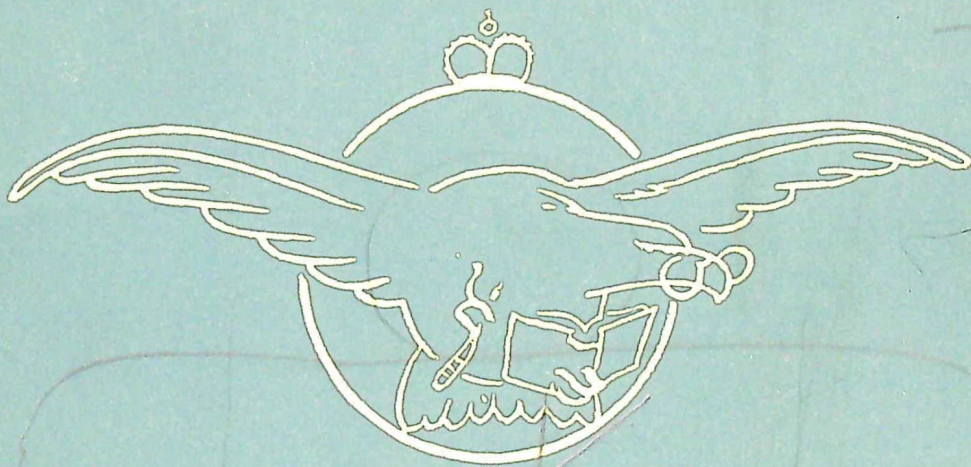


TEE EMM



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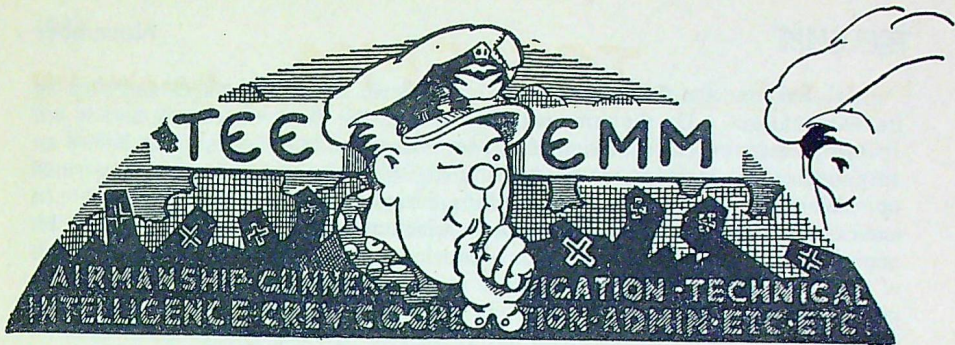
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*Pilot Officer Prune says—
" Take Tee Emm regularly!
Prevents that Thinking
feeling!*



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

ORGANISATION WITHOUT TEARS

II

TO decide what course to take! To be sure that the decision is the right one! To be able to solve the problem correctly! These are the aims and anxieties of all who have to do things. And it doesn't matter whether you are out to determine the one best way of attacking a 190, or of packing a fluorescent block, or of planning the layout of a satellite—there is one (and one only) way of arriving at the right decision.

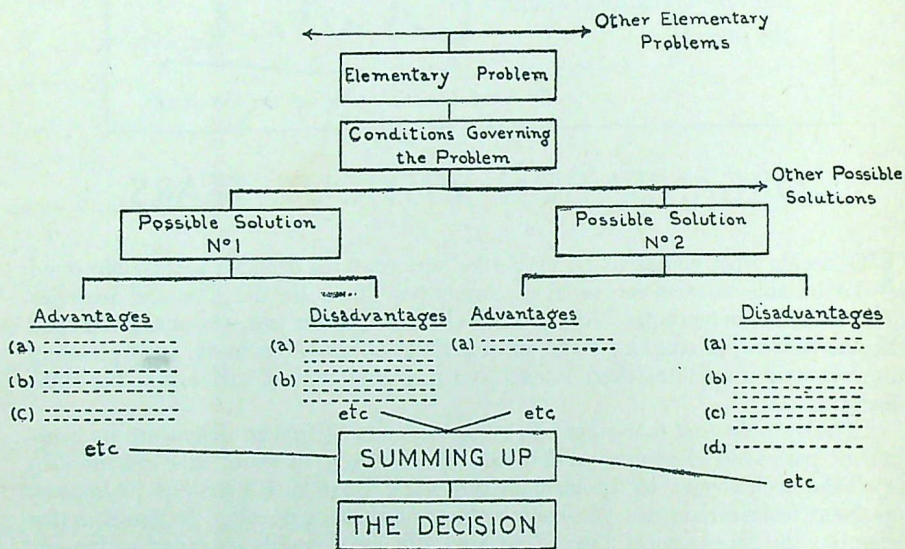
Here are the first four steps: (1) The job must be broken down into its component parts—the elementary problems. (We told you all about this last month.) (2) Take each elementary problem in turn—and make sure that it is *understood*. (3) Next make certain that you know all the conditions governing the problem (for example, the dimensions of a new First Aid outfit are obviously governed by the size of the most suitable container). (4) Then set down every possible solution. *This step is the vital one*, and this is where your resourcefulness and fertility of ideas comes in. Don't just think of the two or three obvious, orthodox solutions. Ask yourself if there isn't some new and better way of doing it. Very likely you'll find that there is.

Here are the next four steps:—

(5) Examine the first solution and write down all its advantages and then all its disadvantages. Do the same with the second, the third, the fourth, and so on. In many cases, experiments and tests may even have to be carried out before an advantage or disadvantage can be determined. (6) Sum up—just as a judge sums up. Weigh the relative advantages and disadvantages of each possible solution. In one case there may be many disadvantages which amount to little, and there may be one solitary advantage which amounts to much. (7) Make your decision as to which of the solutions is the best. (8) Tackle in similar fashion all the other elementary problems, the solutions of which will, all together, provide you with the solution of the main job.

If you have been fertile in devising solutions, and if you have been accurate and thorough in discovering the advantages and disadvantages correctly, then the solution you select—in (7) above, after summing-up—will be the best. But do realise (and it is a big “but”) that everything ultimately depends on your inventiveness, energy, and competence.

Some people like diagrams—so here are the steps in picture form :—



The vital point in the whole business is the “Possible Solutions.” Be original and think out new ways ; but at the same time, don’t overlook the old. Don’t be afraid of putting down crazy solutions for examination. Commonplaces of to-day were crazy a few years ago.

The next point is the *thoroughness* with which you go into the question of the

advantages and disadvantages. If you miss even one disadvantage, you may well—if it is a big one—arrive at the wrong (and fatal) conclusion.

