TEE EMM

Number 3 **June 1941**

Number 3

TEE EMM

June, 1941

CONTENTS

	PAGE
Tee Emm for June	1
The Technical Instructor	3
This Month's Anniversary	5
Lighting of Aerodromes at Night	7
Without Comment	11
What the Hun is Doing	12
The Battle of Training	13
Wanted Ideas for Synthetic Nav.	14
Oxygen and all That	15
It's a Funny Thing, but . . .	18
Make an Aircraft in Your Spare Time	19
Standard Blind Approach	20
War Over France	21

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

PLEASE READ THIS!

Everyone to whom Tee Emm goes is asked to remember that it is, in Air Ministry phraseology, "For Official Use Only." That means, not to be published, or run the risk of getting published, not to go to people for whom it is not intended. Because you may read it and find it interesting, it does not mean that anyone who may find it interesting is allowed to read it. Your family, for instance, or your friend who is something to do with journalism, or even your young relation in his school A.T.C.; none of these is supposed to read Tee Emm. Tee Emm, after all, has a serious purpose: it *is* a Training Memorandum, and as such is out to help. The more we can be certain it is not going to unauthorised readers, the more we can print really helpful stuff, without the authorities cracking down on us and wanting to know why extracts from Tee Emm have appeared in the *Poultry Breeders' Gazette* or why little Willie Scraggs has been caught making paper darts out of its pages in a Public Air Raid Shelter. (Or something else somewhere else.) So please help us, in your own interests, to keep this publication really "For Official Use Only."

Issued by the Department of the Air Member for Training, Air Ministry, London.

I hope that these Training Memoranda will be widely read and studied, since I am certain that they will help us all to improve our efficiency, not only in our training but also in operations against the enemy.

C. Portal.

Air Chief Marshal, Chief of the Air Staff

TEE EMM FOR JUNE

WE know a story about a Guards Officer and an American. They were talking about the British Army and the American was getting more and more angry at a certain calm imperturbability—some might call it an air of boneheaded superiority —which the other was showing. When the officer finally remarked : " Still, after all, y'know, the British always lose every battle but the last," it was too much for the American, who burst out, " Hell ! I'm sick of that line ! What happens if the British for once *don't* win the last battle ? " The Guardsman pondered deeply. This, it seemed, was a new one on him. Then he came out with his reply, more calm, more imperturbable, more superior, and more British than ever. " Well, then," he said, " they fight on till they come to one they *can* win."

That answer displays in one sentence the strength and weakness of the British character. It embodies all the traditional determination to see things through, all the refusal to accept or contemplate defeat, all the calm assumption of superiority, and all the self-assured complacency of our race. And this is what carried us through to victory in the last war. We knew we were going to win. We could *stick it*.

In this war so far we appear to have been " taking it." Largely because, for one reason, or another, the Germans seem to have got ahead of us—from Czechoslovakia to Syria. They have had time to get ready, and we have then had to meet them. Why ? Is it because we are, perhaps, *too* self-assured, *too* complacent ? Brigadier-General Spears once wrote with fervent sincerity and foresight in his book, *Prelude to Victory*, a sentence which should have been blazoned all over the country during the past seven years. He said : " The Germans are an enemy who require time for preparation, and they should never be given it."

Unfortunately we *have* only too often given the Germans time to prepare. And we continue, sometimes perforce, to give it to them. What gives them this time to prepare ? Largely our British complacency. The British will improvise brilliantly when danger suddenly comes : they will not, however, recognise the approach of the danger till it is there. The Germans, with their equally brilliant insight into the weaknesses of others, know this. They aim to let our natural complacency fight for them—till they are ready to strike.

Are you, any one of you, officer or man in the Royal Air Force who reads this, letting yourself get complacent ? Are you falling into the common British error of saying : " It didn't happen when we expected it, therefore we don't now expect it to happen." We refer now in particular to a German invasion of England. Are you thinking to yourself : " We're ready for it," but not asking yourself whether you *are* ready ? Are you, in short, lulling yourself into a sense of security, because now we have in this island a bigger, better-trained and tougher army than ever before ? Are you indeed ready for *anything* that might happen ; because whatever happens will, you can bet your boots, be something you don't quite expect. If you are not ready, not visualising every possible contingency—then for God's sake get cracking ! This is not alarmist—just plain common sense.

Have you, for instance, imagined what the descent of airborne sabotage troops will really mean ? They are all tough, hand-picked gangsters out to kill and destroy as quickly and efficiently as possible before they are themselves scuppered. For not all of them by any means will be shot down in transit or on landing ; not all will be rounded up at once. Don't think we are being fantastic, but are you ready for any eventuality at any time ? By " any eventuality " we mean such things as these. A car with a W.A.A.F. chauffeur and three R.A.F. officers is driving along a quiet Midland road between Stations. A lorry is blocking the road ; the car slows up ; and men are suddenly covering the occupants with tommy-guns from the ditch. Have you visualised that ? It may easily happen, once invasion starts. Follow the picture further. A similar car draws up at the barrier of an R.A.F. Station. The sentry expects the usual thing, the showing of passes and then the reporting at the guard-room. Instead, the car charges through and makes straight for the Ops. Room. Machine-guns are trained from the window, the car carries bombs and explosives. Or a strange R.A.F. padre with a suitcase comes up to a group of fitters in the hangar ; he's asking for the Officers' Mess. Are they relying on the fact that if he's inside the Station he must be all right and that, anyway, padres are harmless people, often losing their way ? Yet the contents of that suitcase, backed by a quick brain and a gun, may send a valuable aircraft for a Burton before anything can be done about it.

These are, perhaps, fantastic ideas now ; but they won't be if an invasion starts.

And it won't start with a formal notice. Are you, therefore, constantly in a state of what the Army calls " suspicious alertness " ? If not, get mobile !

Don't let yourself " sink into complacency " or you may be " stunned into helplessness " for those first few vital moments. Wits must be trained as well as other things. You must, all of you, from Commanding Officer to A.C.2, be in a state of constant instant readiness to exert the maximum offensive violence backed by brains. Never will the difference between the quick and the dead be so marked as in the first hour of any attempted invasion. The British may so far always have won the last battle, but again, don't be too complacent about even this ! Have you considered that for once the first battle may be so badly lost that there won't be any last one to win ?

Stir up your imagination ! Use your brain ahead of time all day and every day ! Be on your toes ! Cultivate that habit of " suspicious alertness " !

It is the *duty* of every officer and N.C.O. in the Air Force to do these things, and see that the men under them do so, too. Get mobile *now !* Don't wait !

THE TECHNICAL INSTRUCTOR

P.O. Prune says—
he's " not technical ! "

LIKE the wings of a newly emerged butterfly, the Royal Air Force grows even while you watch. New squadrons, Maintenance and Technical Units, new stations and aerodromes are popping up like mushrooms. All these need new men—or, as we prefer to say in the Air Ministry, their " personnel requirements are becoming increasingly urgent " —and all these men have to be trained, particularly in the mechanical trades. This means more instructional courses, and thus more instructors to be fitted into the training scheme, the efficiency of which depends upon the success achieved by each individual training unit. And it's up to the instructors to achieve that success.

