins round, the directional gyro topples and spins the opposite way and the pupil gives up his attempt to orient his map. We seem to be getting rather low, and Prune's obvious fear is confirmed by the screened W/Op. suddenly handing him another terrific thump on the back. Wondering whether the W/Op. pupil is again absent, Prune learns with relief it's merely the trailing aerial catching on a church spire. As a small gesture of consolation, the screened W/Op. points out a cathedral, which, upon investigation, turns out to be the local Odeon. Undaunted, he then reveals the presence of an aerodrome adjoining the suburbs, and while Prune is beating it up, he identifies the squadron letters of the kites as those of his brother's mob at Greater Midden.

We set course for base; all are confident that it can be easily found with a few Q.D.M.'s. Fortunately the dance music is ended, and so we are not disappointed. A sudden change of trim sends us into a thousand feet a minute climb, and Prune looks round to discover the disturbance. The navigator pupil is at the rear window, with only his nether portion visible. He returns to announce the loss of his map in the panic, and that he has stepped upon his log, and his flight plan is covered with mud and what shall he do? Prune tells him, but his discipline is not very good.

The appearance of the sodium flares at base is a welcome sight, until the

absence of hangars reveals it to be the satellite, and we have to follow the road past the " Lion " to reach our goal.

Prune lands on the third bounce. The Great Flight is over.

And now for the pill. Well, even Prune guessed the moral, so there are no prizes. You can amuse yourself finding all the " don'ts," but here are a few to begin with.

Pilots ! Don't leave all the navigation to your observer. Know where you are, and in an emergency, you can make for the nearest aerodrome without waiting for a course.

Observers ! A computer and a Q.D.M. will not do your map reading, and remember, it's awfully embarrassing stooging about over Dunkirk looking for a pin point.

W/Ops ! We know you don't often get the chance to listen to dance music, but do practise all you can. Remember, a crew relies upon you when the weather clamps down, so let them feel confident in you.

And All of You! REMEMBER, you can only make the Worst Mistake once !

" Tail piece."

THIS MONTH'S PRUNERY

THE MOST HIGHLY DEROGATORY ORDER OF THE IRREMOVABLE FINGER (Patron : Pilot Officer Prune) has this month been awarded to Sergeant —— for Conspicuous Eagerness to Get Cracking.

About to start his first night flying in the Squadron, he taxied up to the post, and the A.C.P., being a keen type, gave him a " green." He thereupon proceeded to take off, although he did not turn on to the flare path and could not see any semblance of a flare path. Eventually he effected an entry into a potato field through a gate, after passing through several hedges, a considerable amount of barbed wire entanglements and across a road. Special mention is made of his entry through the gate, as by so doing he incidentally, but not intentionally, saved his undercarriage.

THE DUTIES OF A GUNNERY LEADER

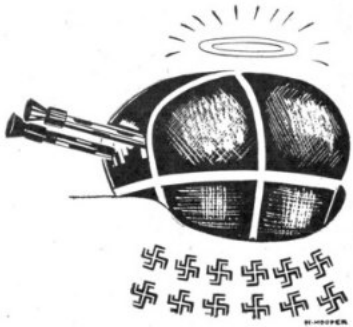
We print below an excellent essay from a pupil who has just completed his Gunnery Leader Course at C.G.S.

ASK an average operational air gunner what he thinks of his Gunnery Leader. If the answer is unprintable, assuming said A.G. to be a good type, we can conclude that the G.L. is not. But if our informant bursts into a happy smile, his cheeks glow and into his eyes enters the light of a man who bears good tidings, then indeed shall we feather our ears and listen to what he's got to say.

If we expect to hear the story of a superman, a kind of Joad-Freud-Henry I-Kaiser combination, we shall be disappointed. No doubt there are supermen amongst Gunnery Leaders: why not? But the majority—no! Just honest-to-goodness air gunners, with their heart in their work and a fair measure of common sense to back it up; these are the men who hold down one of the most important jobs in a modern Air Force.

In Germany, maybe, they are called "Reichsluftschutzenführer" and are chosen for good work in the Party and dirty work everywhere else. In the R.A.F. both title and qualifications are less dictatorial, and their duties more straightforward. To qualify, one must be selected for, and pass successfully through, C.G.S. The duties of a G.L. are clearly defined, and we'll deal with them in detail.

A Squadron Gunnery Leader is the Big White Chief of all turret-dwellers—



front, mid-upper, mid-under and tail—on his squadron. Like some modern "Cid" he leads them into battle, day or night, and organises them into a well-directed defence against the infidel. Also like all good leaders, he is responsible for the training, arming and well-being of his followers. Essentially then, he is a leader—of men. As such he must needs inspire confidence in those under him. Not only that, he must have ***their*** confidence. In the air he leads, commands and takes responsibility for the safety of his formation, and also decides on the methods to be adopted for its defence.

On the ground he helps and advises the individual A.G. He is trained for both these jobs; he is given the "gen." With confidence in himself, good nerves

and complete mastery of his trade, the former should prove a " piece of cake." Even so, no amount of training can produce a leader, and in no branch of his duties is this so apparent as on the administrative side of a G.L.'s job.