If you were a student attending a course on Organisation you would at this point be asked to solve a number of contrasted problems in this fashion—in writing—just to prove that you had got the hang of it. But once you had got it, and shown that the whole thing had become a subconscious process in your mind, you wouldn't have to do it in writing—unless you were preparing a report and had to show your superiors just how you had reached your decision.

One word now to bring all the above into proper perspective. For if you are recalling the imaginary problem we gave you in the first article—moving a party of men to Exville next Thursday—you are probably saying, "If I have to go through all that rigmarole, the men won't get to Exville till Thursday fortnight." Well, there is, of course, the question of degree. Not even P.O. Prune, about to set off on a cross-country flight, would spend a couple of days in determining the one best way of sharpening the Navigator's pencil. On the other hand, a man employed on a job using thousands of pencils a year might think it well worth while to spend a couple of weeks on the problem. Similarly, while, as we showed you, there are very many elementary problems into which the Exville problem can be broken down, the most important thing is that it is *next* Thursday they have to move, *not* Thursday fortnight.

In other words, the importance of the problem must be mentally weighed—and don't forget that in war SPEED and URGENCY are of vital importance. If the technique we are describing seems slow and laborious, remember that we have only described it in detail in order to make it clear. In practice, it can often be carried out in split seconds.

For instance, even a simple daily problem like crossing Piccadilly could be broken down into different parts, each with elementary problems and possible solutions. Crossing here; or going on to the traffic light crossing; pausing at the island; passing in front of that 'bus; or behind that taxi; and so on. But you hardly work it out as laboriously in your mind, certainly not on paper. You do it subconsciously—and successfully, if you have any organising ability at all. (If you haven't, of course, you end up in St. George's Hospital).

But, no matter how trivial or



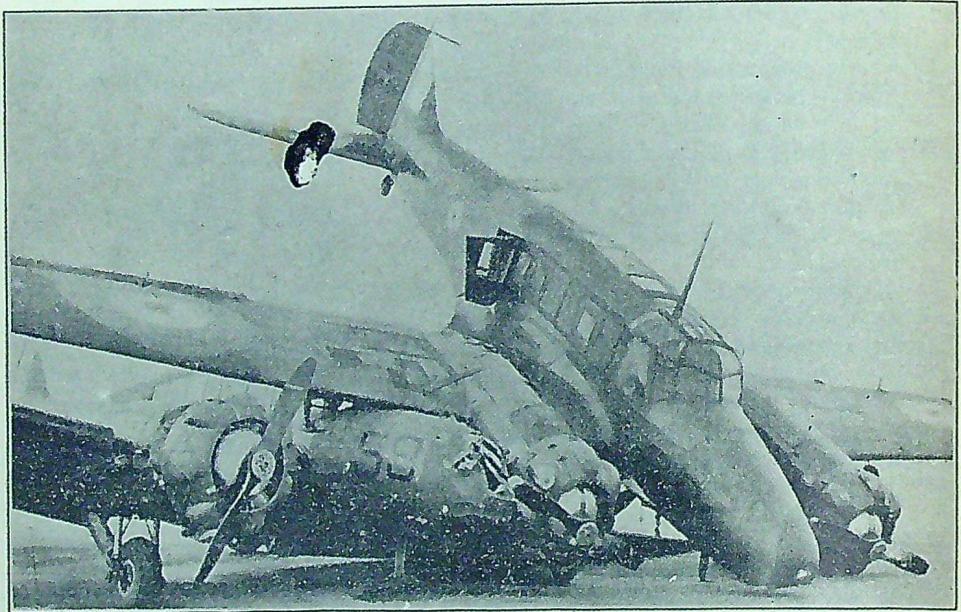
P.O. Prune is getting to know a little about organisation.

unimportant the problem may be, do reject any tendency to make a decision until you have rapidly considered the various ways in which it can be solved, and have equally rapidly considered the advantages and disadvantages of each. After all, everything must ultimately depend on the *right* decision. And the *right* decision is by no means always the *quick* decision.

“Too little and too late” has been said of several ventures in the past. But “too wrong” has rarely been said. That was because problems had been studied exhaustively before decisions were taken.

The signs of good organisation are speed, directness, and simplicity. Slowness and complexity are the signs of the amateur.

Is Your Accident Really Necessary?



How to waste man-hours—or
“Anson is as Anson does.”

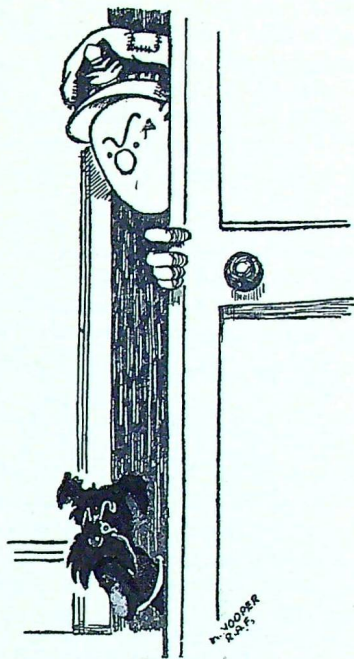
MORE ELUCIDATION FOR PRUNE

SOME months ago P.O. Prune came into our office. He was actually, as we related in TEE EMM (July, 1942) in search of information about Speed and Range of Aircraft—even though his pulse was normal and he seemed otherwise quite well. A Bomber Bloke happened to be in our office too and was able to give Prune the answers he wanted—though whether they really penetrated the Prune skull we don't know. Anyway, he turned up again yesterday, wanting this time to know something about Constant Speed Units. He brought his infernal dog "Binder" with him, too, who prowled round our office the whole time, apparently looking for something—which made us rather uneasy. (Luckily he never found it; our lights are hung from the ceiling.)

Now we know nothing about Constant Speed Units—even less than Prune, which takes some doing—but we got a Bloke from down the passage and let Prune get at him.

Prune began by saying he understood all that stuff about variable pitch being a kind of change speed gear. Just as you change down for hills in your car to let the engine rev. up and develop its power at low m.p.h., so you use fine pitch for climb and coarse pitch for levels. Yes, a very nice *theory*, continued Prune, BUT IT DID NOT WORK OUT LIKE THAT IN PRACTICE. He knew—and everyone knew who *knew* anything and didn't just *theorise*—that the lever should always be at FINE to get the best out of the kite.