All officers and N.C.O.'s employed as technical instructors must therefore realise the importance of their job, must make every effort to do the job well. The first step to this end is being really interested in the work. If an instructor can rouse and maintain his own interest, he will rouse and maintain that of his pupils. He will then be well on the road to doing his job properly. Interest, remember, does not only mean interest in your subject ; it means interest in those men you are teaching, interest in how they are getting on, realisation of what can be done by the well-earned word of praise, the equally well earned " tick-off." You may, for instance, be interested in riding ; but to be a really good *rider* you must be interested in horses.

The next essential for a technical instructor is a thorough knowledge of his subject. This should not be difficult; he's probably been chosen for that very reason. The man who knows his subject can be certain that he's interpreting the syllabus intelligently to the pupils. Moreover, he has the respect which superior knowledge wins—and that's half the battle. Knowledge, of course, includes practical knowledge. The instructor must develop and maintain his own manual skill. It's no good continually telling people how to do a thing if you can't do it yourself. They very soon spot it and then—well, frequently their idea of fun is to pretend to be dense and ask you please to show them how! This goes over big with the rest of the class—but doesn't do *you* any good.

These two essentials will carry you far as an instructor. Here are a few extra trimmings which make for the fullest efficiency.

Don't despise the A.M. publications, the text-books, or even the technical press. By reading and discussing them you can build up a background of good solid theory against which your actual teaching will stand out as clear as a black cat in a snow drift.

You must also take pains to prepare your lectures thoroughly so that you can go from point to point logically and clearly. *You* may know the subject so well that you can dodge about; but your pupils don't. They must be carefully led by the easiest route.

Try not to *read* your lectures; and don't dictate great chunks of them as "notes." Many pupils will only try and learn them by heart; and you want to produce fully trained men, not half-trained parrots. In order that your pupils should have records of the important phases of the instruction, get out properly printed or typed sheets, with diagrams if necessary, and hand them out. These can be studied as homework.

Don't forget, either, the importance of speaking clearly; and stand up straight in front of your squad to do it instead of draping yourself over a chair or desk. The men are having trouble enough in getting hold of a new and intricate subject; the added trouble of straining to hear what you are saying, or the added distraction of watching your acrobatics should not be given them.

Use, too, all aids to instruction—diagrams, models, sectioned components and "mock-ups." These last are of particular value when dealing with things like hydraulic systems and wheel brakes. Don't despise instructional films either. Find out what films there are—new ones are being made every day—and see if they can't save you some intricate explaining.

Lastly, discipline. As an officer or senior N.C.O. you have to maintain discipline in your squad. It is an accepted fact that discipline is born of respect; and so the good officer or N.C.O., knowing this, will foster it by consciously setting an example at all times. It has been truly said that the soldier reflects his officer; so, too, does a pupil reflect his instructor and experience has proved that a smart, well-turned-out airman is almost always a good craftsman.

Our monthly Cockpit Drill Test is unavoidably held over till next month owing to pressure of space.

THIS MONTH'S ANNIVERSARY—JUNE

A YEAR ago almost to the day, on June 2nd, 1940, a young Pilot-Officer had what can only be described as "a hell of a grand afternoon." He belonged to a certain fighter squadron (Gladiators) operating in Norway, which before it left the country had gained such a reputation for itself that, in the words of the Squadron's diary, "it was noticeable that at the sight of British aircraft, E.A. turned round and fled." Evidently they knew what was good for them!

The Pilot-Officer concerned, whom we will call "Smith," was patrolling with a companion in the Narvik area near the Swedish border at about 2.30 p.m. when they met two Ju.88's and immediately engaged them. But let the Squadron diary carry on the tale in its own words:

"A simultaneous beam and stern attack was carried out, Smith attacking from the beam and above, and firing bursts of four seconds from approximately 300 yards. E.A. drew off into Sweden, Smith following. He gave a further burst from 400 yards astern; E.A. evaded by flying into cloud. On breaking off this engagement Smith found that his companion had disappeared and it is now considered that this pilot was shot down during his initial astern attack. Whilst in Swedish territory, returning to Norway, Smith encountered a Ju.88 flying at 500 feet which he attacked from the beam with a burst of two seconds from under 300 yards range. The E.A. dived vertically into low cloud apparently out of control, and in following behind Smith only just missed hitting the mountainside which was enshrouded.

"Returning then over the Norwegian border Smith observed several hostile aircraft circling low in line astern over Bjornfjell. He engaged a He.111 with a diving beam attack at about 250 yards range and after a comparatively short burst this aircraft pulled up and stalled into the ground.

"Almost immediately he was attacked by a Ju.88 and three more He.111's from head-on and above, the former firing cannon shell; in taking evasive action from this attack Smith managed to get a three-seconds burst in at a He.111 from below and from the beam at about 250 yards range He was then attacked by another He.111 firing cannon-shell, and after further evasive manœuvring managed to get a three-seconds burst into this aircraft from 50 yards range from underneath as it broke away; E.A. was last seen diving to the ground apparently out of control.

"Smith now found himself encircled by two Ju.88's and six He.111's, which attacked him with shell-firing cannon from head-on. His oil tank had been holed and his windscreen was coated; a flying wire had been broken. He dived to avoid a head-on collision and managed to make a four-seconds' burst from astern at another He.111 which was seen to rock violently and make a shallow dive towards the east with both engines off.

"Smith then found himself up against very superior numbers with ammunition exhausted and fuel depelenished." (The word "then" in the above sentence, by the way, is delightful; apparently it was not till his 'plane had been badly damaged and he was out of ammunition that the eight hostile aircraft round him were considered a "superior" force.) "By low flying and evasive tactics he managed to shake off the E.A. and to make base.

"It was later confirmed from Norwegian sources, that three He.111's were found crashed near the Swedish border and these were accredited to Smith. It is felt that a thorough search would have revealed the remains of further crashed E.A."

Thus the bald details of the report.

Not a bad afternoon's work. Three certain victories, probably two more, out of well over a dozen E.A. encountered and his own 'plane brought safely back. An afternoon that many another fighter pilot must have envied. An afternoon that, one hopes, many of them might yet achieve. An afternoon that shows the Offensive Spirit at its best.

It is sad to have to record that the hero of these encounters was reported missing only six days later, following the sinking of H.M.S. *Glorious*.

It will be noted that of the E.A. successfully engaged by Pilot-Officer Smith that afternoon no fewer than three were attacked from the beam, a form of tactics devised by the commanding officer of the Squadron in preference to the standard astern attack, and it might be of interest to recapitulate these tactics in detail. (We base this again on the official report.)

The Squadron Commander's theory for beam attack was formed on the assumption that full deflection was correct sighting against a target crossing the fighter's bows at 200 miles per hour: it took also into consideration that the speed of hostile aircraft was invariably greater than this figure and that any change in deflection during attack prejudiced the pilot's opportunity of success. The beam attack designed by this officer was as follows: the fighter approached the bomber from ahead and to one side at an angle of about 20 degrees, the pilot neglecting the outer ring sight but concentrating on training the main inner sights on a point seen in perspective one length of the target's fuselage ahead. Thereafter the pilot held this fuselage length deflection constant and turned as he fired towards the target until the angle of attack had reached 20 degrees from astern. The bullet group was thus set to rake the target's fuselage from rear to front without any change of deflection. He prescribed opening fire at a range of 400 yards, harmonising guns to a concentrated point at 250 yards' range, and breaking away at about 150 to 200 yards in case the target retained any fire power.