Most people think of Generals in terms of battles won or lost. Few realise the tremendous amount of work to be done before a battle can be fought at all—the training of men and reserves, the supplying of arms and equipment, and the hundred-and-one details which go to make up the efficiency of a modern fighting man. In his own sphere a G.L. is a General. His is a small " army " rarely counting more than fifty men, usually less. But it is essential that he should know each individual gunner intimately—their capabilities and their weaknesses. Only then can he help them, bring out the best in them and eliminate their faults. Such knowledge, too, will increase his popularity.

When arriving on a squadron, the new G.L. will make it his first concern to get acquainted personally with his gunners. After that he will want details of each man's training, operational experience and knowledge. He will not be able to carry all this " gen " in his head—even G.L.'s have their limitations—so a card index is necessary, with one card to each gunner. And, of course, when new A.G.'s join the squadron, this procedure will have to be repeated. But already in the initial stage of his new job, the first pitfalls await the G.L., the danger of being labelled a " new broom " or a " binder." A.G.'s are class conscious. For years they were regarded as so much dead weight in a bomber. Phrases like : " The Wellington pilot shot down the Messerschmitt . . ." are, unfortunately, more frequent than accurate. A word of warning, therefore, to all future G.L.'s : Don't try to seem too efficient ! Be it, by all means, but also, be human. A conference of A.G.'s is better than a parade, and an evening in the Mess with the boys can be just as instructive and a lot more amusing. Tests, or exams, are a necessary evil, but by introducing the competitive spirit (inter-Flight, WOP/A.G.'s *v.* A.G.'s, etc.) you will increase their popularity and still get all the information you require.

Armed with a load of " gen," the new G.L. will now get to work in earnest. Sergeant Snooks, he will find, knows his Browning, but is hazy on sighting, whereas Spooks can shoot a drogue to pieces at 400 yards but is foxed by the simplest stoppage. Brown cannot tell a Blenheim from a Junkers, Smith doesn't believe in harmonisation, Green never heard of breeching-up, and ffrench-ffortescue thinks " fighting control " is unarmed combat with a blonde. Unlikely ? Laughable ? Don't you believe it ! We could tell you stories about operational A.G.'s . . . but not here.

Back to the classroom then, and " let's get cracking on a little intensive training." The astute G.L. will probably detect signs of slackness on the part of his predecessor, and a pep-talk seems indicated. Excellent things, these pep-talks—but, like all stimulants, they should be taken in small doses. Liquor, in large quantities, produces four stages of drunkenness : jocose, bellicose, lachrymose and comatose. So do pep-talks !

Classroom work is particularly irksome to operational A.G.'s. It is up to

the G.I.. to make his lectures interesting. Short, sharp and sweet should be the motto. If he succeeds in arousing the gunners' interest, his battle is won. A man with his heart in his job will educate himself. All he wants is the opportunity to do so. The G.I.. provides that. Naturally he will set aside a large-sized room for his gunners. He will decorate the walls with pictures of allied and enemy aircraft and diagrams, festoon the ceiling with models, plaster the notice board with Command and Group Orders, litter the tables with interesting periodicals (as La Vie Parisienne is now unobtainable, preference should be given to TEE EMM (*Thanks, pal! Ed.*) and similar journals, and maybe leave an odd D.P. gun lying around for blindfold stripping. He will arrange, too, with the Intelligence Officer for periodical talks to be given to his gunners on the latest " gen " in connection with their operational work, and he will encourage them to use these amenities.

Subjects like aircraft recognition, turret manipulation and shooting need continual practice. On the ground, various synthetic devices like Hunt and Spotlight Trainers, and Clay Pigeon Traps provide the answer to the G.L.'s prayer. If he is lucky, his station will have already received its quota of " synthetics " under the new training scheme. If not, his ingenuity and ability as a " scrounger " will be severely taxed in procuring them, and he will be well advised to enlist the aid of his Group G.L. Incidentally, a Shadowgraph is cheaper, more easily obtainable and nearly as efficient as a Hunt Trainer.

(To be concluded next month.)

LEARN TO RECOGNISE PROPERLY

ON each of two recent occasions when friendly aircraft were fired upon by pilots, the aircraft attacked were thought to have been Me. 109E's. They were in fact a Mustang and a Spitfire V with clipped wings, respectively, and it seems likely that the squared-off wing tips of the aircraft contributed to the errors in recognition.

Squared wing tips in a fighter aircraft were at one time almost certainly the mark of an enemy, but the position is now entirely different since squared or squarish wing tips can be seen in Masters, Mustangs and some Spitfires, as well as in the FW.190 and the Me. 109E.

As a fighter the 109E has for some time been in a state of obsolescence. The last recorded occasion on which an Me.109E fighter was brought down over this country was in June, 1941, although an aircraft of this type equipped for photographic reconnaissance crashed in Devonshire in January, 1942. It therefore seems unlikely that a single in-line engine aircraft with squared wing tips seen over this country or near its shores will be an Me.109E. On the Mediterranean Front and probably also in Russia, however, the Me.109E has been in recent use as a ground attack aircraft and fighter-bomber, and although the type is now out of production it may be expected to appear occasionally in this capacity.

Flak Through the Looking Glass

" You are old, Father William," the young Prune said,
" But still you are very alive,
After spending much time flying over the Ruhr,
Pray, how did you chance to survive ? "

" In my day," Father William replied, " in the RAF,
I studied the wiles of the Huns,
And (although I succumbed to the lures of the W.A.A.F.),
I knew how to ' fox ' his Flak guns."