The Bloke From Down The Passage began gently to explain the C.S.U. from



P.O. Prune in search of information.

the egg and was doing fairly well when Prune sought to floor him with "But my propeller quadrant is marked "FINE" at the forward end AND THE MAN WHO DESIGNED THE RUDDY THING OUGHT TO KNOW. The B.F.D.T.P. . . . perhaps we'd better call him fellow, not bloke. . . . The F.F.D.T.P. got his attention again with the word "over speeding," P.O. Prune being a bit sensitive on his past relations with traffic cops. He asked Prune why he thought his prop. never oversped in FINE pitch, and he said it did—well, sometimes. But, on

COURSE 70

further pressing, he admitted that for this to happen he had to get up a hell of a speed in a dive, and, as a matter of fact, even so it didn't happen on his present kite except sometimes when he was a bit quick opening the throttle. He agreed it was a little odd that it didn't, when he recalled how r.p.m. used to change with I.A.S. in the far away E.F.T.S. days.

Now Prune, of course, is a firm believer in Gremlins, but all the same it was hard work to get him to believe in C.S.U.'s changing the pitch up and down to give exactly the same r.p.m. at any old I.A.S. and he still wanted to know why the bloke that made and marked the thing didn't know what he was about. The F.F.D.T.P. said that some quadrants had HIGH R.P.M. and others INC. R.P.M. on them and Prune retorted why weren't things standardised and why weren't they right; and anyway he went on, flashing off on another track, when you're running up the engine where's your C.S.U. keeping the r.p.m. constant? This led the F.F.D.T.P. nicely on to FINE PITCH STOPS.

Well, it was a bit tough trying to get two ideas into Prune's head in one afternoon, but he seemed to bear no malice. And soon he got the idea all right that the C.S.U. couldn't work unless it got enough rope—at least we think he did—and that it had not enough pitch to play with on the ground because of the FINE PITCH STOP. From this it was quite an easy step for him to grasp why his earlier kites used to overspeed in the dive; the C.S.U. had not got enough

rope at the other end—couldn't coarsen the pitch enough because of a COARSE PITCH STOP that wasn't set coarse enough on that particular design of propeller.

P.O. Prune, by now was beginning to evince a definite interest in the nature and habits of C.S.U.'s. He admitted to having watched the governor of a steam engine wagging the throttle lever and agreed that the same sort of thing *might* look after the pitch of the propeller. But he couldn't understand when and how the C.S.U. got hold of the job, or how it changed the pitch while the pitch lever stayed put.

This gleam of Prune interest quite stirred the F.F.D.P.T. and he went on quickly. "The right name for it," he said, "is the *propeller speed control lever*. IT DOES NOT, REPEAT NOT, CHANGE THE PITCH, REPEAT PITCH. It's like the telegraph on the Captain's bridge that tells the engineer what speed is wanted. It sets the C.S.U. for the r.p.m. desired and the C.S.U. gets busy on the pitch-changing mechanism, sending the oil this way or that way according as the r.p.m. are too high or too low."

P.O. Prune said "Cor!" Then with the air of one who has crammed a week's brainwork into one half-hour he rose and left our office. Ten minutes later he returned to retrieve "Binder." "Binder" had gone to sleep in a corner during the last part of the discussion, and Prune seemed to think the dog had the right idea about it all.



A.S.R.S. SINGING

FOUR JOLLY BOMBER BOYS

(To be sung in a dinghy at night to the tune of "Four Jolly Sailor Boys")

WE'RE four jolly bomber boys
From over the sea.
It's one of our greatest joys
To bomb Germany.

We set out one winter night
All full of good cheer.
The stars were all twinkling bright ;
Not one thought of fear.

We got there and did our stuff ;
The bombs all went down.
The flak started getting rough
When over the town.

We jinked and we turned about
To make for our shore.
Although it was not a rout,
We wanted no more.

When over the stormy sea
Our port went U/S.
We did not screw down the key,
Nor send S.O.S.

We hit with a horrid crash ;
We were not prepared.
Engulfed with the mighty splash,
Boy ! were we not scared ?

By luck we got out all right
And boarded our " J."
We were in a sorry plight
Just praying for day.

We thought of what might have been
If we'd known our drill.
Our chances of being seen
Were just about nil.

We drifted for days and days,
And what was a rub
We'd climbed out in such a daze,
We'd not enough grub.

Just when we had lost all hope
A Hudson went by.
We eagerly waved a coat
And that caught his eye.

He'd read his A.M.C.O's.
He knew what to do.
And so here we briefly close
The tale of this crew.

Air/Sea Rescue boats came out
And found us quite fast.
We had not the strength to shout
" We've been saved at last."

Now don't let it be your turn
To have such a show.
You need not if you but learn
Our A.M.C.O.

If you've never heard of it
Then find it out sharp ;
Or you will be in the . . .
Or playing a harp.

It is worth reading A.M.C.O. A.25/42.





NO. 4. HELP THE COMPASS ADJUSTER!

You may remember that in Vol. 2, No. 2, for May last we had a short piece called "Can You Rely on Your Compass?" which emphasised the newly introduced trade of Compass Adjuster. Our Pointer this month comes from a genuine Compass Adjuster in good standing with his Union and The Bosses. He says: Compass adjusting has in the past been largely neglected. Crews have been using varied and inaccurate methods of swinging, and since it's considered a bit irksome it's generally been looked on as something only to be tackled on an occasional warm sunny afternoon. Inevitably there have been a growing number of instances of faulty and inaccurate navigation.

Now the whole thing has been revised and, as foreshadowed in TEE EMM some months ago, there are appearing in the squadrons people who have passed through a thorough training in magnetism, compasses, and compass swinging. *But* this compass adjuster needs a pilot and navigator to accompany him on all swings and it is the duty of the Navigation Officer or Flight Commander to see that he gets them. For if he isn't given them officially, it'll mean that a Compass Adjuster—even though he is trying to do the job regularly and methodically—will still be dependent upon the whims of crews. And we shan't be very much better off than before.

When engaged on a swing, crews should also show some interest and try to muster some enthusiasm. After all, it's being done for their benefit: it isn't a mere academic exercise. And it isn't the Compass Adjuster who's going perhaps to lose his way and disappear for ever in the drink. It's the people in the aircraft. So don't, like P.O. Prune, just sit back looking bored, with feet on instrument panel and control column flopped forward. It is essential that pilots hold the controls in flying position throughout the swing and get on courses within 2 or 3 degrees. Electrical circuits have to be switched off and on, on various headings; and crews can cooperate in this. Above all, when detailed to attend a swing don't come "pruning" up to the Compass Adjuster with an "I say, how long's this nonsense going to take? Rattle it through quickly will you? I've got a date!" It is a job which essentially cannot be hurried and snags may occur to make a normal swing even longer. But it is vital that compasses be swung accurately and regularly. The welfare of crew and aircraft depend on it.

