

TEE EMM



Vol. 3. No. 6

September 1943

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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

FITNESS IS ALL

IN the early war days many young men joined the R.A.F. with the idea that flying was rather fun. In their minds flying was the be-all and end-all of their service. They did not fully realise the object to which their flying was to be directed, or grasp that, while many people can learn to fly, only young, fit men can bring down enemy aircraft or successfully bomb enemy targets.

Modern aerial warfare is fought with the most precise scientific instruments. Success or failure is a matter of feet and inches. The highest degree of precision is therefore essential, and for this perfect fitness is everything. Without it you cannot achieve that pitch of mental and muscular alertness that stands for fighting fitness—a very different thing from flying fitness. This fighting fitness can only be reached and maintained by moderation in all things and keeping your body physically fit.

This latter is of increasing importance as you go up the R.A.F. ladder from I.T.W. to Operational Squadron. For the more a man flies, frequently the less physically fit he becomes—without realising it till it is put to the test.

The man who can bring down the fighter a second before the fighter gets him, who can bomb with just that added accuracy that means success, who can stick long hours of navigating or piloting, who in the last resort can hang on for that extra day or so in the dinghy, is the man who keeps himself physically fit by moderate living, by regular exercise and by care of his body and all its works.

BUMPH SPEAKING

IV

CORRESPONDENCE

LAST month we referred to bits of bumph which pass from one bloke to another within the Unit. When, however, stuff comes in from the Big Outside World it has to be treated with the greatest respect. Not only is its arrival recorded in a book, but it will have been placed in a buff manilla cover.

This cover is called a file. The enclosed letter itself will have been given a serial number in the top right-hand corner, following consecutively on any other enclosed communications, and the sender will have written your name on it (and sometimes several other names as well). Your name and the enclosure number—with the letter "E" in front of it—together with the date and the sender's (usually illegible) initials, will also have been written on the outside of the file cover, so that the runner will know who he's got to take it to without delving into the mysterious interior.

The letter inside may be either for your information or for action. You therefore "act according." When finished with, you should strike out your name on the enclosure, initial it, and date it. You also strike out the line on the outside of the file where your name occurs, and below it put the name of the next chap (if any) who has to see the letter, or of the sender if you are answering him—adding as before the enclosure number, say "E.1," the date, and your own (probably also illegible) initials. Then into the "Out" tray with it for your runner or clerk to deal with.

The runner, of course, takes it to the fellow named on the outside—or if you are the last-named person on the letter and it doesn't need an answer the file goes to Central Registry. It is most important that every file should be thus properly and clearly "routed" to its next destination, not only on the letter inside but also on the cover. More delays and misunderstandings are caused by failure to do this than by anything else.

Now inside the file cover there is—beside the letter—a sheet of plain paper, called a "Minute Sheet." This is on the left-hand side, the letter, and all other enclosures, being on the right. The minute sheet is used for "minutes"—that is, any written comments or instructions connected with an enclosure. (Once upon a time, all enclosures were formally listed on the minute sheet, but life is too short for that to-day.) The minutes are numbered consecutively, just as the enclosures are.

If you feel moved to write a minute, put the name and title of the officer to whom it is addressed at the left, then write your stuff, sign it and date it. Once again on the outside of the cover put the addressee, the minute's number—this time with an



"M" in front of it—the date and your initials, just as you did for an enclosure. Then pass the file to him quickly. If, before you send it off, you feel you may have made a mistake in procedure, take a look at the specimen minute sheet in A.P. 837!

If a reply is called for (and you haven't got a clerk) write it out in pencil in memorandum form and pass it to the Adjutant marked "Typing action" and he'll attend to everything. Don't forget that all communications to another unit must be from the Commanding Officer. If on some routine matter, other officers may sign, but when they do so it is always "for Group Captain, Commanding, etc." The Commanding Officer must be kept informed of everything happening in his command—so on no account should a letter on an important matter be signed by anybody other than the C.O. A carbon copy of it is laced in the file and given the next serial number.

File covers, by the way, are not only buff in colour; they may be either green or pink as well. Buff files are "Open" files which anybody can read—though they don't always want to. Green are "Confidential" and must only be kept by the Adjutant; they must not be seen by unauthorised persons. Pink are "Secret" or "Most Secret," and you have to be fearfully careful about these. They are kept by the Adjutant, and not only must unauthorised persons not be allowed to see the letters and minutes in them, but they must not even know of their existence. This means they must not even be referred to in "open" correspondence. They must not be handled by anyone other than an officer, and if you have one in your possession you must keep it locked up when not working on it. You have also to give a signature when you get it and, to protect yourself, you ought to ask for a signature when you return it to the Adjutant or pass it to a colleague.

Remember that files have not just been invented for fun. They are the unit's memory, preserving continuity as people come and go; and as such, when not in use, they are centralised with the "Central Registry" or with the Adjutant. It will, of course, be useful for you to keep a few personal, unofficial files yourself—as we told you last month.

Once more, if you want to go more deeply into the procedure consult the standard publication A.P. 837. It gives all the gen.



Files have not just been invented for fun.



PRACTISE, PRACTISE, PRACTISE!

WE could go on saying that, but three times is perhaps enough to put the idea over.