In many of the earlier engagements before these tactics were generally adopted and astern attacks were more favoured, aircraft returned from attacking such E.A. as He.111's in badly shot-about condition; frequently on this account, their attacks had had to be broken off with indecisive results. On numerous occasions when two aircraft made synchronised attacks against a single target from beam and astern respectively, the aircraft which attacked from astern sustained serious damage whilst the other returned unscathed. In the extract from the Squadron diary already quoted it will be seen how true this was in the case of Pilot-Officer Smith's companion.

It was also noticeable that hostile aircraft were more effectively despatched by these tactics. It was comparable rather to a pheasant which has been shot in the head as opposed to one which has been winged. There is no protection offered to the pilot of a bomber from this direction of attack, whilst bombs, superstructure and crew all provide protection from astern and permit the aircraft to return to base even though badly damaged.

A further advantage claimed for the beam attack was that in making constant change of direction the fighter obviated the danger of counter-attack from other protecting hostile aircraft in rear. Taking into consideration the respective periods of operations in Norway and the relative variation in gun power and speed, it is significant to note that the Squadron employing these tactics obtained twenty-six confirmed victories by them, whilst the other Squadron engaged in the same operations which clung to the more conservative form of astern attack achieved ten only and sustained heavier damage from return fire. During the later operations in Northern Norway almost every pilot in the "beam-attacking" Squadron secured a victory in this manner.

LIGHTING OF AERODROMES AT NIGHT

Sergeant Straddle says he's never lit at night.

THERE are at the present time far too many different systems of aerodrome lighting employed at various stations. Sufficient experience should now have been gained for a uniform system to be agreed upon and adopted. After all, the purpose of training pilots is to lead them gradually up to those conditions they will have to meet in operational squadrons, and this is going to be difficult when conditions differ from station to station—even if it is only the conditions surrounding a landing after dark.

Besides, assuming new pilots do quickly learn the lighting system in force at their own particular aerodrome, there is naturally no guarantee that that aerodrome is the only one they will ever have to land at. The net result may well be to fox night-flying pilots so completely that they're nervous of landing anywhere unless the place is lit up like Piccadilly Circus between wars. And pilots have enough to contend with without that.

There is then a very good case for a standardised system of lighting aerodromes at night, and while due allowance is made for the enthusiasm of unit commanders for their own particular system, with or without their own particular modifications, their co-operation is now asked for in adopting and working the uniform system laid down.

The main functions of aerodrome lighting, whatever your own particular fancy, must, of course, be the same. The light must be concealed as far as possible from the enemy, must be able both to stay in action as continuously as possible and to be put out as quickly as possible, must place a minimum of strain upon the pilot (whose idea at the time of using it is generally to get down quickly and go to bed, instead of playing at lights-and-crosses), and must be as simple in construction, maintenance and portability as possible.

Probably no two units have exactly the same system in use, but in general there are five main types. These are the Boscombe, the Hainey Hooded Flare, the Bircham Newton, the Drem, and the Modified Drem. The last-named is the one now decided upon for general use.

Here is a brief description of its requirements and method of working.

The Modified Drem comprises two main parts—the lighting external to the aerodrome and the actual lighting of the runways themselves.

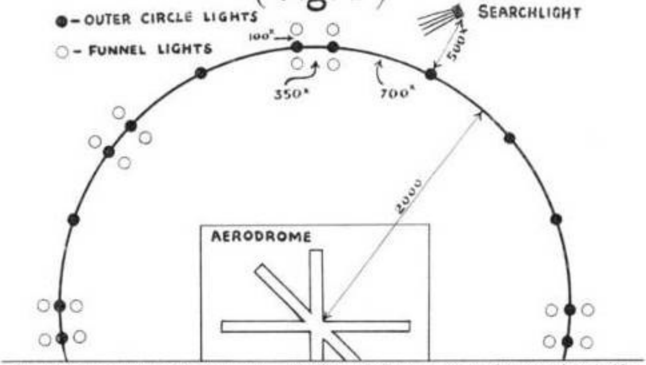
The external lighting can be further subdivided into the Outer Circle, the Funnels, and the Searchlight. The Outer Circle is simply a series of lights strung round the aerodrome on a rough circle of 2,000 yards radius from the centre. These lights are normally 700 yards apart, but this distance is reduced to 350 yards for the pairs of lights opposite either end of every runway.

The Funnels are based on these pairs, which form the centre, or parent, lights of each Funnel. Four further lights, one a hundred yards inwards and one a hundred yards outwards from each parent light go to make up a Funnel. Thus there is a narrowing Funnel, 200 yards deep and averaging 350 yards wide, on the Outer Circle opposite each end of each runway, and the wiring of all these must be such that any one Funnel can be switched on or off independently of the others, and of the full Outer Circle lighting.

The Searchlight is a mobile lighting unit, and its function is to indicate to a descending aircraft, when necessary, which Funnel to use in order to land on the correct runway from the proper direction. For this purpose it is placed about 500 yards outside the Outer Circle lights on the left-hand side of the Funnel, and directed inwards towards it.

All the above external lighting is independent of the runway lights, and must be capable of being brought up or dimmed down, as required, by Rheostat control (see Fig. 1).

(Fig. 1)



The above is a rough sketch design only. The Funnels, of course, narrow from outside to inside.

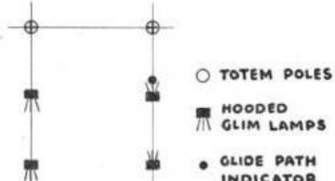
Inside the aerodrome boundary is the second distinct part of the system, that is to say, the runway lights. Along each side of every runway, lamps are let into the ground, or plug points are provided to connect up to Glim Lamps. These lamps are so hooded that, to a pilot taking off or landing, only those on the left-hand side of the runway are visible, and according to the direction from which the runway is being used only the left-hand side is in action. In addition a duplicate lamp is provided alongside No. 3 lamp on the runway to indicate to a descending pilot that he is over-shooting if he has not touched down before reaching it.

At either side of each end of the runway there is, further, a Totem Pole, 10 foot high. Starting from the top of each pole down to about 4 feet above ground level there is on either side a series of six lights about 1 foot apart forming a vertical bar of light. Each light is separately hooded from observation above, and all these lights on the side facing inward along the runway are white, while all those on the opposite side facing outwards towards the Outer Circle are red. Thus the outward-facing red lights indicate where the aerodrome runway starts for an aircraft coming to land, and the inward-facing white lights denote the far end of the aerodrome runway for both landing and taking off. In addition the Totem Poles mark the runway's width. As with the Glim lamps, only the Totem Pole lights facing the direction of approach are lit up at any one time.

Finally a Glide-Path Indicator is used, to indicate the correct angle of descent (see Fig. 2).

The correct method of using the system is as follows :—

(Fig. 2)



Sketch design only. The duplicate Glim Lamp shown at No. 4 should be at No. 3. Sorry!

For Take-Off

The left-hand Glim path of the chosen runway is lit, together with the near sides of the Totem Poles and the up-wind, or further, Funnel. In the early part of the take-off the pilot is guided by the Glim lamps on his left and the white lights on the far Totem Poles indicating the aerodrome boundary. As soon as the aircraft is air-borne he can see the lights of the up-wind Funnel which then serve as leading lights. (The Outer Circle lights would not normally be switched on during a take-off.)