A. M. P. G.

THIS stands for Are Many Pilots Good—at saving petrol? It also stands for Air Miles per Gallon, which of course is the secret of petrol saving.

Petrol at a refinery is dirt cheap, like coal at the pithead or ammunition at the factory. The money that is spent on an aeroplane or a gun makes the cost of its petrol or ammunition look very silly. And yet an army in the field has to consider its ammunition supply very seriously indeed, not because of its initial cost, but because of the labour and risk and additional cost of getting it up to the guns.

In the air, petrol is even more precious than ammunition at the front. It is not merely difficult and dangerous to get further supplies, it is just impossible. Hence the insistence in Pilot's Notes General on the methods of flying and engine handling which give you maximum a.m.p.g., and the inclusion in each individual Pilot's Notes of the recommended speed, and sometimes notes on the handling of the particular engine. We are not going to go over again all the stuff there. Instead, we have a few figures to give you and finally two suggestions to make.

The figures are to remind you how much petrol you can *waste* by mishandling your engine or by flying too fast. They are figures for one particular heavy bomber, but they are typical of aircraft in general. And they show you the varying amounts of extra petrol certain definite flying or handling errors will mean on a flight which could, if you made no errors at all, be done on just

one thousand gallons. In each case, we assume, you are only making the one mistake specified and not slipping in a few prunerics of your own.

1. Flying 20 m.p.h. too fast. 50 gallons extra.
2. Flying 40 m.p.h. too fast. 150 gallons extra.
3. Using highest permissible r.p.m. instead of lowest possible. 140 gallons extra.
4. Using S ratio instead of M ratio. 20 gallons extra.
5. Using S ratio and the highest permissible r.p.m. 185 gallons extra.
6. Using rich mixture 180 gallons extra.
7. Using rich mixture and the highest permissible r.p.m. 340 gallons extra.

Study the above for a moment and remember that all that petrol is petrol *wasted* over and above the necessary 1,000 gallons. And note that the last item shows the enormous amount you can dispose of (one gallon for every three really needed) if you think flying at the correct airspeed is *all* you have to do to get maximum a.m.p.g. It is far less wasteful to fly even 40 m.p.h. too fast in weak mixture than to fly at the right speed without bothering about correct engine handling. But the correct speed is quite fast enough for anyone, and so we would like to ask you if—you really wish to be

in on this petrol saving business—to fly at the correct speed *and* at the correct engine conditions.

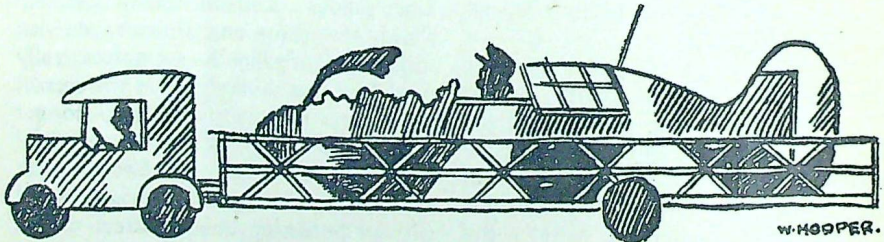
Now for our first suggestion. You will naturally fly for best a.m.p.g. on the outward journey; and on the homeward journey so long as you are not sure whether you can get home on the petrol you have got. What we would like you to do is to go on flying for best a.m.p.g. *even if* you have enough petrol to get home three or four times over. It is very tempting to increase power and speed towards the end of a long flight, so as to get at the bacon and eggs sooner. But then there will be less surplus petrol in your tanks, and surplus petrol is petrol saved. The more petrol there is in the tanks, the less is needed to fill up. And petrol on an aerodrome is not by any means as cheap as at a refinery; it has been brought thousands of miles by seamen in tankers, some of which get sunk. So the fewer the tankers you keep occupied the better for both the seamen and the rest of the R.A.F. (Let alone the fact that you thus may be instrumental in helping to get the public back on to a basic petrol ration !)

The second suggestion is that when, as sometimes happens even in war time, you are flying just to keep your hand in, or to get somewhere, you should be even more careful not to waste petrol. Remember that if you are not on operations you must have an excuse for flying at all. After all, there are trains; if you are given the petrol to fly, you ought to try and teach yourself something on the way. Have you practised flying at the lowish speeds which give the best a.m.p.g., or at the very low speeds which will give you the longest time in air? Do you know how low you can reduce the r.p.m. at various heights and still get your best a.m.p.g. speed?

These are the obvious things to practise. If you are a bomber pilot, you may know all about them already. In that case, what about some "engine failure" practice? Can you say that you really know all about the aeroplane until you have done many hours of this, and is there any reason why you should not practise it on your way from one place to another?

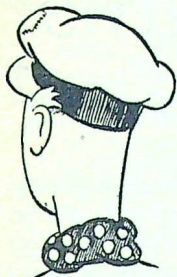
Watch that petrol!

Watch those Air Miles Per Gallon!



Prune is certainly saving petrol on this return journey.

EVEN FULLER MARKS



P.O. Prune washes his hands of the affair.

You may remember that in the June, 1942 TEE EMM we printed a little piece, called "Full Marks." The full marks were awarded to a certain Coastal Command pilot, who, wanting to land and finding he couldn't get his wheels down owing to a leak in the hydraulic system, poured two pints of coffee, which they had in the aircraft, into the emergency tanks and was able to pump enough pressure to bring the wheels down and get 30° of flaps.

Now of course it was lucky he had the coffee handy. The crew might have already have drunk it, and he'd have been in a bit of a predicament. Still, even so, the difficulty might have been overcome, and here is a story—also from a Coastal boy (operating from Gibraltar)—of a similar case in which, however, no coffee was available. Blushing slightly, we reprint the tale simply because some of you may not have known of it, heard of it, or thought of it and it may be of help if you are similarly situated.

"The Captain of the aircraft was unable to lower his undercarriage and flaps. This was noticed before return to base owing to the failure of the Gyro Pilot to work, and the loss of oil pressure. No pressure could be built up by the manual pump. The Captain investigated the trouble and found an oil leak on the floor. The measuring stick of the Servo oil sump read zero. He then ordered the crew to urinate in their thermos flasks, and these were poured into the Servo oil sump. Pressure at once built up with the use of the hand pump, to 90 lbs., and the undercarriage was successfully lowered and locked. No difficulty was experienced in carrying out the landing."

Well it seems to us that even fuller marks should be awarded to this Captain and crew who, having unfortunately already drunk their coffee, were yet able to produce the right answer, at the right time, in the right place, and so save a valuable aircraft from damage.

It almost proves that you *can* both have your cake and eat it! And it's certainly worth remembering as a tip in case you're up against the same trouble.