Well, what's it in aid of? Who have we got an eye on this time? . . .

Sergeant Winde here gets up and tries to sneak away nonchalantly, but we haul him back. Yes, Winde, it's you! You and certain other air gunners.

Are you as good a shot as you might be?

We're afraid not. For that'd mean you'd have to be perfect, and in this world peopled by mere humans real perfection is an impossibility.

But can you get to be a better shot than you are? Yes. How? By practice, constant practice. Right from the very day your training starts you air gunners must stick at it until you can really shoot. And when you can really shoot you must stick at it in order to keep your hand and eye well in.

In all this the importance of clay pigeon shooting can't be overestimated. For this develops two most essential qualities in the good shot: (i) speed; and (ii) co-ordination of hand and eye. Gunners get a good dose of shooting clays during their preliminary training, but there is not enough time to turn them all into first-class shots. In other words, Sergeant Winde, "it all depends on you."

There are facilities at every Station for practising your clay pigeon shooting, and you should see that you do so. The facilities may, of course, be anything from a reserved patch of ground to a properly laid out Skeet range, as ex-



And it all depended on Winde!

plained and described in TEE EMM for April, 1942, and June, 1942.* But that is up to your Gunnery Leader—and if he hasn't got a Skeet range on his Station he ought to look up those articles in TEE EMM and see about making one. What is up to you is to get all the practice you can, under the ægis, of course, of a qualified instructor who will help you check your faults.

Given speed and hand-eye co-ordination, the next thing is to keep your hand in at turret manipulation (see the TEE EMM article in Vol. III, page 25), and make certain you're completely *au fait* with all the rules which govern the methods of sighting. You've been issued with the Student's Version of the G.2 Standard Note on air-sighting, and in it you'll find (we hope you have found) complete rules for aiming, using the Zone tracer-assisted method. These

* "Training with Clay Targets" (Vol. II, p. 5), and "Further Notes on Clay Pigeon Training" (Vol. II, p. 75).

rules *must be learnt* as they provide a complete guide to a successful career in Air Gunnery.

Here again continual practice is necessary. Even when you're operational you'll find plenty of opportunities for practising these methods of aim. So don't wait until you have to fire in anger before finding out the right time and the right way to do the right thing. Try to eradicate your faults during rehearsals, not on "the night"—or you and your faults may all be eradicated together. Apart from anything else, practice will give you confidence both in yourself and your equipment—and then in turn the rest of the crew will have confidence in *you*.

Finally, you must remember that no amount of practice is going to do you any real good if you don't keep fit. You have—for that's how you've been selected—good eyesight, youth and fitness. Both the first two can be negated by lack of the last. You've got to be on your toes all the time. Though we have no record of it we can well imagine a bomber being shot down through such a simple little thing as the rear-gunner

having been on a bit of a binge the night before and so being a trifle, shall we say, sluggish, at a time when he should have been right up on the top line.

All the foregoing is vital. For the air gunner is possibly quite the most important member of a bomber crew. In his hands, equally with the air bomber's, is the power to inflict destruction on the enemy; and in his hands, equally with the pilot's, is the ability to bring about the complete destruction of his own aircraft and crew, if he doesn't do his job properly. A pilot who by poor flying crashes his aircraft into a hillside kills his crew without giving them a chance. A gunner who lets an enemy fighter come right up and shoot them down because he can't hit the other fellow first does the same thing.

It is therefore an air gunner's definite duty to his pals in the aircraft to turn himself into a first-class shot, and the only way to do that is by practice.

Good flying is useless without Good Shooting—so Practise,

Practise,

Practise.



THIS MONTH'S PRUNERY

THE MOST HIGHLY DEROGATORY ORDER OF THE IRREMOVABLE FINGER (Patron:

Pilot Officer Prune) has this month been awarded to Pilot Officer — for Ability to Rise Above Petty Detail.

When it was suggested to this officer that he should check his Astro Watch, he replied "What for? It only loses about a minute a day!"



BIPLANE TO MONOPLANE

THE time has now come when the good old Swordfish and Albacore begin to pass into the pages of the history book, their place being taken by the Barracuda.

As a natural result, there are a large number of pilots, some of them old timers with a veritable library of old log books, who are finding themselves flying a monoplane for the first time, and viewing the prospect with a certain amount of gloom and despondency.

This feeling has been somewhat enhanced by several fatal crashes that have occurred recently in Barracuda squadrons, and the natural tendency is for all and sundry to blame the aeroplane and not the pilot, particularly as the pilot happens to have been an old timer with no small reputation amongst his fellow stringbag drivers.

Now far be it from us to suggest that the biplane pilots are in any way inferior; this is not so at all, but there are definite differences in the technique of flying a monoplane which it is as well

to remember if you wish to live and learn.

These differences lie primarily in the characteristics of the stall. There is an old E.F.T.S. maxim that "Speed never kills"—profound words with which Sub-Lieutenant Boffin, who pranged his Bentley after a party at the Mayfair, would undoubtedly disagree were he in a position to do so. Nevertheless, bear them in mind.

Briefly, a stall will occur as soon as the upward component of force caused by the forward motion of the aircraft through the air becomes too small to support the weight of the aircraft.