" I absorbed all the ' gen,' on Predictor Control,
Seen, Unseen and Fire called Deterrent
Concentrations Predicted and Barrages Fixed
And how to evade them I lerrent."*

" I knew that by making a sharp turn to port,
Or starboard, if so I desired,
And varying height when in range of the guns,
The chaps on the ground would get tired."

" For I held to this course twenty seconds or so,
Until they had started their shoot,
Then changed it again and juggled with height,
Thus alt'ring my ground-speed to boot."

" I very soon found that by changing my course
And my height in amounts quite erratic,
The Boche down below might as well have been armed
With drills, road repairing, pneumatic."

" For try as they would my true course to decide
With each cunning modern device,
By visual sound and new radio means
Their efforts just did not suffice."

* Gone all Scotch, hey?

" To obtain all the accurate data required,
And the future position to show,
The Predictor must have a course level and straight
And held for ten seconds or so."

" With another ten seconds put on for the flight
Of the shell from the gun to the Wimpey,
The chances the Boche had of bagging his bird,
Were really remarkably skimpy."

" And that is just *one* of the good reasons why
I'm alive and still kicking to-day,
And feeling just right for a quart o' best beer—
Provided you're ready to pay."

A SPITFIRE IS A LOVESOME THING

A Spitfire is a lovesome thing, God wot !
Open throtl,
Boost full—
The veriest Hun's decease ; and yet the fool
Contends that Guns are not—
Not Guns ! In a Spitfire ! With their barrels cool !
Nay ! But I have a sign ;
'Tis very sure there's Guns in mine.

(*With apologies to T. E. Brown*)

LIKE T. E, Brown's garden, a Spitfire really is a lovesome thing ; and anyone with an eye for clean lines and graceful curves can appreciate its looks. Those who have flown it can also appreciate its fine flying characteristics ; it is a pleasure to handle, and to see it put through its paces by a competent pilot usually calls forth a tribute to the pilot's skill. " Damn good pilot," we say, gazing up approvingly.

Well, maybe there's no doubt that he can fly the thing, fly it beautifully—but can he *fight* it ? That is what really matters in a fighter pilot.

We are now about to begin the painful process of applying logic, you Fighter types, so bite on the bullet and read on.

Behind the production of a Spitfire is a vast organisation : there are draughtsmen and drawing-boards ; sailors and ships ; machinists and machines ; and the whole Ministry of Aircraft Production. And, once produced, to keep it in fighting trim

there are mechanics, armourers, electricians, radio men—in fact, a regular army of hard-working technicians.

And what of the one man who sits in it? What, in short, of the pilot? Apart from his O.T.U. training, he has had an Empire Training Scheme to teach him to fly. Yes, a whole ruddy Empire! When he gets to a squadron he then has the enormous resources of his Command working to make his task as easy as possible. The Operations Room staff tell him when and where to go to find his quarry; he is guided through daylight and dark, cloud and mist, until he comes up with the enemy.

Imagine the toil and sweat which has been expended to reach this happy state of affairs—a trained pilot in a Spitfire within range of the Hun.

Now then, if the pilot cannot take full advantage of the opportunity with which he has been presented, how much toil and sweat has he wasted? (We pause for a moment to wipe our own streaming brow at the mere thought of it!)

There is not much point in training a soldier to march vast distances, to be a brilliant tactician and an artist in camouflage, and finally to take up a commanding position if he cannot use his weapons with precision when he gets there. Similarly, the most essential attribute of a fighter pilot is good marksmanship. He may be a remarkable navigator, a regular Braille at blind flying, an accomplished aerobat; but if he cannot shoot accurately when he gets into position, he might as well stay on the ground and save the petrol. We appreciate that he gains experience each time, but the aim we have in mind is an original proficiency which will reduce the "experience" period to a minimum.

We have done a fair amount of belly-aching about this marksmanship business, and we shall do it again. There's a reason. Armour plate needs a bigger projectile to pierce it, and in consequence bullet patterns have become smaller and rates of fire slower. Meanwhile speeds have increased. These factors demand a higher standard of accuracy in marksmanship, and therefore we say unto you fighter pilots: "Get stuck into your air-firing exercises and cine-gun practices. Take an intelligent interest, and analyse your results; study them; try to learn from your mistakes." In short, take it seriously.

A Spitfire is a lovesome thing—but beauty is only skin deep. The hard vital core of the Spitfire is in its GUNS. That is what it was made for.

"Guns!" says Prune.
"Let me see! Guns!"

Service Terms Illustrated

by

Well-known Newspaper Cartoonists

No. 4. GHILCHIK of the *Daily Sketch*.

GET CRACKING!

TEE EMM'S Brains Trust

Tee Emm, being an official publication, everything in it appears with the approval of the Air Member for Training and represents official views on policy. This page, however, we reserve for occasional unofficial correspondence—criticism, comments, suggestions, queries, and so on—to which we have tried to dig out an official reply.

In last month's "Brains Trust" we printed a letter criticising rather severely our "Flak and the Bomb Aimer" article in the February issue. We now, as promised, print further comments in the light of that criticism.