RT/DRILL

Cases still occur when someone leaves his R/T transmitter switched on, which means that during sweeps the aircraft of the wing are out of touch with each other due to the interference. A method of dealing with this has been evolved successfully in one of our wings. It is simple. Everyone violently rocks his wings, and this indicates to the culprit that something is wrong.

If the Wing Leader's R/T fails, it is suggested that he rocks his wings slowly and definitely and then pulls violently right away from the formation, when his No. 2 takes over.



TEE EMM'S Brains Trust

Tee Emm, as you know, is an official Air Ministry Publication. Everything in it appears with the approval of the Air Member for Training, representing official views or policy. We get, however, a certain amount of correspondence—criticisms or comments on articles, queries, suggestions and so on—which cannot be published as official, and though we always dig out the answer, when we can, it only affects the writer, while others, who haven't written us, might also like to know the answer.

Under the above title we are now printing some (but by no means all!) of this correspondence, and in our turn have tried to produce an answer, or answers, from the experts here. In accordance with Tee Emm's policy, we won't print names (and in accordance with the Editor's own policy, no payment will be made!).

LETTER. "SIR:—In your issue of July, 1942, you have an article asking for map-reading ideas. It inspires me to a few words. Although map-reading is the means whereby you may know exactly where you are, successful map-reading depends paradoxically on knowing where you are before you start to map read. Take the case of a pupil pilot going on a cross-country flight. It is essential to study the track before getting into the aeroplane. Make a mental note of all prominent landmarks not merely on the track but also on each side of it, in a belt 20 miles wide, with the track as the centre line. Study the belt carefully, particularly the 20-mile 'run in' to your destination or turning point. If you are flying a single-engined aircraft the flank landmarks are of more importance than the ones actually on your track, because you cannot see your track but you can see on each side of it.

"Just prior to taking off have another look at the map and pick out your first landmark, which should be not more than ten miles away. Note carefully the features surrounding it, for example—the bend the railway line makes before you get to the junction or something definite of that sort. Now fold your map, so that when you pick it up it will be open at the area you want to look at, and put it away. Take off, get over the top of the aerodrome on your course and then look ahead for your first landmark. As soon as you can see it clearly take your map out of your boot, or wherever you stowed it, and look for the next landmark, repeating the process you went through before you left the aerodrome. Having put the map away again and checked your course, with correction if necessary, look ahead again for that landmark. This method of looking at the landmark on the map first, memorising the details and then looking for similar features on the ground is infallible.

"P/O Prune, of course, doesn't do this. He flies along until he sees a large town and then searches all over his map for one that looks like it. While he is doing this he gets about 30° off his course without noticing it, and not finding any such town on one map he pulls out another and pores over that, by which time he is twenty or more miles off his track. Five

minutes later, naturally, he's lost. One word of warning, do not place too much importance on aerodromes as landmarks. Remember that for every aerodrome marked on your map there are four more on the ground in its vicinity which aren't on the map."

REPLY. We think this letter an extremely sensible one, and we take this excellent opportunity for enlarging upon our correspondent's ideas. At the same time, we should like to state that the section on Pilot-Navigation in A.P. 1234 is being completely rewritten, in order to cope with the latest gen.

As Tee Emm's correspondent suggests, the whole secret of successful map-reading is the adequate preparation on the ground beforehand. This must be our first principle and should be constantly adhered to. Our second is to estimate where we should be after given intervals of time. This can be achieved by first drawing in our proposed track, and then marking off our track in intervals of ten minutes. The third principle, and the last we shall lay down—knowing P/O Prune's mental capacity—is to know what to look for and to know what to expect. If these three simple rules are adhered to, our friends should find their maps an asset instead of a liability.

Now for the more pernicky details. These may naturally vary according to the type of aircraft and the extent of the flight. But the following points are considered least pernicky and most useful.

The pilot, or the navigator, if carried, will, of course, make out the flight plan on his log-sheet. This will tell him, amongst other things, what drift to expect. He will by now have learnt that it is advisable to consult the met. people before going flying. Perhaps in addition to receiving the common-or-garden dope, the met. folk will have thrown in a few additional tips for the same price. If the would-be map-reader notes any expected changes carefully, he will remember to expect certain errors on his forecasted flight plan. With such information in his head and his log-sheet and maps in his hand he sets off.

We will presume that he is an expert at flying his aircraft, so that no hints on cockpit drill are needed here. However, for the benefit both of pilots who navigate themselves and of those who carry proper navigators, we will stress once more the importance of maintaining a steady compass course and a constant prearranged airspeed, without which navigation means little.

In the course of the flight the log-sheet must be properly completed. No doubt this is a bind when flying over your local territory in good weather, but the time always comes when you need the information that you have omitted to fill in—E.T.A.'s are favourites.

If you are certain you are drifting off track, alter course to maintain track as quickly as possible. This will keep you parallel with your intended track, and probably within visibility distance of it. Check your pin-points systematically, taking every opportunity to make mental checks on your ground speed, and so correct your E.T.A.

On all occasions maintain a high standard of accuracy, both in your flying and in your time-keeping. With modern high-speed aircraft it is essential, elementary arithmetic will tell you that it never fails to pay.

“COASTAL COMMAND”

GO and see this film if you have the chance. It gives a grand cross-section of the work of Coastal Command from dreary stooging round a convoy to fighting off Ju 88's, from shadowing a raider to bombing U-boats. It is exceedingly well acted by an all-star Coastal cast and the photography is grand.

BOMBING ERRORS OR, CRIES OF NO, NO!

I



"Errors," says Sgt. Straddle, "I never make errors."

The idea of this article—and the two subsequent ones (we hope)—is to lay the "Bad Bombing Bogey" by the heels. This article is—or (again, we hope) these articles are—designed to help all concerned with the training of Bomb Aimers—even though Sgt. Straddle doesn't see how it affects him.

Now, Instructors, remember that your work is of first-class importance in helping pupils to get accurate results. Only if you give them all possible gen and personal help, will they eventually be able to drop their bombs on Jerry where it hurts him most. You must know everything about bombing and its analysis. Otherwise your pupils will have no confidence in your instruction, will consider the whole thing a bind, and will learn only slowly if at all—apart from probably giving you the bird. (These notes, by the way, augment A.P. 1243, Chap. 14, and Standard Notes B.5.)

First we come to the object of Grouping Exercises. These were introduced into bombing training so that human errors of sighting, sight-setting, etc., and mechanical defects such as bent height bars and faulty airspeed indicators, might be brought to light and systematically got rid of, until at last the Bomb Aimer is able to produce consistent Close Groups. These groups—if consistent and close—will show that pilots, equipment and pupils are all on the 'top line.' Those small remaining distances between the "point of impact" and the "mean point of impact" are not worth worrying about because they are caused by small haphazard errors over which the crew has no control.