This state of affairs can be brought about in two ways: either the forward speed becomes so reduced that the lift falls off, and the downward force of the weight of the aircraft becomes the greater; or the relative weight of the aircraft becomes increased by the application of "g," and once more overcomes the lift. For instance, a Barracuda weighing about 14,000 lbs. will in turns giving

three "g" produce a relative weight of $3 \times 14,000$ lbs. or nearly 19 tons. Makes you think, don't it? This will happen at high speeds, either in a turn or when pulling out of a dive where large values of "g" are built up, and constitute that alarming phenomena, a "high speed stall."

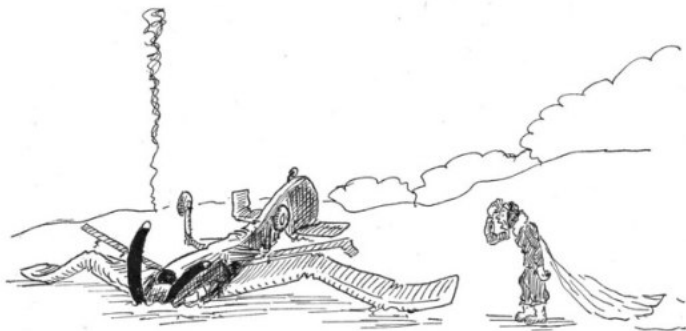
A high speed stall will probably occur suddenly, the first warning being a juddering of the aircraft as each wing in turn begins to lose its lift and tends to drop, but if you remember that the stall that is about to occur is solely due to the value of "g" built up, it follows that an immediate release of the pressure holding the aircraft in turn will reduce this, and the conditions causing the stall will immediately disappear. In other and simpler words, ease the stick forward and you will be safe as a house—in these days perhaps safer.

All this and more you will be taught during your conversion course. The

high speed stall may be new to you since the old biplane never really went fast enough to produce the conditions, and the low speed stall was so gentle that you came to ignore it. But don't just take the easy way out and blame the aircraft; many have done the same thing in Spitfires and Hurricanes, but unfortunately few are still around to give us the value of their experience.

An old hack gets so used to being kicked and having its mouth pulled that it pays no notice whatsoever and soldiers on, but a well-trained horse will probably put you on your back in the ditch. In this undignified position you'll undoubtedly discourse at some length on the demerits of the horse, but will they be justifiable comments? We think not.

It's the same with aircraft. You may blame your Barracuda, but will you be right? Avoid the question by getting Monoplane-conscious at once.



Did I stall or was I pushed?

USING INSTRUCTIONAL FILMS



You can't stop a film to get a point quite clear. Or can you? . . .

INSTRUCTIONAL films cannot instruct efficiently of themselves. They have many limitations. They haven't got a personality. They can't sum up a mixed audience and make allowances for different temperaments. They can't assess reactions. Nor can they be stopped and questioned by way of getting a point quite clear. They are, in short, only *aids* to instruction.

On the other hand, as such, they are invaluable. They have breadth of vision; they provide movement, and they can show movements correlated. They can associate ideas without having to use words. Above all, they are *visual*, and the brain takes in about four times as many ideas presented by the eye as it does those presented in speech. We said somewhere before—and we think it rather good, so we're booking a repeat performance—"What goes in at one ear often goes out at the other, but what goes in at both eyes more often stays in!" (Neat, hey? . . . No? Well, perhaps you're right!) And, finally, films can give instruction in detail and at a uniform high level to larger audiences than can a number of different Instructors in person.

It follows therefore that the Instructor and the film are interdependent, each amplifying and helping the other's efforts. It follows further that as the films can't use the Instructor, the Instructor must know how best to use the films, which is what this article is trying to help him do.

Now Instructional Films are, broadly speaking, of three kinds:—

- (i) Those that deal with hard cold facts, such as the hidden intimacies of the Claudel Hobson carburettor. (The mere thought of this terrifies us!)
- (ii) Those that deal with abstracts—psychological films, such as the importance of being absolutely conscientious in carrying out one's work, and similar subjects.
- (iii) Those that aim at associating ideas, such as various ways of finding wind-speed, using cloud-cover, dive bombing, and so on.

Now each of these types needs different treatment from the instructor and here are some hints on the best methods.

The first type of film presents a lot of solid facts, and hard solid facts, like hard solid food, take some digesting. So the

nourishment must be administered slowly in small portions, not a heaped plate. There is, for instance, a three-reel film on the "Master-Control Carburettor." To show all three reels at once would be to cause mental indigestion, if not to invite caustic comment, and ultimately induce sleep, coma, and possibly death.

One reel only, therefore, should be shown at a time, followed or preceded by verbal instruction with the actual carburettor as model. Later, when the pupils have got that under their belts, the other two reels can be similarly tackled. Finally, the whole three can be run through for recapitulation.

The second type of film is (as Prune would say) a very different kettle of tea. It is abstract, or psychological, and so has a story, or at least a theme.

Take that excellent film "Interrogation of Prisoners of War," which shows all the dodges the Hun tries on to make his prisoner give away vital information, generally without knowing they're doing it. This should be shown as a complete story—which in fact it is. But a point about this type of film is that, while it is a help to show them as illustration to a preceding talk, they *can* stand alone, though the value derived is not quite so great.