To begin with, we must point out that TEE EMM has a very wide circulation among Allied Air Forces throughout the world, and its articles, therefore, are not always applicable to Home Commands.

The article in question has been criticised mainly from the point of view of heavy bomber squadrons operating from this country. We wish to emphasise that it was not intended to over-ride the instructions and advice given to crews using the present technique for mass attacks on German targets. This technique is well known to those concerned and some of the tactics suggested do not apply to raids where large numbers of aircraft are concentrated to saturate enemy defences.

In the Middle East and other Overseas Commands, however, the technique and tactics of night bombing vary considerably. The aircraft used are relatively few and the targets small when compared with those in Germany. There is little predicted flak compared to Western defended areas, most of the guns resorting to barrage fire. Again, night operations in these theatres often necessitate small numbers of aircraft remaining over the target for a considerable period.

With reference to flak, experts agree that if plotting methods only are being considered 50 seconds is about the normal time for prediction and drill time plus the time of flight of the shell. However, as it is believed that predictor control (continuous following of the aircraft) is generally employed by the Germans, it is wise to base evasion of heavy flak on the times relevant to this method of control.

If the position of the aircraft in relation to the outer defences of a gun-defended area is known exactly, 25–30 seconds may be allowed for the time between initial pick-up and guns firing. Since, however, in practice a pilot can seldom know when he has been picked up, it is necessary to take the time needed between last change of course and/or height and guns being ready to fire (say 10 seconds), since much of the preliminary data may have already been obtained. To this time of approximately 10 seconds should then be added the minimum time of flight of shell appropriate to the height of the aircraft. These times are approximately as follows:—

10,000 feet	5 seconds
15,000 feet	8 seconds
20,000 feet	12 seconds
25,000 feet	18 seconds

Thus it will be seen that for an aircraft flying at 16,000 feet, the safe time on which to base evasive action is 10 seconds (prediction and drill time) plus 9 seconds (minimum time

of flight) = 19 seconds. In the unlikely event of exact knowledge of first pick-up the figure would be 25–30 seconds plus 9 seconds = 34–39 seconds.

As 10 seconds represents a very conservative estimate for prediction and drill time from last change of course and/or height and as a minimum time of flight is taken, no deduction for the " spread " of the bursts due to aiming errors, etc. need be considered and courses can be held for the full periods, providing alterations of not less than 20° are made. On the other hand, alterations, unless very violent, should not normally be of less duration than 10 seconds, otherwise " the spread " of bursts fired on the original data may not be avoided.

A point of the greatest importance when evasive action is being discussed, which was not mentioned in our correspondent's letter, is that alterations of course and height should on all possible occasions be irregular : if they are not, they can probably be " meaned."

To sum up, it is agreed that some of the tactics laid down in the article " Flak and the Bomb Aimer " are at variance with the present technique employed by Bomber Command's heavy aircraft, but it is again pointed out that bomber squadrons operating overseas often employ tactics which differ from those used by Bomber Command.

LETTER. " SIR,—May I suggest an article in TEE EMM on 'Organisation and Discipline,' for the interest, and perhaps benefit, of Flight or Squadron Commanders and their squadrons ?

" As you are probably aware, none of these gentlemen are ' P.O. Prunes ' by any means, otherwise they would not have their jobs. On the other hand, the mere mention of the word ' discipline ' makes most of them long to be up in the blue with + 6½ lbs. boost and about 2,850 r.p.m. ; very few realise the trouble to which other people can be put through lack of interest on the Flight Commander's part in anything other than serviceability and flying hours per day (or month).

" During eighteen months as senior N.C.O. i/c Flight (Fighter O.T.U.) I have had eleven or twelve Flight Commanders. With perhaps two or three exceptions the same difficulties have arisen in all cases. As long as the required number of flying hours per day or month is attained, the Flight Commander is happy. He doesn't realise that the Flight Sergeant wants somebody to back him up in matters relating to ground work, discipline, etc. In a few cases it is due to fear of interfering. In most of them it is the attitude of ' Leave it to Chiefy—he'll fix it.' (It's nice to know they have such faith in us, but not good enough, nevertheless).

" Now, I seem to remember, when I was one of the ' erks ' (happy days), the Flight Commander used to visit our huts or barrack rooms sometimes. I also remember very well what happened if I was caught smoking at the wrong time and place. Chiefly, I remember how thrilled I felt when I found he actually knew me by name. As for his office, to me it was the ' holy of holies.' I realise that things have altered vastly since then in many respects ; however, I think he *ought* to :—

(1) Inform me when new pupils are expected. There is considerable importance attached to accurate ration strength returns (more so as we are attached to a 'drome belonging to another Command).

(2) Occasionally inspect the living quarters (including the N.C.O. pupils, although they may be about two miles away from dispersal).

(3) Impress upon pupils the importance of the travelling copy F.700 when they take aircraft away for three or four days on exercises. It doesn't help me a little bit when they return with no record of flying times away, and tell me that, even if they'd remembered the F.700, it's Chinese to them, anyway !

" And as for ' taking office, interviewing applicants, etc.,' the Flight Commander usually has to be forcibly held down in his chair for it. If it's good flying weather at the time, he's too busy flying and can't do it till later. If the weather's closed in and visibility is about nil, he's in the Mess or elsewhere, and only after frantic telephoning does he come to Dispersal and mete out justice, or give hope to the despairing.