For Landing

The left-hand Glim path and near sides of the Totem Poles are lit as before. The Glide-Path Indicator is also lit and so is the down-wind, or entry, Funnel. Passing through the Funnel, the pilot next sees the red lights of the two nearer Totem Poles, the light of the Glide Path Indicator, by the colour of which he can check his angle of descent in the normal manner, and the lights of the Glim path (with its double warning at No. 3) along the left of the runway, the end of which will be shown by the white lights of the far Totem Poles. As the aircraft passes through the down-wind Funnel, the up-wind Funnel should also be illuminated, in case it is necessary to go round again.

In bad weather the Outer Circle should be lit in addition, and, if further aid in locating the entry Funnel is necessary, the Searchlight should be switched on as well. In such a case the pilot, after making contact with the Outer Circle lights, should turn right and fly round in a left-hand turn till he sees the Searchlight. He should then bear slightly to the right, turn left round the Searchlight and so straight down into the Funnel.

Permission to land will, of course, be given in the normal manner; and all lighting, with the exception of the searchlight, will be controlled from the Watch Office, which must regulate the scope and intensity of the lighting according to the conditions prevailing at the time.

SOMEONE'S MADE AN ERRATA OF THINGS

IT wasn't us. It wasn't the printer. It was, so help us God, the author himself, who apparently had his telescope to his blind eye—and the telescope stopped up at that—when he checked the proofs of his article in last month's TEE EMM. The article was called *Never Too Old to Learn*, all about astrograph or something—personally we couldn't understand a word of it, so it *must* have been good—anyway, at the top of the second column of page 12 the author wrote: "The deviation coefficients left uncorrected are + 0·5° B, + 1·5° C, + 2° E."

Now these coefficients were correctly named +, when you worked them out from the deviations shown in Fig. 2, next page. But the signs for deviation apply when working *from* COMPASS *to* MAGNETIC. The author, in Fig. 1, wanted to show what must be applied when working *from* MAGNETIC *to* COMPASS because this is the normal way round when deciding on the course to steer. When working this way, however, the signs should, of course, have been reversed and this the author omitted to do. So, if you worked from Fig. 1 as it was shown, the coefficients B, C and E would have been —; if you worked from Fig. 2, they were correctly shown as +.

In view of the interest assured by this article (*vide* TEE EMM's postbag), a further article on the subject—with, we hope to Heaven, no author's oversights—will be printed next month!

WITHOUT COMMENT

Extracts from two reports on recent accidents.

Printed by order of the Chief of the Air Staff

The pilot, Pilot Officer Wilson, flying a Havoc with full operational equipment for the first time, was detailed for a one-hour practice flight. After forty minutes he flew at a low altitude in the neighbourhood of Burnt Oak Farm, near Crowborough. He then proceeded to " shoot up " the farm buildings in a series of low dives and almost vertical climbs, at times within 50 feet of the ground and below the level of the surrounding high ground. Eye witnesses were duly impressed. When the aircraft came round for the third time it was pulled up into an almost vertical climb which was maintained until flying speed was lost. It then fell over backwards and spun to the ground. Both occupants were killed and most of the aircraft was destroyed by fire.

Enquiries revealed that a Miss —— lived in a house near the scene of the crash and that the aircraft had circled over this house. She was a friend of the pilot who had done the same thing on several previous occasions.

This was a straightforward case of " shooting-up."

* * * *

A Hampden with Sergeant J. J. Campbell as pilot, took off to carry out a general test prior to an operational trip that night. The flight was to have been for about three hours' duration. Weather conditions at the time of the accident were favourable. The cloud base was about 3,000 feet and visibility was over five miles.

Two hours later the aircraft was seen flying at tree-top height near St. Deny's Road, Evington. After circling for a few minutes it dived slightly and then levelled out. Immediately afterwards the port mainplane struck the roofs of three houses, demolishing the chimney stacks. A woman standing in the back garden of No. 26, St. Deny's Road, was killed by falling debris. After hitting the houses it struck high trees about 40 yards distant and the tail unit and part of the bomb compartment were torn off. It then crashed into the adjoining field and distributed itself over a distance of 120 yards, killing the pilot and 1st W.O./A.G.

Interviewed at the hospital next day the 2nd W.O./A.G., who was the sole survivor, said that a short while before the crash they had been flying round the telephone exchange at Uppingham.

It was later learned that the pilot had, until two days before, been on leave, staying at St. Deny's Road, Evington, with a lady friend, who was a telephonist employed at Uppingham Exchange.

Eighty-one pilots and crews have lost their lives in flying accidents of this nature in the last six months.

WHAT THE HUN IS DOING

III

IT would seem that the Hun in some places, notably Berlin, has other methods of spotting the approach of aircraft at night besides sound locators, as our bombers have been met with "flak" even though making a gliding approach. Don't rely too much, therefore, on complete immunity from "flak" when gliding, particularly over important and well-defended targets.

A Junkers 88 when attacked by fighters recently went into a spin as an evasive manœuvre.

A Heinkel 111 attacked from dead astern often cannot reply effectively for fear of hitting its own rudder.

Watch out for E/A below you flying low over the sea. The Hun has recently been doing some snappy camouflage work with dark green and light grey, blending well with the sea and making the aircraft very difficult to identify from above.

A Heinkel 111 recently brought down had an unusual amount of defensive armament. Eight M.G.'s altogether: one in nose ring, one in nose just outside nose ring mounted on a gymbal, one rear upper, two lateral, two in lower gondola, and one M.G.17 in extreme tail with remote control electric trigger release and 400 rounds.

Remember that a coloured flare dropped from an E/A may only be a ruse of some kind, but that sometimes the Hun uses this means of signalling for help from fighter aircraft if he doesn't want to use direct R/T.

The Hun's junior partner in crime, the Wop pilot, has been using the following method of dropping torpedoes. He approaches the target in a long shallow dive out of the sun; hoping fervently he won't be noticed, because at the same time decoy aircraft have put in an appearance on the far side of the objective in order to attract all the anti-aircraft fire.

THE BATTLE OF TRAINING

TO win the war we have got to train many more pilots and many more crews. Without these the efforts of the front-line squadrons cannot be maintained, nor shall we be able to man the aircraft which are now beginning to roll out from the factories in this country and America.

In planning the strategy of the air war, both we and the Germans have had to set aside considerable resources for training crews. (In our case these resources will be such that when the Empire Training Scheme is in full swing, nearly twice as many pilots will be employed in training as were available in the entire Royal Air Force in 1938.) The side, therefore, which makes the most effective use of its training organisation will clearly have a big advantage. This is the Battle of Training.

This Battle of Training calls for as much care in planning, and skill in execution, as any other major operation of war. Above all, it must be based on what is needed at the time and not on what may have been desirable in the past. The two things are not always the same. Already this war has taught us how quickly conditions change, and how fatal can be the results of an undue adherence to tradition. We must accept the fact that new ideas properly developed and applied are necessary if we are to win the battles of this war.

Many of the problems involved in training aircrews on the scale now called for are new ; thus they require new methods and new ideas for their solution. Our task is to take people who have been leading normal civilian lives and in a few months make them into captains of heavy bombers, pilots of modern fighters, air observers, wireless operators and air gunners. These jobs do not entail a great deal of learning. Nothing is called for beyond what common sense and a quick intelligence can achieve ; but many of the problems are novel, and the normal person can only absorb a limited range of new ideas each day. Thus while the syllabus provides time to cover all that it is necessary to know, it does not, and cannot, provide for the constant practice which is the only way of becoming really proficient.