The third type of film naturally assumes that the pupil, who is being asked to associate two ideas, has some knowledge of one of them. Take, for instance, the two-reeler on "Bombing Procedure." The pupil is here considered to know already all about his sight and how to adjust it: the film is merely concerned with showing him how to do this under various war conditions. Again, a film on how to use

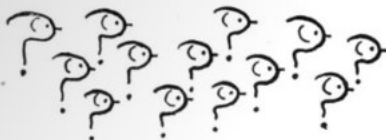
cloud cover very obviously assumes that the pupil already knows how to fly an aircraft. He is now being taught to relate the two.

Once more an accompanying talk by the instructor will bring out the value of the film which in this type is very high. For with these films a large class can be instructed in detail and at once, instead of the mere one or two who could be actually taken up in an aircraft. In other words, instead of taking a couple of pupils up in the air, the air has been brought down to a couple of dozen or more.

From all this it will be seen that the Instructor *must* study his film first, before he ever steps in front of his class, and *must* decide how he is going to use it to best advantage. And in his talk he must concentrate always on such points as may be necessary to bring on the slower and more backward pupils, for one thing a film can't do is distinguish between the types of people seeing it.

And so once again the important thing for an Instructor to remember is, as we said before, that the film is not a separate instructing entity; it is an *aid* to instruction—that is, to *his* instruction.





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, to which we have tried to dig out an official reply.

LETTER. "SIR:—A point which has been puzzling us recently is why an aircraft flicks *out* of a steep turn if the turn is tightened up to a certain point. It seems agreed (although I've never experienced either) that, while most aircraft flick *out* of the turn, some do flick *in* towards the centre of the turn. While we can assume the latter is due to the inside wing travelling more slowly than the outside wing and consequently stalling before the outer wing, we cannot work out why an aircraft flicks *out* of a similar turn, *i.e.*, that the outside wing drops although it is travelling faster than the inside one.

"There have been several suggestions that this phenomenon is caused by: (a) the angle of attack being greater on the outside wing; (b) the fact that a steep turn cannot be executed without holding the nose up and consequently side slipping with blanking effect on the wing foot of the outside wing so that it stalls; and (c) high wing loading.

"In case it may be (a) would you please explain whether the angle of attack of the outside wing in any normal turn (rate 1 to rate 4) is greater than that of the inside wing and if so why? I have always been given to understand that each wing has the same angle of attack except in the case of side slipping.

"The second possibility (b) is almost self-explanatory, but if the wing foot is stalled, as the greater part of the lift in a twin-engined aircraft is obtained between the fuselage and engine nacelles, this certainly would cause that wing to drop. I refer to "twins" as we are flying Oxfords.

"In the last suggestion (c) it is claimed that in any normal turn, the upper and outside wing, as it has greater lift, must support a greater proportion of the weight of the aircraft than the inside wing, and consequently have a higher wing loading than the latter. If so, it would appear that in a very high steep turn the outside wing will reach its maximum wing loading before the inside wing, and consequently drop with the resultant flick *out* of the turn.

"Personally, I'm all for the last suggestion, but if you could clear up this problem for us I'm sure it would save many heated discussions and contribute considerably to the future peace of our mess."

REPLY. A wing stalls because the airflow over it becomes turbulent; the main reason why the airflow becomes turbulent in an ordinary stall is that the angle of attack becomes so great that the airflow over the top surface refuses to be deflected downwards and carries straight on. The airflow does *not* become turbulent simply because the speed is below a certain value, nor because there is a certain wing loading. These may be *incidental* in causing the angle of attack to be too high, but they are *not* the *primary* cause of a stall. This is where the writer of the letter seems to be misunderstanding the problem; there is no reason why the inner wing should stall first, *just because* it is going more slowly than the outer wing; nor is there any reason why the outer wing should or should

not stall first, *just because* it is going faster than the inner wing, or because it has a higher wing loading.

If the aeroplane were perfectly symmetrical (which it is *not*), and the pilot were to do a perfect turn (which he never does) and there was no slip or skid (which is very rare), and no loss or gain of height (also very rare) and if the air belt were absolutely undisturbed (which it never is), both wings would be at the same angle of attack during the turn and *either* wing might drop at the stall, or *both together*. In practice, however, there is nearly always *some* reason why the airflow over one wing should become turbulent before that over the other, and the reason has little or nothing to do with speed or with wing loading. Possible reasons are:—

- (i) The unsymmetrical flow in the slipstreams from the propellers.
- (ii) Imperfect turns, especially slip or skid. These will have a big effect because in the case of a slip (by far the most common fault in a steep turn) the fuselage and the engine nacelle will shield the outer wing and often cause a turbulent airflow over it, and probably a premature stall.
- (iii) If there is a loss of height, the inner wing is at a larger angle of attack and is likely to stall first; if a gain of height, the outer wing is likely to stall first.
- (iv) If the air is disturbed, any local disturbance may encourage one wing to stall before the other.

If then, as on some aeroplanes, either the *right* wing or the *left* wing *always* tends to stall first, whether turning to right or left or in a straight stall, the reason must be due to something unsymmetrical, as in (1).