To do this, sight-settings must remain unaltered from the first "Bomb Gone," and a consistent aim must be taken on the target during any one grouping exercise. If you do not keep strictly to these two principles the plotting office staff can't possibly analyse the results properly. Which means the mistakes made won't be found out—and rectified.

For, remember, on an operational sortie you rarely get the chance to drop more than one stick of bombs. It is the *first aim* that counts, and if the Bomb Aimer misreads his computer or forgets to level, or some other prunery, for that aim, then he might just as well have stayed at home.

Piloting errors, of course, can—and do—come into it. Pilots must be up to the mark at all times, and they must realise that their contribution to the success of

an exercise is as great as that of the Bomb Aimer. If they can't fly accurately they are about as much good, in the role of bombing pilots, as a rude noise in a bottle.

A pilot *must* be capable of keeping constant height, constant airspeed, and constant course during the run up to the target. He *must* immediately obey all steering corrections given by the Bomb Aimer. And he must ensure at the same time that he doesn't make violent turns, or flat turns, or let his aircraft swing to the right or left on completion of the correction.

It's interesting, by the way, to note that night-bombing results are usually more consistent than day ones; the pilot has to concentrate to a greater extent upon instrument flying.

Now, in order to keep a check on the capabilities of bombing pilots, a record should be kept for each individual pilot

of the results achieved on the exercises in which he took part. If any pilot gets a continual run of failures or bad exercises, he himself should be suspected as the cause of the failures, and his flying ability for bombing thoroughly tested by a flying instructor or skilled bombing pilot.

Bomb Aimers can help in checking pilots, and also in the general analysis, by noting the height and airspeed at the time of release of each bomb. As two Bomb Aimers are normally carried, this can be done by the one who is waiting his turn to bomb. And as soon as each bomb is released the pilot should give the heading of the aircraft to the Bomb Aimer who will then check it against the heading set on the bomb sight. You may easily catch an error or so here.

In our next issue (we hope) we will tackle the question of how to recognise the different types of groups and what causes them.

A NEW PUBLICATION



*P.O. Prune says
"I shoot 'em down
first and answer
questions afterwards."*

In aerial fighting there are three prime necessities—good flying, accurate shooting and the quick recognition of hostile from friendly aircraft. It would be easy to argue that of these the last is the most important. Good flying alone won't bring down the enemy; good shooting alone may quite easily (and sometimes does) bring down your friends. For either of these to be of full value you must therefore be able to tell friend from foe, and tell quickly. That is why the powers-that-be in the Royal Air Force are constantly insisting on the importance of Aircraft Recognition—and why they are constantly developing training in recognition.

All this is to lead up to the fact that we want to bring to your notice a recently issued pamphlet (A.M. No. 137) called *Hints on Teaching Aircraft Recognition*. The general idea of it, of course, you can guess from the title. Instructors who, now that the demand is so great, have to be made not born, will find it a great help to them in putting their stuff over in the best and easiest way. It has also the merit of being quite short—only seven pages with illustrations.

ARE YOU FLAPLESS WHILE OTHERS FLAP?



"I'm afraid the flaps wouldn't work, sir."

THIS is only one particular crash, but no doubt there have been many similar. It might be summed up as "There he was, no flaps at all, ten feet up, 150 on the clock, half-way along the runway . . . and *still* he landed."

It was, in fact, a Mustang. The pilot arrived over the aerodrome but couldn't lower his flaps. Maybe he was a bit hazy on stalling speeds, maybe he'd never tried it (or even thought of it), but anyway he approached at 150—overshot to glory, touched down well over half-way along the runway and went through a brick wall at no mean rate of knots. The pilot survived comfortably but the Mustang died a nasty death.

Now an analysis of a dozen or so Pilots' Notes for types varying from S.E. Trainers to four-engine Bombers gives stall with "wheels and flaps up" an average of 12 m.p.h. above stall with "wheels and flaps down." As this is only an average, obviously one cannot recommend just adding 12 m.p.h. for an approach without flaps, but the greatest difference in the stalling speeds mentioned was only 20 m.p.h. (Stirling, Typhoon), so it should not be necessary to come in *more* than 20 m.p.h. faster than usual whatever the type.

The stall "wheels down and flaps up" rarely varies more than a few m.p.h. from the stall "wheels and flaps up." So the soundest thing to do is to add the difference between the stalling speeds, explained in the previous paragraph, on to the normal powered approach speed as given in the Pilots' Notes for the type concerned. Better still, try it out in the air and convince yourself. Then when there's a nice strong wind blowing try it on the aerodrome—with *good* brakes. (P.O. Prune says he never stalls—unless he has to; he then murmurs something about "better stalled against than stalling!")

By the way, as the main object of this piece is to stop you coming in *too fast* we hope you already have the right ideas about such obvious points of airmanship as the longest run, low approach clear of obstacles and so on and are all set to go round again if you're not on the ground just inside the aerodrome edge, because there is naturally a tendency to run fast after the touch down.

As the approach tends to be flat with the nose high you may be surprised at the

comparatively low amount of power required. The nose up attitude makes things considerably more difficult for the single-engine dicers, but the answer to this seems to be to approach on a gentle turn, or even come in 20° offset from the proposed landing path and straighten onto it for the last 100'. A dummy run should help.

Again—try it!

* * *

Since writing this we have checked up on a Mustang and a Mosquito. 120 and 140 respectively seem quite pleasant and leave quite a bit in hand. In the near future we hope to let you have a list of recommended speeds for flapless approaches on various types.



LEARN MAP-READING BY THE PAINLESS METHOD



*No learning is
painless to Prune.*

Here's a new scheme for helping your map-reading. It's just been produced by the Air Ministry and is designed to inject a patient with the map-reading sense quite painlessly. In fact, a chap can help his map-reading no end, without realising he's made any effort at all.

It's in the form of a map-reading game—called "Pin point the Bomber"—and in it you have to overcome all the difficulties you normally meet on a cross-country trip (and some which we hope you won't encounter *too* often) before you reach the target and win the game.

Gambling is, of course, forbidden by K.R. and A.C.I.'s, otherwise we'd venture the suggestion that this seems to be a grand opportunity for the ace navigator who can't cope at pontoon, and wants to recoup his fallen fortunes.

"Pinpoint the Bomber" is now being issued to all Training Units and Squadrons so it's up to you to get hold of it and have a crack. It will make those waiting hours in the crew room pass very quickly. Unfortunately, because of war-time restrictions, no counters or dice are provided, but you can easily make a few coloured flags on pins to serve as counters, and as for dice, well, you can use the aces to sixes of a pack of playing cards.