Do not, therefore, think that your share in the Battle of Training is over when you go to an operational squadron ; that you can now ease up ! There can never be an easing-up in training, because training means constant practising, whether you are practising a new type of formation, learning new bombing tactics, or merely getting a better mastery over your aircraft, its armament and its navigation. Everyone knows that a well-trained squadron can do more harm to the enemy and suffer less harm to itself than one less well trained, but the exertions which are needed to reach a high standard of training are not always appreciated.

Last—but most important—is the position of the instructor in the training organisation. In spite of the emphasis which we appear to put on machines and the production of machines, the war will not be won by these, whether they are aircraft or tanks, but by the crews who man them. At the present stage of the war we are still striving to overtake the lead which the *Luftwaffe* had gained in peace. Our success in this struggle directly depends on those hundreds of instructors who are passing on to others their knowledge and experience. They naturally want to take a more active part in the war, and in due course they will; but for the present, whether they be teaching flying, navigation, armament, or a technical trade, let them picture their German opposite numbers who are doing the same. If at the end of each day an instructor can feel that he has given those he is teaching a better understanding of their job than his German adversary, he has done his work well. He has done his share in winning the Battle of Training. He has brought nearer our final victory in the air.

WANTED IDEAS FOR SYNTHETIC NAV.

WE are staggered. People seem actually to be coming round to the idea that navigation matters. Even our P.O. Prune has admitted this—after having been heard to express surprised pleasure at finding that the *Scharnhorst* and *Gneisenau* had at last been sunk—and then discovering he was over Lorient, not Brest. So a drive to improve Navigational Training is definitely On, and there are now three officers (Specially Engaged at E*nor*mous Expense) working solely on the development of synthetic devices.

P.O. Prune will have a good idea—as soon as he thinks of it.

While, of course, they are bursting with ideas, they can't be the only ones—the bursting officers we mean, not the burst ideas—and we wish to get in touch with anyone who's also bursting. We want suggestions, and we don't mind how nutty they may seem. If they're no good we'll tell you so, grateful, however, for your troubling to send them. (If they *are* any good, we probably *won't* tell you so; but will take the credit for ourselves !)

Remember that synthetic devices can range from highly elaborate doodinkuses like the Link Trainer for pilots, down to a simple idea recently put forward for impressing on the "new boys" how very little one can see from the air when visibility is, say, a mile. A hole is cut in a piece of paper of a size appropriate to the scale of the map and the paper is slid along the map at a rate corresponding to a likely ground speed. *That* brings it home to 'em.

Don't worry if you send up a new idea and we say, "Oh, we thought of that one *long* ago!" These things happen. Try and think of another new one *before* us. And, by the way, don't bother us personally (*Tee Emm* Editor speaking); *we're* just off out for a quick one. Write direct, no matter what your rank, to: Officer Commanding R.A.F. Navigation Synthetic Development Unit, c/o Phillips and Powis, Reading Aerodrome, Woodley, near Reading, Berks. We're passing the buck to him !

OXYGEN AND ALL THAT

THE body is nothing more nor less than an internal combustion engine. Every time you eat you are merely shovelling in fuel—and if ever you've seen P.O. Prune's uncle in action, you'll realise that's just what it looks like too! The fuel is then changed by combustion into energy, the necessary oxygen for which operation comes from the air. The air is drawn in through the nose—or through the open mouth, if you're that sort of fellow!—into the windpipe and thence is carried by a series of smaller and smaller tubes to the tiny, thin-walled air-cells, of which the lungs are mainly composed. The total area of the walls of these air-cells is about the same as that of a tennis court—though much more useful—and over this whole area the vein blood, returning from its job, loaded with carbon dioxide but poor in oxygen, is getting rid of its carbon dioxide, taking up oxygen from the air and turning itself back into artery blood, rich in oxygen and off to work once more. To enable the blood to do this a certain Partial Pressure of oxygen is required.

All the above is really old stuff; the important thing is this "Partial Pressure."

Partial Pressure is the pressure exerted by any one of a mixture of gases and is proportionate to the percentage of that gas in the mixture. At ground level the Partial Pressure of oxygen is just right for sufficient oxygen to be taken up by the blood; when, however, you get into higher altitudes the atmospheric pressure falls and with it the Partial Pressure of the oxygen. The blood, therefore, cannot be sufficiently saturated and you suffer from lack of oxygen.

P.O. Prune has had one oxygen under the eight.

The effects of lack of oxygen are at first just grand. They have even been compared to the effects of alcohol, and who can say fairer than that? You are on the top of the world and chock-full of self-confidence, without any tendency to that self-criticism which so often spoils one's enthusiastic appreciation of one's own achievements. You lose the faculty of accurate judgment or reasoned thinking, and, what's more, you don't know it. You may also be inclined to hilarity or pugnacity—as with too much beer. You are indeed a pretty dangerous person to be piloting an aircraft: you are equally dangerous as a navigator, because—just as in the later stages of a cocktail party, when you take a poor view of anything requiring much concentrated thought—you don't want to be bothered with working out even the simplest navigational problems. (If you *do* work them out, you get a wrong answer, which, unfortunately, you are convinced is the right one!) To crown all, you may even pass out without knowing it.

In the later stages oxygen-lack affects

your vision, particularly your power to see in the dark, weakens your ability to co-ordinate your limb movements, makes you both sick and cold, more liable to frostbite, and inclined to twitch uncontrollably, which may look funny to your friends, but is no joke to you. It may also give you agonising muscular cramp. All this distressing business is lumped under the name Anoxia, or Altitude Sickness—which is putting it mildly.

There is naturally one remedy for Anoxia. That is, extra oxygen, in sufficient quantities to keep the blood properly saturated. Now by the time you are at 10,000 feet, extra oxygen becomes necessary for any reasonable efficiency at that height if you are going to stay there for an hour or more. By the time you are up to 15,000 feet it is necessary for actual safety. More and more is required as you go higher, till at 35,000 feet you would have to breathe pure oxygen, and at 40,000 feet even that would be no good by itself.

You would also have to have a pressure suit or cabin, because the atmospheric pressure has now fallen so low that you are in danger of bursting outwards like a deep-sea fish brought up to the surface. And at 63,000 feet the pressure is so reduced that the fluids in your body would boil. This, of course, is rather a distressing thing to happen to anyone.

Now there are two main points which must be emphasised about the use of oxygen for high altitude flying. The first is that you *must* take it in time. This means you must go by the altimeter, not by whether you think you need oxygen or not. For, as we said above, the first symptoms of lack of oxygen are just those which tend to make you feel you *don't* need it—over-confidence and inability to criticise. These are *mental* changes, and thus their significance is not appreciated by you yourself; they are, however, clearly seen by an observer who is *not* suffering from oxygen lack. You are in the position of the drunk who says, " I'm perf'ly all ri', o' man ! " and a moment later falls slap on his fanny without knowing quite how he got there. The drunk, of course, hasn't done any damage—except possibly to his own fanny—but if you are a pilot flying an expensive aircraft with perhaps several companions, you can see the implications. *You are a definite danger ! And you do not know it !* Remember that men undergoing anoxia tests have been known to pass out completely while in the middle of writing a sentence, and then on receiving oxygen have come to, finished the sentence, and been prepared to swear they never lost consciousness at all ! That is what lack of oxygen can do for you. Guard against it !