If, as on some aeroplanes, either the *outer* wing or the *inner* wing *always* tends to stall first—not at all the same thing—the reason must be the way in which the pilot always turns the aeroplane, the chances being of slipping in, and so the outer wing going. By slight adjustments of the controls the pilot can nearly always decide for himself which wing is going to stall!

If, as on some aeroplanes, either wing may drop, that is just what we would expect.

In short, the most likely cause of a marked tendency of an outer wing to drop is probably inward slip and shielding of the outer wing, and turbulence over it. It must be remembered that beyond a certain angle of bank some inward slip is inevitable.

WHAT'S THE USE . . . ?

EXTRACT from a Mediterranean Report: "Once the Me 109G or the Focke-Wulf 190 has lost its initial advantage of speed from a dive and has been caught, it is powerless to shake you off at low altitudes, due to poor manœuvrability. The 109G has proved itself very unmanœuvrable in the looping plane and even a small rate of turn will produce very noticeable vapour trails from its wing tips. It was very noticeable that Ju. 88's seemed to get away far too often from attacking Spitfires. This was due to either (i) bad harmonisation of sights, or (ii) bad marksmanship."

Once more we ask what's the use of out-manœuvring your enemy, making an attack upon him—and then letting him get away, because you can't shoot him down.

See that your *guns* shoot straight and see that *you* shoot straight. Otherwise you might as well stay on the ground.

LEARN FROM THE OTHER FELLOW'S MISTAKES



"It happened like this," says P.O. Prime.

must also have been attacked by a second aircraft, which none of the aircrew had seen. The aircraft had been weaving and continued this all through the combat. This shows the need for a careful watch for a second attack, whilst the first Hun is engaging. The fact that our aircraft was weaving at the time probably prevented greater damage being done. If this weave could have been converted to a cork-screw, it is possible that even less damage would have resulted.

From a report: "Aircraft circled strange-looking craft, apparently a camouflaged tanker (geometrical greys and greens), blunt nose, thought to be a submarine at first, approximately 3,000 tons, direction 280 degrees, 8 knots. Constantly challenged with the challenge letter of the day, he only replied eventually, when a dummy run was made, with a weak letter of the day." The aircraft shouldn't have done this. Avoid upsetting ships unless you have been briefed to do so. This pilot had evidently forgotten that an aircraft cannot and must not use the challenge letter at any time.

"Yellow 1 asked Yellow 2 to set course as his compass was faulty, and while Yellow 2 was looking at his compass he heard a bullet strike his aileron. He saw an F.W. 190 on the tail of Yellow 1 and warned him, but saw a burst of flame in the fuselage. Yellow 2 turned towards E/A which climbed into the sun. Yellow 2 again saw tracer passing him so evaded in steep aileron turns to zero feet." Here is a tragic illustration of the price paid in failing to maintain an adequate rearward search. Yellow 1 should have intensified his search, whilst Yellow 2 was temporarily and unavoidably occupied in the "office."

A captured enemy pilot stated that on three separate occasions he had been attacked by our fighters, once from below and twice from behind. He never knew they were there till he saw the tracer go by, and had they only held their fire he would have been shot down. Those three pilots made the mistake of opening fire too soon and so failing to score on an enemy who didn't even know of their existence. Learn from those three that you *must hold your fire*.

Service Terms Illustrated

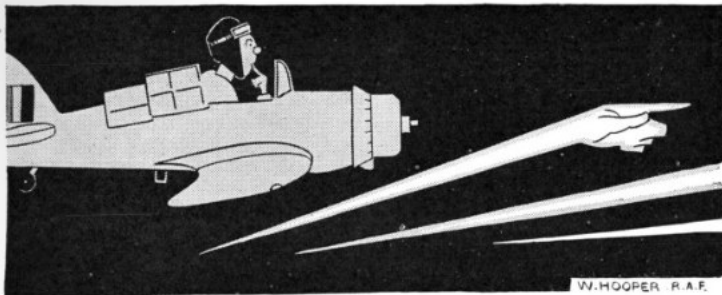
by

Well-known Newspaper Cartoonists
No. 8. LEE of The Evening News.



"TEARING OFF A STRIP."

SEARCHLIGHTS HAVE THEIR USES



W. HOOPER R.A.F.

PILOT OFFICER PRUNE agrees with this. Searchlights certainly have their uses. When they are weaving gently about the sky on a calm winter night, for instance, they spread such a pleasant glow of reflected light over the countryside that he is able to make the local in the blackout without once using his torch.

On the other hand, there are times—and generally these occur while he's on his way *back* from the local—when they start up a most peculiar Dance of Death. They waggle up and down till they make him giddy, and then suddenly lie flat and point. Moreover, they point, he feels certain, straight at him, which makes him feel guilty as well as giddy. He has an insane desire to shout at them to turn away.

The other night, however, Prune suddenly took quite a different view of searchlights. He was doing a night

cross-country, and everything was going like clockwork until Billy Cotton suddenly faded. Despite all the W/Op's efforts he could not be picked up again, and it was soon evident that the W/T and R/T equipment on the kite was all u/s. The night was extremely dark with heavy clouds and when E.T.A. had come and gone and there was still no welcome glimmer of lights on the ground Prune began to feel more than somewhat uncomfortable. Consultation with the navigator revealed no good reason why they should not have arrived at base, as it was only afterwards that they discovered he had been allowing for a south-westerly instead of a south-easterly wind; and so Prune decided to circle whilst a Council of war was held. Just in case anyone on the ground might be interested in their behaviour, he switched on his navigation and recognition lights.