We tried the game out ourselves with one of the Nav. people here. At our first triumphant pin-point a look of awe came over his face and he packed up his game like an Arab folding his tent and silently stole away. Seems he'd never met a chap before who could pin-point himself in Belgium while flying over Czecho-Slovakia!

LETTER TO AN AIR GUNNER

FROM ONE WHO HAS BEEN THERE

IV

DEAR SERGEANT BURSTE,

Last time I wrote I promised to take you on an imaginary operation. Well, here we go. You have been briefed—and I expect you heard a lot of stuff that you thought was all hot air. You wanted to have your supper and get on with the show. All the same, before I start I want to talk to you a moment about that very thing—hot air.

Your prime duty on a squadron is to win the confidence of the fellows with whom you fly. You can do this on the ground by keeping your guns and turret on the top line—for the other members of the crew know better than anybody else how much time you spend at the aircraft. But it is in the air that they will best appreciate—or not—your true qualities. If you want others to be glad to fly with you, you must behave toward them as you want them to behave toward you. So save the hot air for the cabin. *Don't* say anything over the intercom, that isn't absolutely necessary; it may interfere with something important. And if you have any information to give, say it as calmly as possible. You remember our old friend Sergeant Winde—and by the way do avoid imitating him in any respect whatsoever. He used on ops. to scream "Get weaving, skipper!" whenever a little flak came up behind. Lord, how they used to hate flying with him! I saw him the other day wearing the prune-coloured ribbon of the O.I.F., and very clever he thought himself, too. . . .



RAFF.

Avoid imitating Sgt. Winde in any way whatsoever!

To resume: The main thing on any operation is to put your captain first. He has a great deal to worry about, and *he* must bear the blame for anything that goes wrong with the trip. So don't distract him by telling him of things that he can see for himself, or that, if he did see them, wouldn't interest him. Don't report flak or searchlights that are twenty miles away.

Do, on the other hand, tell him about flak and searchlights that are meant for you. He can't see behind, and he wants to know what's going on in order to take

appropriate evasive action. So tell him exactly what it is and where it is—give him the course, the height and the position in relation to your aircraft. Something like “Heavy flak, same course and height, one hundred yards astern”; or “Searchlight flickering on our tail,” or whatever is necessary. And remember, there is nothing more likely to jeopardise your own safety than an excited yell.

Now, of course, you fired your guns at a firing point on the air test. But it is well to fire them again on the operation, immediately after you have crossed our coast—pointing them down, naturally. If the Captain doesn't tell you to do so, remind him. You need not be afraid of hitting ships or other aircraft or attracting the attention of hostile defences. There is plenty of sea between England and the enemy coast—in spite of the fact that Sergeant Winde always says he hasn't had time. (Probably he's hoping not to have to clean his guns next day.) When you do fire your guns it is a good thing to leave your microphone switched on. The rest of the crew may like to hear that all your guns are working; besides giving them confidence, they know you're awake and on the job.

But the most difficult part of your job, the most important, and the part that will be most appreciated, is keeping your eyes skinned for night fighters. By that I don't mean taking a casual glance out of the turret to see if the sky is clear-

that's Sergeant Winde's idea of a constant hawk-eyed look-out. I mean swinging your turret all the time you are over enemy territory and maintaining a systematic painstaking search over the entire field of vision. In some turrets you will almost have to stand up to see behind and below you. It is hard work, I know, but that is why you are in an air crew. Master Hun is always very sly and he will certainly try to surprise you. And if he does see you first, you and your aircraft are very probably finished. I have heard that the fighters of the *Luftwaffe* boast that they rarely experience return fire from those of our bombers that they shoot down. It *may* be only a boast—or it *may* be that the gunners of the shot-down aircraft weren't on the look-out. (Sergeant Winde, as you know, always gets his chocolate out the moment he's left the target). But remember that if you can give the Boche a burst before he has his sights on, quite probably he'll decide that there is no future in his immediate mission and go off to look for somebody else who is less vigilant. Only a small percentage of cases are reported in which the Hun persists in his attacks after he has been shot at from a turret.

But in my next letter I will talk about some of the things that you might do should you have the actual pleasure of affiliating with Master Hun.

Yours sincerely,

A. G. BARRELL-FFOULYNGE, F/Lt.



THIS MONTH'S PRUNERY



THE MOST HIGHLY DEROGATORY ORDER OF THE IRREMOVABLE FINGER (Patron: Pilot Officer Prune) is this month awarded to Sector Controller — for Supreme Sacrifice of R/T Security.

On the first day of "ACK" Squadron's adoption of the call-sign "BEER," he transmitted the following message: "Hullo BEER Red One, CHARLIE calling, are you ACK 34?" The call-sign had immediately to be altered.

The O.I.F. is also awarded to F/Lt. — for Conspicuous Sense of Direction.

Told to fly on a reciprocal course he rotated his verge ring 180° and then turned 360° to continue on the same course as before.

THEY'VE GOT SOMETHING THERE

THE following is extracted from a Monthly Summary of Events, issued by No. 92 Group. Referring to an original idea produced by the Group Armament Department, it goes on to say that this "has resulted in the birth of a Group 'Tee Emm' Book, which was demonstrated at the recent Gunnery Conference. The idea is that much valuable and interesting 'gen' appears month by month in TEE EMM, and it is rarely read again after the original digest, unless all Gunnery articles are cut out month by month and put into a 'Gunnery Tee Emm Book,' which might be kept in the Aircraft Recognition Room. Similarly, a 'Bombing Tee Emm Book' can be produced. It is therefore suggested that a potential Prune be selected at each O.T.U. to create, after much hard work with scissors and paste, a rival to the Group book. No prizes are offered as yet for the best effort, but the Group Bombing Leader has been appointed a suitable judge."

Well it's certainly an idea.

EXTRACTS FROM TEE EMM

THE Air Member for training wishes to point out that material from TEE EMM should not be republished in other Service publications without permission. This refers particularly to the illustrations. Several cases have occurred where illustrations have been taken from TEE EMM and not only used elsewhere but given different captions and often even cut about, added to, and altered by other artists. It is felt that this can be neither to the ultimate benefit of TEE EMM nor to that of the other publications concerned. If it is desired to publish illustrations and articles from TEE EMM, they should be reproduced in their original form and permission obtained first.

EQUIPMENT IS DULL

COMPARED with actual flying and fighting anything to do with mere equipment is dull. But you can't do without equipment. You've got to have aircraft if you want to get on with the war: and you've got to have equipment, stores, and spares of all kinds, if you want to have aircraft. Hence the importance of equipment and particularly the importance of looking after it and not wasting it in any way.