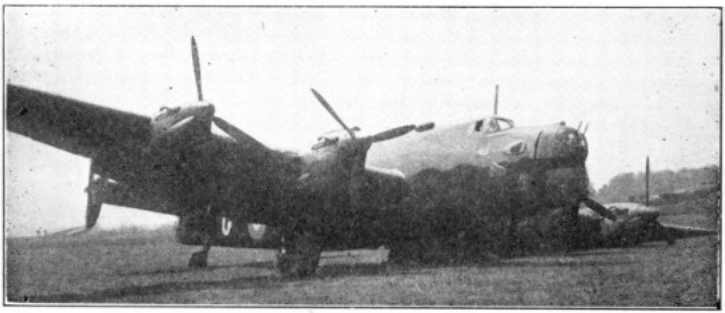
"Whilst on the subject of justice, by the way, it isn't very encouraging when, having marched in a delinquent for some nefarious crime, he is awarded seven days' extra leave (well, nearly !) by a Flight Commander who doesn't even know the man's name, but is over-enthusiastic about a theory of appealing to the better side of his nature.

"I could also tell you about the Flight Sergeant who, having mustered all the flight to deliver a stern lecture on smoking at work, noticed a great lack of interest amongst the troops, and, turning around to find the reason, saw the Flight Commander happily puffing away at his favourite brand, with his back against the fuel bowser. The least said about that the better. I could carry on almost indefinitely, sir; perhaps, however, you haven't even got this far.

"If you publish this, or an article on these lines, I am sure it will strike home to most of the offenders (I repeat, they are *not* 'P.O. Prunes' by any means—more than one of them now carries the D.F.C. and bar) and perhaps more than one flight or squadron will benefit by the lessons—which are there to be learned."

REPLY. We have printed the above letter exactly as it reached us because it brings into the limelight many hitherto unrealised difficulties caused by officers who do a first-class flying job, but fall short on the organisation side of their work. We have already published a series of articles bearing on the subject, called "Organisation without Tears," which, judging by requests for back numbers containing them, seems to have been fairly popular, and in the near future we shall be publishing another series with particular reference to "office organisation," but with the same object in view. In the meantime, we hope that the letter printed above will attract the attention it deserves. If any officer feels that his own house might well be put in order we suggest he reads the following three A.M. pamphlets (which being a personal issue should be in his possession): "Guide to Service: Officers," "Comrades in Arms," and "The Airman's Welfare." And also, of course, the just re-issued Manual of Administration.

Is Your Accident Really Necessary?



"What you gain on the Runway you lose on the Swing."

LEARN FROM THE OTHER FELLOW'S SUCCESSES

A single Beaufighter encountered a Ju.88 whilst on interceptor patrol. The Hun was flying at 200 feet, ahead of our aircraft which was at sea level. The enemy aircraft turned slowly to port whilst our pilot climbed and made a diving beam attack from 600 yards, closing in and firing until dead astern at 50 yards, return fire being experienced all the time. The Hun's starboard engine caught fire and he was seen to crash into the sea. Our aircraft experienced damage to the extent of machine gun hits in the tyres, rear hatch and port wing, and also a hole 2 feet square in the leading edge of the starboard wing.

A Whitley whilst on anti-submarine patrol, proceeding to investigate explosions on the surface of the sea, was suddenly approached from astern by an Arado 196. Cloud cover obtaining at the time was only 2/10, but the Whitley made use even of this. The Arado then manœuvred into a position dead in the sun; our rear gunner, however, was able to follow these tactics with the aid of sun goggles and directed the pilot to turn into the attack. The Arado opened up at 600 yards, closing to 300 yards with cannon and machine gun, tracer being seen to pass under the starboard main plane of the Whitley. At 300 yards our rear gunner replied with three medium bursts, strikes being seen and the enemy aircraft broke away to port, obviously damaged. A second Arado, which had appeared on the scene, stood off on the starboard quarter and opened fire from 600 yards with cannon and machine gun. Once again the Whitley turned into the attack on instructions from the rear gunner, who, thinking that the Arado would break off outside the effective range of his guns, depressed his guns and acted dead. The enemy aircraft immediately closed in and tracer was seen entering the Whitley port plane. Our rear gunner held his fire until the enemy aircraft was at 200 yards and then levelled his guns, giving a very long burst. Bits were seen to fly off the Arado which at 100 yards distance pulled its nose up sharply, presenting a beautiful target, into which two medium bursts were fired. The Arado side-slipped into the sea.

". . . Spitfire VB heard over R/T of presence of bandit 3 miles S.W. of Lizard. Flying at 2,000 feet, kept eyes open and saw aircraft at sea level approaching from east, 3 to 4 miles south of Lizard, travelling fast. Recognised as Ju. 88 and dived down from east, opening fire 300 yards, closing to point blank. E/A burst into flames and went into sea. Cannon not used. Return fire heavy tracer." And that it is how it should be done! But use your cannon to make sure.

A MATTER OF FORM

Forms—those sheets of paper you have to fill in, not the things you sit on in a lecture room—are a pain in the neck to most of us. We don't refer, of course, to those Forms—all too few !—which are highly beneficial to the individual, such as claims for travelling expenses and allowances, or applications for leave. There aren't many complaints about these : nobody says *they* are too difficult to fill up, or take too much time. No, the Pain-in-the-Neck Form is that which is not designed to put money or leave within our grasp, but merely to save the tax-payer's money by preventing waste of material and labour. Being, however, but human, that particular aspect doesn't really interest us much.