The situation, of course, called for clear thinking, but while Prune was trying to perform this rather difficult operation, the inky void below was suddenly broken by three searchlights which proceeded to wave up and down and then to freeze into pale fingers lying along the ground. Prune had an uncomfortable feeling that it was the same Death Dance that he so intensely disliked after having had a few, and that they were doing it now with a sort of earnest gloating—probably for The Last Time. It was only when the W/Op. murmured something about a searchlight pointer organisation that he realised that all three were pointing in the one direction. He decided to follow them.

To his amazement as he flew in the direction in which they pointed, more beams jumped into life ahead of him, waved in the air and then also froze into pointing fingers. This went on till at last far ahead he noticed that they had developed a new technique: three of them had joined together in a tripod towards which the others were now all definitely pointing. As he approached he saw beneath the tripod a flarepath; the tripod was, in fact, sitting on top of an airfield. As Prune said afterwards, it was a piece of cake—all those policemen waving him along like a V.I.P. going to Buckingham Palace for an Investi-

ture and more than ever does he now agree that searchlights have their uses.

* * *

Bear in mind, O readers, this Tale of Prune. Remember that as soon as you are in trouble at night you will be plotted on the ground, and searchlights, Sandra lights, flarepaths, pyrotechnics, and even night fighters are all there waiting to be put up to help get you down to the nearest suitable airfield. If you want to call up this assistance, just do as Prune inadvertently did: circle with navigation and recognition lights on, and to make doubly sure fire the colours of the period. The searchlights will then guide you to the selected airfield which in many cases will be indicated by a cone of intersecting beams. They will also warn you of the presence of a balloon barrage in your path by forming a fence of stationary beams round it. One thing: if you see the pointers at work beneath you when you know perfectly well where you are, do not panic or curse the busybodies who are trying to interfere with your perfectly good navigation. They are perhaps not so dumb. For it may not have occurred to you that they are probably not for you at all, but for some less fortunate wanderer in the same part of the world who is not cursing, but definitely blessing those same busybodies, *i.e.*, the Flying Control organisation.



THE CLOSE SEASON FOR FARM WORKERS

REMEMBER that the close season for farm workers is from January 1st to December 31st inclusive.

We are inspired to write the above because twice recently a farm labourer has been winged by air gunners testing their guns on the ground at Bomber Stations before an op. without taking sufficient precaution against ricochets. Other cases have occurred before, and though the number of these accidents is a very tiny proportion of the number of tests made they are all avoidable, if guns are tested with due regard to people working in fields on or near the Station.

Here are some points to remember.

The range of a .303 bullet is anything up to $2\frac{1}{2}$ miles ; therefore the range of a ricochet can be pretty high too and still have plenty of kick left at the end of its unintended journey. So don't point your guns so that a ricochet is likely to occur.

Any bullet which strikes the ground at an angle of less than 30° is likely to ricochet : the less the angle the more liable it is to bounce off again.

Now in a tail turret the guns are very close to the ground, so close that if a gunner shoots at a point only twenty-five yards away, the angle of impact will be no more than 2° or 3° . To get down to the 30° angle required, therefore, the aiming must be within 6 feet.

Again, in a four-gun turret each gun has its own cone of fire. Harmonisation spreads these cones and, while all gunners know just what size the pattern is at any range, they should remember that when testing guns they must have an object at least 12 feet square to catch all the bullets at 50 yards range. This allows of course for a reasonable safety factor and a slight wander of aim.

It's impossible to lay down hard and fast rules because conditions vary so greatly, but knowledge of the above fundamental points will help. So, gunnery leaders, captains of aircraft and gunners, get them well into your heads and avoid any chance of bringing down a left and right in a nearby field. There's no open season for farm workers, whether labourers or land-girls.



A left and right in a nearby field.



A REAL LIFE STORY

IT happened in the North Sea, and we tell it as nearly as possible in the pilot's own (expurgated) words.

"Just after having turned, my motor faltered twice in quick succession, so I throttled back and climbed in an attempt to gain sufficient height in case baling out should become necessary. At about 600 feet a horrible grinding came from the sharp end of the aircraft, and apart from the odd sob, splutter and popping, silence reigned supreme. I informed the leader of the formation of my predicament and he acknowledged my message. By opening the throttle fully, I attempted in vain to make use of any available power in order to reach land.

"My height was then about 900 feet and I estimated that with luck, I should be able to reach 2,000 feet, so I opened the hood and door and undid my Sutton Harness, preparatory to baling out. A bare 1,200 feet was reached—I had not taken into account the drag effect of the almost stationary propeller. It became obvious that the only possible course to adopt was that of ditching the aircraft.

"Land was some distance away, so I headed for a fishing vessel about a mile

to port, at the same time struggling to get the Sutton Harness refixed. This was extremely difficult and, when about 50 feet above the water, I abandoned the attempt. Flaps were then put fully down and the speed reduced. Just before touching down I placed my right leg between the compass and the petrol cock and my right arm in front of my forehead, so that on impact, my head would be protected in the crook of my arm.