The second point is, don't let yourself fall victim to the fallacy of thinking that to use oxygen is " pansy." The unspoken thought, " You weaklings have to take oxygen ; *I* don't ; *I'm* tough " doesn't denote toughness—so much as dumbness and damfoolishness. Remember that oxygen should be used for all long flights *above* 10,000 *feet*. So use it !

Finally, a few practical hints.

At ground level you are getting all the oxygen you need. Taking more doesn't harm you—it doesn't make you " burn up " ; it doesn't even act as a " tonic " ; for all the oxygen the blood can absorb is already being received normally and you are just breathing out the surplus and wasting it.

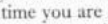
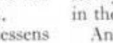
If you do suffer from shortage at any time while flying, and cannot for any reason relieve it, deep slow breathing is the best way of counteracting the effects. While you may be quite comfortable sitting still, moving about in flying clothes demands more oxygen and so causes a temporary shortage which may lead to a sudden faint. For this reason if physical effort is necessary, as in the case of a rear gunner, the regulator should be set for a higher altitude than you're at. If, when using your oxygen mask, you have actually to move about the aircraft, take two or three deep breaths before unplugging the point, hold your breath, move to the new place and plug in at once. (Be sure that the bayonet-fitting has been firmly turned to the right and is secure.) When portable oxygen bottles are available, moving about is simpler, but they should be used sparingly. They only give a "full-on" supply for twelve minutes, and you may want a lot of that if baling out.

Oxygen cylinders hit by a bullet are less liable to cause damage when pressure is reduced. It is important, therefore, to turn on *all* bottles in the early stages of a long flight so that the pressure has fallen by the time you are in action.

Excessive smoking or drinking lessens the blood's power to absorb its oxygen. This means you want more oxygen to keep efficient. In other words, not only you, but the rest of the crew may go short of oxygen—because *you* have, in effect, smoked it and drunk it the night before.

Finally, baling out. (We say "finally" because it's probably the last high altitude flying you'll be doing with that particular aircraft, and we hope it'll never come to that.) If you have to take leave of your 'plane above, say, 20,000 feet, great care must be taken not to lose consciousness on the way out. You may then not be able to pull the rip-cord: you may, even—for such are the strange effects of the lack of oxygen—stare dully at your rip-cord handle on the way down wondering what the hell that thing is for. So make all preparations possible while still using oxygen, and take as many full breaths of oxygen as possible up to about a score, *i.e.*, load yourself up with it to the Plimsol, before disconnecting. Then hold your breath, just as in diving, and GO! Pull your rip-cord *as soon as you are clear*. Then it doesn't matter whether you do lose consciousness: with the parachute you will be falling slowly enough to come round properly in the lower air before reaching earth.

And happy landing to you—right side up!

NOTE.

Last month we published an article (by *A Modern Mariner*) about the Air Sea Rescue Service. It said at one point: "See that it (your dinghy) is secured by a painter to the aircraft and that the knife is there." It should have said: "See . . . that you have a knife handy." There is, as yet, no knife supplied with dinghies. Also, the sentence, a few lines earlier, about the "K" type dinghy would have been better in brackets as the subsequent sentences, of course, cannot refer to this type.

IT'S A FUNNY THING, BUT . . .

P.O. Prune says it is.

ASK any pilot how he would know if an engine had failed in the air.

If he's a fighter pilot he will probably give you a scornful look and leave it at that. Well, perhaps he may be forgiven; he's only got one engine to look after anyway. If he's a bomber or coastal command pilot, however, he will look at you in a frightfully superior way, as if he thinks you'd be far better off in a home. Then he will say loftily that the " pull " will tell him at once. Anyway, all pilots will say after a moment: " What the hell do you think the rev-counter is for ? "

Well, the rev-counter doesn't lie, but it's very likely to push out some uncannily queer propaganda.

If an engine seizes up, or the airscrew gaily flies off, or a broken con rod lets daylight into the sump, even our P.O. Prune jumps to the right conclusion; but less obvious failures do occur. Many are caused by lack of fuel in some way or another—pump packing up, choked feed or empty tanks—and all of these result in the engine buzzing merrily round as before, but not pulling. Now when this happens with a Constant-Speed airscrew, the C.S. unit looks after the revs. and keeps them up, even if the engine isn't doing its stuff; so when you look at the rev-counter you are deceived into thinking that because the revs. are there the engine's still pulling. Yet, as a matter of fact, you might as well assume that your car engine is firing, when coasting, because your speedometer shows m.p.h. Meanwhile the boost also remains the same, for in general the boost varies with the revs. and throttle setting. You haven't moved the throttle and the revs. are still there; so, you will find, is the boost.

This, in fact, is where we really begin to collect our audience. Even our P.O. Prune is taking notice; that is, he has moved up quite close to you and his mouth is open. You will be asked: If all this is true, and you aren't just shooting a line, how are we to know whether the " urge "—the power in the cylinder—has gone or hasn't?

Well, that's easy. First, the cylinder temperature begins to drop. Soon, also, does the oil temperature, and if there is a fuel gauge fitted it will read " O," thus showing there is no fuel getting to the engine. These things, plus the swing in a twin or the loss of height in a single-engined aircraft, are the real indications of engine failure.

So what? So you have really got an engine failure, almost certainly due to lack of fuel, and it is extremely likely that if you have found this out in time you can put it right. Have you forgotten to change to another tank? Or have you a reserve tank you can use? Have you a gravity tank if your pump has failed? Or are you able to pump up by hand? Have you, perhaps (even though this sounds silly), knocked your switches off, or your main fuel cock if it is of the snap-up variety?

In any case, we hope, you won't bale

out, letting your aircraft crash and then shoot a line to the ground engineers by saying that the rudder fell off and that your engines were going all right but you could not correct the swing. If you do *have* to bale out, you will at any rate be able to give valuable information.

P.O. Prune by now has probably shut his mouth and is thinking. Foreseeing the workings of his mind you point out to him quickly that though there may be times when he thinks his engine is O.K.—and it isn't, there may also be another side to the picture. There may be times when he thinks an engine has packed up—and it hasn't. He may note the revs. dropping off the clock and the boost falling away. He may experience swing. He may observe also that the engine isn't pulling. But these things may really be nothing more than the C.S. control getting a bit stuck and putting the airscrew into full coarse. Move the speed control lever about and you'll probably find you can clear the trouble, which may only be due to cold oil.

Aeroplanes with four engines are more likely to lead you up the garden in this respect, because they don't swing so much when one engine stops, and those with automatic control will keep you straight without your noticing anything wrong—except that "George" is using a lot of rudder and maybe aileron as well.

Well, that's all. It's a funny thing, but—knowing that funny things do happen, may make just that bit of difference which saves you getting into trouble, or helps those on the ground to help *you*, by getting at the root of the trouble straight away.

MAKE AN AIRCRAFT IN YOUR SPARE TIME

THIS title, of course, does not mean that we are giving away free with this issue a Model Aeroplane Cut-out, Full Instructions Enclosed, Only a Sharp Knife Needed. We simply want to bring to your notice that not all the aircraft engines used in the Air Force come straight from the factory, brand new and neatly packed in cardboard box. In point of fact, for every hundred engines so produced a further sixty come from the Repair Organisation, where engines that cannot be repaired are taken apart and the pieces used to make good those that can.