The chief arguments levelled against Forms are these :—

(i) " They are too complicated. We don't need the damned things for our business in civil life."

(ii) " There are far too many of the damned things."

(iii) " We lack experience of service procedure." (In plain English this means " We don't understand the damned things.")

(iv) " The damned things are no good anyway."

and (v) that good old stand-by, " Paper-work is not my job."

Let's have a look at these complaints.

Take the first—" They are too complicated." The Forms we'll consider for the moment are those for the receipt, issue, and care of Equipment.

In the first place, even Prune doesn't need much convincing to get it into his skull that the system for controlling so vast a business as the Royal Air Force must be a little more advanced than that for a small business in the local High Street. After all, you know, the R.A.F. is a world-wide organisation, using literally millions of pounds worth of equipment. But the point is that even in a small business in civil life you must have *some* sort of a system, and *some* paper work, if you want to make a profit. If system and paper work didn't pay they wouldn't be used.

But just there is the rub. For the efficiency of a civilian business system is measured by the profits, or the absence of them, whereas the Air Force doesn't aim at making a grand showing with a balance sheet at the end of the financial year. Its dividends are great, but not in cash. The need for " efficiency " in

Even in a small business in civil life you must have some *sort of a system.*

its administration system, therefore, is not so strikingly shown up as in a truly commercial business : the Air Force has to rely on the conscientious efficiency of those actually running its business side.

Now for the second complaint—too many Forms. Go back to the basic principle. It's really quite simple. It amounts to this. If you want Equipment, write out a demand for it ; describe it clearly and legibly, and sign for it. If you hand equipment to somebody else, get a receipt for it. If you are put in charge of a Flight or Section, you may be given a list of the more attractive and valuable items in your custody to help you to keep track of them and look after them. There are different coloured Forms, but this is merely to brighten the dull lives of the poor lads and lasses who have to spend their lives amongst them, and—incidentally—to help sorting, identification, etc. On the whole, there are probably no really *unnecessary* Forms.

Next complaint : The Forms are not understood. But surely all that is really needed is a little energy and commonsense. You are merely being asked to take the same care with the R.A.F. equipment entrusted to you as you would with your own property. And much of it is more valuable and more difficult to obtain than any property of your own.

The next criticism, that Forms are no good anyway, can best be answered by specific examples of how useful they are. Here are three taken at random. We'll find you plenty more if you like.

(i) You don't want your Flight or Section to look like a junk shop, do you ? Of course not. You want to know what equipment you have in the place. In other words, you want a List. Well, you have it—the Inventory. If you find that you must have certain items, you look them up in the Inventory, and see whether you do actually hold them before you yell for another lot. Only the other day one fellow didn't bother to do this, with the result that he got more than he needed and probably another Flight had to go short of them.

(ii) A Flight asked for certain valuable spares because they did not know they had some already. Fortunately, however, a bright lass in the Accounts Section looked up *her* Forms and pointed out that they had had some of the identical items quite recently. Had they used them, or where were they ? . . . They found them under a piece of old sacking in the Flight.

(iii) If you are in charge of a Flight or Section you are not expected to do everything yourself : that would be bad organisation ; but neither should you leave everything to A.C.2. Plonk. Supervision is essential and the key-note of efficient administration. There are Flights and Sections where loans cards are not kept up to date and, with the onward march of time, the Equipment marches on also. That means more waste of labour in the factories, more waste of materials—in other words, diminution of the war effort. All because someone thought forms were no good.

The last criticism, that " paper work " is not my job, anyway, is very common. Your job, you say, is flying, engineering, or one or other of the vital R.A.F. jobs

calling for considerable skill, but the point that is apt to be overlooked is that, in addition to the specialised skill of your job, administrative efficiency is essential too. The higher you get, Flight Commander, Squadron Commander, Station Commander, and so on, the greater the need for you to be an efficient administrator. That means being able to control and save equipment, to run a Section or Station to best advantage, and to look after such things as food, accommodation, clothing and pay in addition to organising your own specialised job. And this administrative efficiency definitely demands a certain amount of paper work.

If you hand equipment to anybody get a receipt for it.

Forms again !

They really *are* essential and you should start learning right away their various uses in so far as they affect your present job—also if you have an eye on any future job, whether Air Marshal or the equivalent later on in Civvy Street.

NEW MANUAL OF ADMINISTRATION

FOR several months now many young officers, whether directly concerned with administration or not, have been completely at a loss to understand how anything at all happens in the Admin. line through such a maze of orders, cancellations, more orders, and still more amendments. It has looked just like a ball of wool, and in their saner moments they have thirsted for some medium to give them the real gen in simpler form.

Well, now they have it. Already each Flight Commander should have on his desk a copy of the new A.P. 837—Manual of Administration in the R.A.F. It is the old one revised up to date, in order to emphasise the importance of sound administration in securing high operational efficiency ; and in order to provide all officers with a good reference book on how to carry out their administrative duties.

P.O. Prune says that guy's been flying since the Air Force was painted blue, not wearing it.

WHY SHOOT YOURSELF DOWN?