"The aircraft touched down (into wind and at right angles to the swell) at an angle of about 25-30 degrees (tail first) between the trough and the crest of an oncoming wave. The hood slid forward to the closed position, hitting the back of my head as it did so. I managed to open it sufficiently to get my head and part of my shoulders through, before the nose started to sink. A desperate heave did the rest, and the hood came partly adrift.

"By this time the nose was under water and she was on the way down dragging me with her. I made two frantic attempts to get out, before I realised that I had not released my parachute and it was caught fast somewhere (probably on

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THOSE LATE NIGHTS



P.O. Prune is suddenly called out for a morning's flying.

"I'm tough, I can take it!" is a grand attitude to adopt, but not always a very wise one. Certainly not in the flying game. And most certainly not if the being tough means staying up till the small hours on a party and tackling a flying job next morning.

Split seconds are often the only difference between surviving to fly another day, or having suddenly to tackle a different kind of flying altogether—one with feathered wings and both hands at the controls of a harp. But seconds are frequently hard to split, if you're not on your toes and keyed up—in other words, fresh and fit. Which you won't be if you've been hitting it up the night before.

You want proof? Here it is:

A pilot preparing to land at "X" Station found the undercart lever would not go into the down position. So he went round again and found the lever was working O.K. He then became hazy and queer in the head—all this is from his own report—and flew on for a time in a dazed condition. He next saw "Y" airfield ten miles away, and mistook it for "X" which

had already twice given him permission to land. He selected u/c lever down, but did not check that the green lights were on and that the lever had returned to the "idle" position. He then circled, chose a runway—regardless apparently of the wind "T"—came in, held off very high and landed against a red light with wheels retracted. He afterwards said he did not hear the horn blowing loudly on his approach. Result: a damaged aircraft.

Taking it all round that pilot seems to have behaved in a most peculiar fashion, only excusable if he had been suddenly taken ill in the air.

But he hadn't been. For though in a very dazed condition on landing, and as a result being taken to Sick Quarters, he was found physically fit. He was merely completely exhausted and was confined to bed for thirty-six hours, after which he was O.K.

Enquiries showed that he had been flying for three and a half hours before the crash, not a particularly fatiguing ordeal for a competent pilot in good health, *but*—and here it comes—he'd been at a party till after two a.m. the night before and had had a number of late nights before. In other words he was just "done in" from having too good a time.

The A.O.C.'s comment was that the accident was entirely due to the pilot being completely tired out and that for this he was to blame for not taking his personal health into consideration and getting sufficient sleep. And his log book was endorsed "Gross Carelessness."

All work and no play makes Jack a dull boy, but you *can* overdo the play and then the work suffers. And when your work suffers in the R.A.F., you may very easily suffer with it. It's all very well to think you're tough enough to put in more late-night-party hours than flying hours, but one day you may be proved wrong.



"What did I do wrong then?"

TEE EMM VISITS THE CENTRAL NAVIGATION SCHOOL



F.O. Fixe thinks he's up to it.

TEE EMM'S special representative shot off the other day to pay a visit to the Central Navigation School. It rather cut into our weekend, but then anything which does not happen on a Wednesday or Thursday is liable to do that. And after all, what we always say is, Duty is Duty, cost us what it may (and in this particular case cost our hosts what it did).

The object of our brief dash into the wilds of Cheshire was to take a general goof at this hive of industry where great brains are throbbing all round one like dynamos and you can hardly hear yourself speak for the clatter of Astro Compasses. We were, in short, out to give a little helpful publicity all round. Helpful

that is, not only to the C.N.S., but also to all who may or should use it.

The hub of the Central Navigation School is a frightfully brainy course for Specialist Navigators known as the "Archangels." Archangels are, of course, rather "super." The budding Archangel must acquire the widest possible knowledge of his science. He should be a man who can assist in thinking up a new map projection, can investigate the navigation problems of polar flying, or advise and guide the scientists in the invention of new gadgets which will make navigating easier for the ordinary navigator. In short, he is expected to influence the development of navigation technique. He must, therefore, combine wide practical experience with profound theoretical knowledge.

So much for him—wings and all. What we particularly want to talk about here are the Staff Navigator Courses. There are about half a dozen of these running at the moment, lasting ten to fourteen weeks. One course is allotted to Coastal Command, one to Bomber Command, and three to Flying Training Command. Of these three F.T.C. courses, one is for navigators coming direct from the Observer A.F.U.'s., one a mixed course (people back from abroad, for instance, and other odd numbers), and one for pilots from A.F.U.'s., who need—and also, we hope, *wish*—to rev up their navigation brain centres.

There is also from time to time a short three weeks' course for Bomber Command pilots, the main object of

which is to put them in the other fellow's place. For they are turned for the time being into navigators, while hardened pilots weave about all over the sky and shout excitedly at them to do a variety of navigational jobs. They thus learn at first hand just what their own navigators have to do. In future they are able to distinguish between the navigationally possible and the navigationally impossible; and treat their navigators as almost human after all!