Now the repairable engines, you can see, need a constant supply of spares. If they are not forthcoming the output from the Repair Organisation is slowed up. This is a thing you can all help to prevent, but, mind you, go the right way about it. An excuse like that of our P.O. Prune, who, when he failed to select his undercarriage down and crashed his kite, said he was really providing sorely needed salvage, is unlikely to be received in the proper spirit. Remember what

P.O. Prune has no spare time.

may be to you "something that'll come in useful some time" is to the Repair Organisation probably "just the bit he's looking for." So don't *hoard* bits and pieces; get them back into circulation.

Now for a more personal talk! First to N.C.O.'s i/c Flight:

Clear that load of "gash" spares out of the flight lock-up. They are probably causing a shortage somewhere. Don't order any more till your present stock is used up. Another thing: an unserviceable item is not necessarily scrap, so get it back to stores, who will get it out to the Repair Organisation, where it will be salvaged by the fitment of non-standard parts. When returning spares such as sparking plugs, give them some protection, so that threads don't get damaged: in other words—"Use your loaf!" And keep an eye on the airmen. Get their kit boxes cleared of that private store of nuts and bolts. If serviceable, they should be in the store; if not, there are boxes for old metal in the workshops.

Now to N.C.O.'s i/c Workshops:

Your junk-box is not the place for keeping blanking plates and plugs. If you are not going to use them, return them to the stores and give someone else the benefit. Don't throw unserviceable "C" stores into the dustbin: Sort them all out and return them as old metal, along with the swarf from your machine shop. And don't break up unserviceable items you have saved from crashes. It is surprising what the salvage section of the Repair Organisation can do. Their motto is: "No matter what it is like, we'll put it right."

To Equipment Officers:

Don't hang on to those repairable stores, get them back to U.E.D.'s so that they may be put back into service. You've sworn when the Station Commander has been chasing you for a spare which you've had on demand for a month. If you and your brother E.O.'s would only chase the unserviceable components out as soon as the arisings occur you'd get replacements more quickly. Don't wait for "Boards of Survey." Get repairable stuff back to the Repair Organisation right away.

To Station Commanding Officers:

See that *everyone* in your command helps in this good work!

Lastly, to whom it may concern:

Bring in those souvenirs you have swiped off various crashes at your unit. Although they may look very nice on the mantelpiece or may even be converted at some future date to very useful ash trays, they could be put to far better use if returned to stores; then, if they were repairable, they'd soon be back in service. If they are *not* repairable, they are worth their weight in gold to the country as scrap. Either way you're helping to build an aircraft in your spare time.

Or would you really prefer *Tee Emm's* Model Cut-Out?

STANDARD BLIND APPROACH

BE Blind-approach Minded! When returning from an operational trip switch on your own beam and do a dummy run to keep your hand in.

Have you thought what it means to be "BLIND"? (P.O. Prune, of course, doesn't have to think.) Use Standard Blind Approach and "SEE"!

WAR OVER FRANCE

(This is the continuation from our last issue of the account of the air warfare over France in the summer of 1940, written by a fighter pilot.)

THE last boatload of troops that pulled away from Dunkirk did not by any means contain the last members of the B.E.F. left on French soil. The section of the front stretching from the mouth of the Somme to St. Quentin was still being held by British troops, and as the tide of battle pushed them southwards and westwards along the coast it soon became apparent that they would have to be evacuated also.

In the meantime they had to be protected. Owing to the rapidity of the German advance and the imminence of a complete French collapse, it was neither possible nor politic to operate fighters any longer from French aerodromes, and so patrols had to be sent out from aerodromes such as Hawkinge and Tangmere.

A glance at the map will show that a trip down the Somme to St. Quentin is a very different proposition to a short Channel hop to Dunkirk.

The all-important factor was economy in petrol. Patrols could not take the short route down the coast because they would have been spotted immediately and would have invited a whole packet of trouble on their way home. They consisted normally of about two squadrons and their patrol line was so long that a scrap against odds on their way home would have inevitably parked them in the "drink." For this reason they had to go in in a wide sweep, making their landfall at right angles to the coast. In this way they would sometimes travel as much as 200 miles before they reached the end of their patrol line.

In actual fact this distance was probably greater, for it excludes all the jinking necessary to avoid enemy A.A. fire. This was particularly heavy at times, especially when escorting bombers. Sometimes the purely offensive patrols would be left entirely alone—presumably because the Huns did not consider them worth worrying about. But when it did come it was accurate, and some tips for avoiding it are: don't fly directly below cloud base (as often as not the Hun has the height); if the shells are bursting at the same height as you and ahead, throttle back and lose 500 feet (the shrapnel spreads less and is less effective below the burst); before entering an A.A. zone start altering course about 4 degrees every thirty seconds (the Hun predictors take about thirty seconds to relay their information to the guns), and after the first bursts quicken it up to 10 degrees every ten seconds.

To conserve petrol the patrols went out very slowly, usually at about —4 lbs. boost and 1,900 to 2,000 revs. Although a Merlin uses very little petrol at these revs. and boost, it does not like it, and one of its methods of showing this dislike is to "surge." A surging motor is apt to produce a lot of anxiety in the breast of the more timid type of pilot, especially when he is far out to sea, but when it occurs at low revs. and boost he can set his mind at rest—it is common to most Merlins and means nothing at all.

These patrols differed from those over Dunkirk in many vital respects. The air over Dunkirk was, to all intents and purposes, neutral, whereas the sky over the Somme was most emphatically hostile.

It was more than ever necessary to stick together ; to leave a formation and follow a Hun down was to court disaster. 109s seemed particularly eager to make one do this, their habit being to lead down in a series of vertical turns.

The endurance margin was so fine that "weaving" had to be cut down to a minimum. A weaver will always use more fuel than the rest of the squadron, and in this case the unfortunate pilot concerned was placed in a very precarious position. He might be said to represent the capital ships in a Fleet action ; as the speed of a naval force depends upon the speed of its slowest vessels, the battleships, so the endurance of a squadron depends upon the endurance of the weavers. But the difference between speed and endurance is that speed is visual and endurance is not. Since the use of R/T was *verboten*, the contents of the weaver's petrol tanks was a secret that he could share with no one. The poor soul could do no more than pray fervently to his Maker and hope like hell that his leader would not let him down. On more than one occasion pilots landed with only a pint or so of petrol left in their tanks.

The final evacuation of this part of the B.E.F. from Cherbourg was carried out smoothly, and, as far as the air was concerned, was in no way comparable with the operations over Dunkirk.

Then came a lull, both Air Forces concentrating mainly upon re-organisation, and preparing for the German offensive to come.

On the German side their efforts were directed chiefly towards consolidating their position, preparing the forward aerodromes which they had captured, improving communications and modifying their aircraft.

In so doing they handed us a bouquet, for their first modification on all types was to install heavy armour plating. It appears that they were in a hurry, too. Rather than carry out any extensive alterations to the Me.110 they discarded the rear gunner and put armour in his place (though later models now have both).

In their anxiety to put more punch into the defensive armament of some of their bomber types their ingenuity rivalled that of Heath Robinson. In single seaters and in some two-seaters they fitted fixed machine-guns—sighted dead astern and fired by the pilot. These were a nuisance, but ineffective. The crowning glory of the Nazi brain, however, was a sort of torpedo tube leading out through the bottom of a bomber's fuselage through which the frenzied rear gunner poured a variety of oddments, such as hand grenades, coils of wire and old nails.