We've heard of over-enthusiastic air gunners shooting down other British aircraft by mistake, but we thought the danger of air gunners shooting down their *own* aircraft was pretty remote. Indeed, you'd almost say it was impossible. But it was done only the other day—and indeed very nearly done a short while previous to that. This looks rather as though it might occur again, so we're telling you all about it here, in the hopes of preventing such prunery in the future. It chiefly concerns Halifax aircraft with Boulton and Paul turrets.

The Halifax concerned was flying along quite happily at 5,000 feet when the mid-upper gunner while "fooling with the guns," as the bomb aimer's subsequent statement describes it, fired a burst into the port inner engine. The engine immediately seized up and caught fire, and all hydraulics—wheels, flaps and bomb doors—operated at the same moment. The aircraft went into a flat spin to port and crashed. Four of the crew were killed, one injured and only one escaped unhurt.

The other accident luckily did not have such serious consequences, for in this case the burst fired only injured the rear gunner and slightly damaged the airframe, but the primary cause was exactly the same.

Since all the crew of this aircraft survived, it has been possible to find out exactly how each of these Halifaxes in the absence of any other target managed to engage itself in combat.

The mid-upper gunner in this second case fired a short burst to test his guns and got a stoppage in his port gun. He centralised his guns, depressed the muzzles and let the breech block go forward manually. By depressing the rear sear by hand he by-passed the electric cut-out in the firing circuit, which normally prevents the guns being fired when pointing at any part of the aircraft. *And* he did not have the "fire and safe" mechanism on "safe."

It's as simple as that. What the wounded rear gunner afterwards said to the mid-upper gunner is not evidence and just nobody's business.

Do, therefore, remember, all you gunners in Boulton and Paul turrets, that it *is* possible to shoot down your own aircraft and crew, and that it has been already successfully done. See then that it doesn't occur again; and that there is absolutely no chance of your being the one to do it. If you must attend to your guns for any reason, MAKE SURE

THAT THE GUNS ARE NOT POINTING AT ANY PART OF YOUR AIRCRAFT
THAT THE "FIRE AND SAFE" IS ON "SAFE,"

BINDING UP TEE EMM

"Bind 'em," says Binder.

We referred in our last issue, page 29, to the fact that we knew a certain firm which would bind up your copies of TEE EMM into volume form for a small sum. So many people have since written to us about this—a large number indeed have already had it done—that we think to save further paper, postage, etc., we'd better give you the name of the firm. It is *Messrs. Whitefriars Press Ltd., Tonbridge, Kent ;* and the drill is to send them your TEE EMM's under plain cover (we'll supply you with missing copies or replace dirty ones if you write us) and ask them to bind them up, enclosing your name and address and 5/- per volume, i.e. 10/- for the two volumes, which will be bound separately. The money will cover cost of binding *and* return postage—assuming you remember to put your name and address on ! Be sure and send the money in advance, instead of expecting a bill afterwards—they know that one ! And *don't* send to *us !* Apart from having no facilities for dealing with money—safes, cash-books, receipt forms, etc.—we're simply not to be trusted.

The above now cancels out, repeat cancels out, our suggestion that you get a local binding firm to do the job for you, as Whitefriars Press (who incidentally print TEE EMM) are officially recognised. After all, TEE EMM is an O.U.O. publication, for the safeguarding of which you are responsible, and we feel that you might possibly pick on a binding firm that was not necessarily approved by the authorities—though we hasten to say all the ones we know are highly reputable, their professional code demanding secrecy in these matters. So wash out that local firm idea, and send your copies up to Whitefriars Press only—*with* cash.

HOW TO SUCCEED AS A FIGHTER PILOT

OF a famous " Malta " fighter pilot a brother officer said : " The secret of his success is his incredible knowledge of deflection shooting. All his attacks are worked out carefully beforehand. . . . He concentrates his whole life on air fighting. He has no other interest." And we don't suppose he was born with a knowledge of deflection shooting. Obviously he had taught himself. How ? By application, perseverance, *and* constant practice.

In our article " More Light on a Dark Subject " in last TEE EMM (April) we referred on page 13 to a P.A.P. 104 shortly to be issued on the subject of Night Photography. We have just heard that this is not now to be issued as a P.A.P. but as an A.P., the number of which has not yet been decided and will be notified later.

THAT D.R. COMPASS

"It's all a mystery to me," says P.O. Prune.

To use your D.R. Compass properly you must understand a bit about how it works. Here's the gen.

The master unit of the compass is in that can which swings about it in the rear of the aircraft. Inside the can is what we'll call the North-seeking mechanism. This consists of a rotatable frame in which are mounted a pivoted magnet and a gyroscope. By means of contacts and electro-magnets the axis of the gyroscope is kept in alignment with the mean direction of the magnet ; by means of more contacts and an electric motor the rotatable frame is kept in alignment with the gyroscope. Therefore, since the mean direction of the magnet points to the North, both the gyro and frame will point North too. All clear so far ? Good.

Now the master unit is put in the back of the aircraft so that the deviations of the magnet shall be as small as possible. Since, therefore, you can't steer by reading it direct you must have a repeater on your instrument panel. The repeater works like this :

First of all you must realise that when the aircraft turns, the North-seeking mechanism stays put ; in other words, the aircraft turns around the mechanism. Now the movement of the North-seeking mechanism relative to the aircraft is made to drive a " transmitter " which pushes electrical impulses along the wiring to the repeater. The repeater contains a motor which is driven round by these impulses, and the motor, in turn, drives the dial by which you steer.