Well, we are not going to talk about these courses in detail. In the first place, we probably couldn't make it clear to you, as we don't understand them ourselves; and, in the second, it's all in the syllabuses (or syllabi—your guess is as good as ours), copies of which every Station or Group has, even if no one has read them.

What we want to put over is that these Staff Navigation Courses are *really valuable*. In the old days, say 1938, if a captain of aircraft was going on a Transatlantic trip he would certainly have wanted a Specialist "N" as his Navigator, but nowadays there are masses of chaps who in their daily round do practical navigation jobs which would in 1938 have been navigation *feats*. On the other hand, many a B.C. Navigator would find Coastal work hard going, and *vice versa*, because owing to war conditions people have had to be trained to work more or less by rule of thumb and they're not necessarily very versatile. The object of the C.N.S. therefore is to provide a place where Navigators can go into the thing more deeply, exchange ideas and try things out, can get, in short, a good theoretical background to their practical stuff.

There are, as we've said, many chaps who are good practical Navigators, even if only in their special line, but a lot more are needed who, besides *knowing how*, also *know why*, who in effect have the "higher criticism" all buttoned up. They want just that little bit more than the ordinary Navigator—in maths., for example, or in Bomber Command gen, if they're Coastal, and Coastal gen if they're Bomber, and so on. Hence the Staff Navigator.

Now the Staff Navigator is an important man. He must be able to fill any Staff or Instructor post in the Navigation world. Of course, in practice, pupils are assessed and the assessment tells the postings people how wide is the range of jobs that a particular man can fill. The Staff Navigator may run a School, be an Instructor, or advise an A.O.C. on the navigation planning of an operation. Staff Navigators are therefore precious, and it is because we want a lot and haven't got unlimited places in which to train them that these Courses are valuable.

Since therefore the courses are valuable, it follows that they should not be wasted, and this is a thing which all can help to avoid. And when we say *all*, we mean all concerned with sending customers along, from Command Headquarters down through Groups and Station Navigation Officers, as well as the actual intending pupils themselves.

Now the one big way in which waste can occur is by having people on the course who cannot get the best out of it—in some cases cannot get anything out of it. For this means that—since, in Bomber and Coastal Commands at any rate there is a waiting list—someone

who cannot benefit from the course is keeping out someone who can—and for ten weeks or more too.

The two chief reasons for this situation are, first, lack of realisation of what the course actually entails. Many people turn up with not the remotest idea of what they are up against. They come quite unprepared, that is to say, their theoretical knowledge is rusty and not up to the standard at which they have to start. For instance, a knowledge of logarithms and plane trigonometry is essential, and so is basic navigation up to wind velocity triangles. To have to tackle spherical trigonometry when you have forgotten what a Cotangent is, or think a Cosine is a make of racing car, is like trying to climb a ladder and learn how to make the ladder at the same time.

But this can easily be avoided: first, by those concerned with finding victims giving them ample warning, so that they can brush up on their mathematical past; and secondly, by a study of the syllabus on the part of intending customers themselves, so that they can cry off if they feel they are not up to standard. There are two examples at the moment of waste in each of these ways. The first is a pupil of over forty who arrived without having had a chance to polish up his mathematics, last tackled at school twenty-five years ago. The second is a pupil who turned out on arrival to be unable to read latitude or longitude from an ordinary map.

The other reason, and perhaps the most important, why the courses get this sort of dead wood cluttering up the living branches is that those responsible for sending the bodies along in the first place, say, the Squadron or Station, seem

more concerned with filling the vacancies they have been given than filling them *properly*. Rather than fill only two out of four with the right people and saying they have nobody suitable for the other two, which would give Command a chance to send someone suitable from another unit, they arbitrarily detail two more bodies. And when you *detail* someone to go on a course, you rarely secure the right person to get the best out of it; for, in the first place, he does not go willingly, and, in the second place, it is only human nature for you to send someone who is a bit of a Prune or a dud, rather than someone good whom you don't want to lose, fully qualified though he may be. Yet it is *wrong* to give the worst fellows the best chances. You rarely improve the worst, and you only hold back the best.

To sum up, the courses need pupils who are *up to standard* and pupils who are willing, and it is the duty of both those who come and those who send to see that this is so. Only thus will waste of valuable time and instruction at the Central Navigation School be avoided.



Practise your navigation under all conditions.



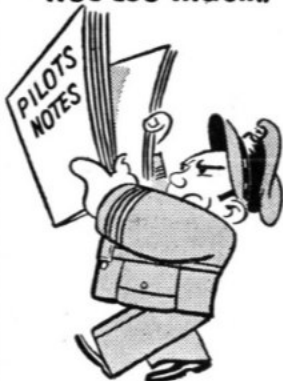
He always followed his victim down.

THE EMM is a "Reserved" publication, which means it is for Official Use Only. And this means that those not entitled to see it are *not* to see it. It is primarily a Training Memorandum for air-crews, instructors and all those in the Air Force connected with these jobs. It is, in short, a Service Training Memorandum written for the Service, issued by the Service, and reserved to the Service.

Not too little..



not too much..



but just right



PILOTS' NOTES

W. HOOPER, A. R. F.

WITH APOLOGIES TO MESSRS. EARSHAW & COLTON