Activity in our Fighter Command was threefold. First we recognised the immediate necessity of forming O.T.U.'s, and withdrew a certain number of operational pilots from squadrons to instruct in them. Secondly, all the tactical "gen" available was carefully sorted and the training of all squadrons modified accordingly. Thirdly, the problem of night interception began to be studied intensively.

While all this was going on behind the scenes public attention was focussed on the Channel.

The Luftwaffe was not entirely idle. The sight of British convoys steaming brazenly down the Channel was apparently more than it could stand. Out came the Ju.87s, and there followed a series of attacks, lasting over a period of weeks, during which many truths were concealed—soft be it said—by the Censor and in which many tons of merchant shipping were lost.

The Stuka dive-bomber is a formidable weapon unless and until it is attacked by fighters. It is nice and easy to shoot down, as its losses have proved, but it is as well to remember one thing. With its bombs it is like an old tub and is virtually at the mercy of a fighter, but without its bombs it can be a menace. It can turn very quickly—sometimes the flaps are lowered to increase its manœuvrability—and give as good as it gets.

The next phase of the War in the Air was, of course, the Battle for Britain.

In this battle, as in others, we were outnumbered, but we had one important thing in our favour—it was a "home match." Apart from the fact that a "brolly hop" meant temporary security, comfort and a certain amount of hero worship for our pilots, as against imprisonment for the duration for the Germans, it is an obvious fact that a man will always fight best in defence of the things he loves.

That was the sum of our advantages. It might be said that the Germans had also to contend with our A.A. barrages, but, without wishing to belittle the stout show put up by our gunners, it is nevertheless a sad fact that our fighters had to dodge their shells also. One pilot, after landing from an offensive action over France recently, paid the British gunners a much deserved tribute. He said, "The A.A. over Calais is hot—almost as good as Harwich!"

The aim of the fighter defences is to destroy enemy bombers. The destruction of enemy fighters is of secondary importance, and should be concentrated upon only in order to pave the way towards the main aim. It is a striking tribute to the efficiency of our pilots that from the outset the Germans found it necessary to increase again and again the strength of their fighter escorts.

The German bombers were knocked down at a rate that was little less than startling. The worthies whose job it is to look ahead must have been asking themselves one pertinent question—if we can do this to the Hun, what will the Hun do to us when we start an offensive?

The answer is—nothing; provided that our broad strategy is sound, our tactics are sound, and our pilots have the will and the determination to go through with it. The first of these provisos we can leave with safety in the hands of the Higher Command, the second, we can rest assured, will be provided by our own common sense, and the last we can take for granted.

The Hun's failure lay in his lack of guts. A bully, in the final showing, can never turn out to be a brave man. The Hun is fundamentally a bully—the modern species, the Nazis, being trained that way. His idea of heaven is a situation wherein he is provided with four or more machine-guns with which he can demonstrate his bravery by slaughtering such inoffensive people as lighthouse-keepers, refugees, parachutists and children. He is not at home when the odds are even. He showed this during his attack against this country.

In the Battle for Britain the Germans had the aircraft, the numbers and the initiative. Yet they failed.

They failed mainly because they could not " take it." It would be idle to deny, however, that some Nazis are fanatics, who would willingly lay down their lives for their god—Adolf Hitler. It is the writer's opinion that had THIS type been employed in the right way the Germans would have won.

All the evidence goes to prove that the Germans failed for two reasons : (*a*) when the bomber leader was downed there was no determined leader available to take his place, and the formation broke up to be slaughtered piecemeal, and (*b*) that the close escorts, when attacked, forgot their *rôle* and thought only of their own skins.

It is the writer's firm opinion that had these two factors been allowed for, and the Nazi suicidal type been utilised to the best advantage, the story might have had a very different ending.

As it is the German failure provides us with a very interesting fact.

If our squadrons, our individual pilots, forget their *rôle*, then the battle is lost. This fact has been proved time and time again in the fighting to date. The danger with all fighter pilots is to think of themselves solely as individuals. They are not. They can draw a correct comparison between themselves and Company Commanders. A battalion, holding a front or taking the offensive, must obviously rely upon each separate company carrying out its allotted *rôle*. If one fails, then the whole plan is jeopardised.

It cannot be too strongly emphasised that each individual pilot in a formation can desert his post just as easily as the infantryman who throws down his rifle and runs like hell. He cannot so easily be found out, but it is to be sincerely hoped that his conscience will trouble him for the rest of his days. His action may well have resulted in the loss of the bulk of his squadron.

A lot of ink and paper has been used in describing the earlier battles, and not much more can be used profitably in describing this—the greatest of all.

It is a curious fact that the principles of air fighting have changed very little since the last war. The speeds have increased, the manœuvrability of aeroplanes has decreased accordingly, and yet the fighter pilot's maxims remain the same.

The ideal fighter pilot must be, and will always remain, a peculiar individual. He must remain a soldier (in so far as he must trust his leader's judgment implicitly), and yet be an individualist. The final responsibility for his own skin rests upon himself, and yet, if he is a true soldier, he must be prepared to sacrifice it.

He may be decorated, but he should realise that this is an accident. Often his bravest deeds must remain unwitnessed and unrecognised.

He is not like a Nazi. He is a cold-blooded scientist : a killer because he has to be—not because he likes it. He should know, as well as we do, that upon his prowess, the future of the civilised world depends.

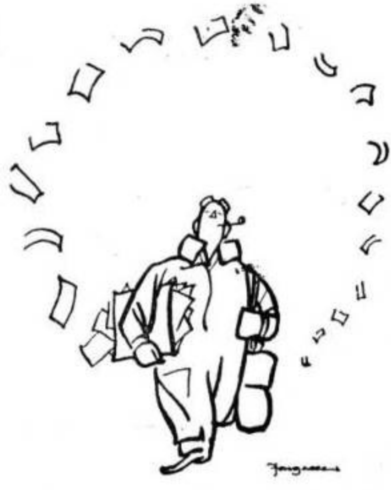
This copy belongs to :—

Sergeant Straddle says—
"Are you a regular reader?"

DISTRIBUTION OF TEE EMM TO O.T.U.'s.

IN view of certain anomalies existing at O.T.U.'s under the present scheme of distribution of TEE EMM as originally laid down, *i.e.* personal copies to all G.D. officers and instructors, O.T.U.'s will in future, starting with the June number, be issued with a fixed number of copies to be distributed as the Station Commander thinks best. (At stations where there are other units besides O.T.U.'s these units will continue to receive their issue of TEE EMM direct on the previous scale.) This change has been made at the instance of O.T.U.'s themselves. In general, it seemed to be agreed that more copies than the six originally laid down should go to the Sergeants' Messes, and that copies might with advantage also be provided to crew rooms. It was further suggested that the copies provided for the Officers' Messes should not be distributed *en bloc* on arrival, when they might all soon disappear, but at two periods during the month, to allow for courses coming in during this period. All such arrangements, however, are now in the hands of the Station Commanders, but it is hoped that any officer or instructor who wants to keep a *personal* copy should be encouraged to do so. Additional copies can always be asked for direct from us, but please say *why* they are wanted. Any surplus copies should be returned to A.P.F.S., 81 Fulham Road, S.W.

(1828.) 6030. Wt. 8145. 25M. 5/41. W.P. Ltd.



NOT to be taken into the air