It is arranged that the dial is rotated relative to the lubber line through the same angle as that through which the aircraft rotates relative to the North-seeking mechanism. In short, the job of the repeater is to measure the angle through which the aircraft turns relative to the North-seeking mechanism.

Though the repeater will tell you how your course has changed, it won't tell you *what* course you are on, unless both repeater and North-seeking mechanism start together at the same angle to the aircraft. Therefore you have to synchronise your repeater with the master unit before use. (We won't describe the method here ; you'll find it in A.P. 1234).

We have not yet mentioned the Variation Setting Corrector. Through this gadget pass the electrical impulses on their way from the master unit to the repeater. Its function is described in A.P. 1234, but we must refer to it here, because very occasionally the motor inside gets stiff and is a cause of desynchronisation. If all the repeaters become desynchronised by the same amount and the power supply is O.K. the Variation Setting Corrector should be suspected.

All this sounds a bit complicated, we know, but it will help you to understand, and therefore avoid, the more common abuses of the gadget. Here are some do's and don'ts.

The D.R. Compass is a *compass*. It is put in the back of the aircraft to give you greater accuracy than you can get

from the P4. Therefore don't copy some people and synchronise the repeater with the P4 ! Synchronise it with its own master unit.

It is unnecessary to put the setting-switch to " SETTING " when taking off. This switch is merely to speed up the control of the magnet over the gyroscope in case they get out of alignment, and is only wanted when starting up the instrument or when the gyro is " toppled " during flight. Toppling happens at 75° bank and may make the repeater go round and round. This should not affect the synchronisation if the power is O.K.

When flying you should occasionally compare the reading of the P4 with that of the repeater. This is because the D.R. Compass *can* go wrong. Certain troubles are not due to the instrument, but to the power supply. If the supply fails altogether, the compass just stops working, and you can tell at once what has happened. More awkward for everyone is the result of a drop in power. If the voltage falls below about 22, the compass may be slow to follow up during turns. If the voltage falls below 18, the repeater dial will just go round and round ; under these conditions the impulses pushed out by the transmitter may be too weak to drive the repeater properly at such a speed, and, when the power revives, the chances are that the repeater will be desynchronised with the master unit. Therefore, if you doubt the repeater reading, get someone to go back to the master unit and give you its reading (not forgetting the A error) over the intercom. If the two readings are different, re-synchronise. Don't just shrug your shoulders and tell the compass adjuster that the damn thing is u/s.

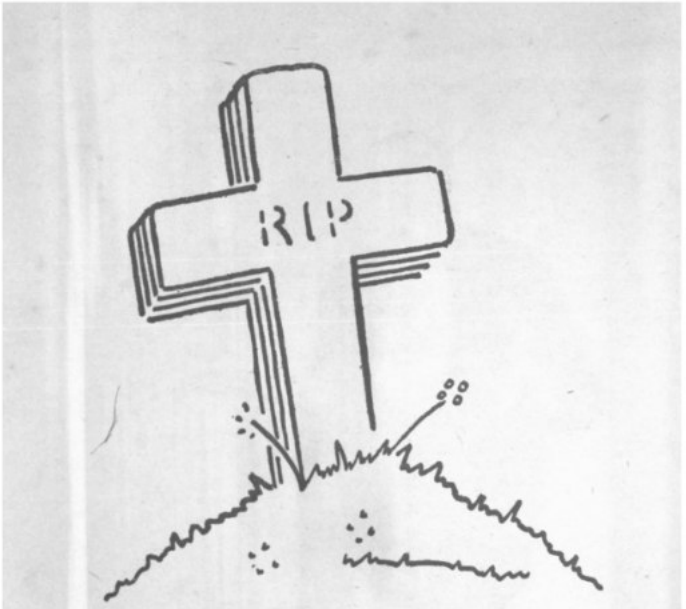
Another cause of de-synchronisation is stiffness of the repeater motor. To test whether this is the cause of the trouble, compare your repeater reading with the readings of the other repeaters in the aircraft ; if all readings are the same, the trouble will not be in your repeater.

Don't get the idea that fast turns can cause de-synchronisation. If the power supply is normal, the compass can cope with rates of turn up to six revolutions per minute—a rate you'd never approach in any aeroplane carrying a D.R. Compass. If you did it in a Spitfire you'd black out. There's no point whatever in putting the setting switch to " SETTING " during turns ; you won't improve the performance of the compass, and you'll only have to switch it back to " NORMAL " when you straighten up.

If you do have to synchronise in the air, you will need a compass corrector key : see that you have one in the aircraft. And remember there is no need to switch the power off during the process.

Two more points : When you read your repeater, look at it directly, not from one side, otherwise the reading may have a parallax error up to 5°. If the compass goes wrong in the air, note carefully the symptoms, and give an accurate account of them ; you may save a lot of time by helping early diagnosis.

We hope we have made you happier about your D.R. Compass. When carefully maintained and intelligently used it is a valuable aid to both navigation and pilotage. See that you get the best out of it.



He could have sworn that that aircraft was friendly

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