"The rapidly increasing production of aircraft calls for a corresponding increase in the availability of spares and ancillary equipment, both airborne and ground. To achieve this without prejudice to production, it is necessary to exercise the strictest economy in the use and holding of equipment and to eliminate any cause of delay in the disposal of surplus serviceable and repairable items, so that they may quickly become available for use elsewhere. . . ."

We must confess that the above paragraph of limpid prose is not TEE EMM's. It is the snappy opening to a two and a half page A.M.O. on "Economy in the Use of Equipment" and what it really means is, "the more aircraft you have, the more spares and equipment are needed; so treat what you've got carefully and don't hang on to any of it which you don't really want."

The A.M.O. concerned is A.932/41 and if you have anything to do with equipment it's worth re-reading it. For apart from the fact that the writer of the paragraph above has put it far more beautifully than we could ever hope to do, he's certainly got something there.

The raw material situation being what

it is to-day, there definitely is *not* equipment enough and to spare. Many of the most important operational items are, as dealers say, in short supply. That means that distribution of what we do get must be made as fairly as possible; and this isn't only up to those who distribute the stuff. It's up to everybody who asks for, and gets it. In other words, if you—whether armourer, fitter, aircrew, or Flight Equipment Assistant, are one of the people who wangle odd bits and pieces and put them by for a rainy day, just to be on the safe side, you aren't being clever: you are merely doing somebody else down. Somebody who is in the same Air Force as yourself. Somebody who perhaps really needs that bit or piece at once, not just for some possible future emergency. And they can't get it. So all the people concerned with bringing the raw material over, transporting it, making it into that item and sending it out to you—everyone from merchant seaman and factory hand, to lorry driver and store-keeper—have worked in vain; for the item isn't being used by anyone, and isn't even available to be used by anyone, except the hoarder who may not even need it after all. It is lying idle.

The moral of that is, send everything not needed back to store. The Equipment Officer knows the rate of consumption and keeps the stocks his people need; and he in turn sends *his* surplus back to the Maintenance Unit where it is available for an even greater number of people, some of whom may actually be crying out for it at that very moment.

Again, we need hardly point out—but

we do because that is what we're being hired to write about—that you must *look after* equipment and not ill-treat it. We don't imagine anyone in his senses would chuck a compass or bomb-sight around like a cricket ball; but there is a tendency to lose all sense of responsibility towards equipment in your care which is not being used at the moment. All instruments and other delicate doo-dinkuses, for instance, should be kept in their special boxes and containers—see A.M.O. A.416/42—and these in turn kept in a place where they can't be themselves knocked about. And the other, not so delicate, stuff which doesn't want a private box should always be kept clean and dry and tidy.

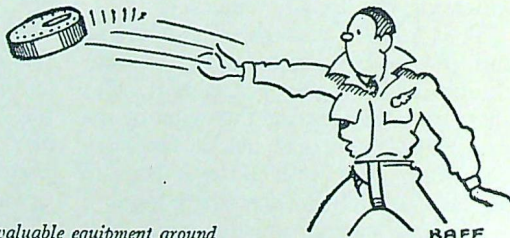
Because a piece of mechanism gets broken don't fall into the error of thinking it's completely u/s. The broken part must be repaired but the rest of it may be quite good and, though the whole thing is temporarily out of action, the unbroken parts are just as valuable as ever they were. Damage from Hun attention can't be helped, further damage from your lack of attention can. So send it back in as good shape as possible and as complete as possible, so that it can be tested as soon as the new part is fitted. And if any part of it is missing make it clear, when sending back, whether you

have or haven't got a spare of the missing part.

Sometimes an order is put forward and afterwards found to be unnecessary. It should then immediately be cancelled, otherwise all sorts of people from packers to railway officials and van drivers will have had a lot of work for nothing, while some unfortunate unit wants the very things you now find you don't want. It is not good enough for you to say to the Equipment Officer "this is the scale officially laid down for us." These scales are only a guide. Actual needs will vary from unit to unit and with a little trouble taken in pooling equipment, you can make a large reduction in the quantity held.

Summing this up, a large part of our national man-power is at work producing new equipment: therefore every bit of avoidable damage done to equipment whether an airborne compass or a grounded mess-room chair means more man-power to repair it. Every bit of equipment unnecessarily hoarded and kept in reserve or not used to the full, or not maintained in good condition means more man-power to replace it. And that is not very far from helping the enemy.

Equipment may be dull, but it is vital.



Don't chuck valuable equipment around

RAFF

LEARN FROM THE OTHER FELLOW'S MISTAKES



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

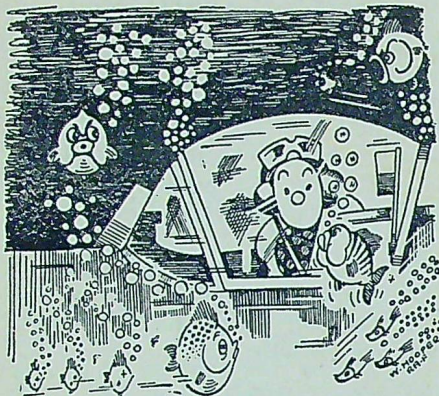
A report reads as follows:—

"When close to the French coast, Blue Section were detailed to investigate an aircraft flying west to east at 300 feet. Blue 1 made a port quarter attack, diving on the aircraft which made a steep turn to port. From the plan view, Blue 1 identified it as a Ju. 68 and fired one burst ahead of the aircraft. As the aircraft straightened out, Blue 1 saw roundels, and on following it down to sea level and approaching very close, identified it this time as a Beaufighter with day camouflage. No lettering was visible to our pilot. Blue 2 followed in and gave two bursts which fell behind, and is not sure of the identity of the aircraft. The aircraft made off at high speed in a northerly direction." And no wonder—after having been mistaken for a Hun. On the other hand his own identification didn't seem so hot after all for we read in another report that a Beaufighter stated on landing safely that he was attacked by two Me.109s but beat them off! Same day, too! In fact, the pilots concerned seemed quite able to carry on the war without an enemy at all!

". . . they saw a Ju.88 500 feet below and half mile ahead. The squadron dived on to the tail of the E/A in line astern formation, all twelve aircraft firing. The E/A took no evasive action except to increase speed and was shot down into the sea. One pilot, after attacking the Ju.88, sighted two Me.109s climbing up to attack from 3,000 feet below. He gave chase, but the E/A dived away." Before going down to attack the odd Hun below, never forget to order a top cover. You may well be falling into a trap designed especially for the unwary. Here is a case in which no top cover was detailed and the whole squadron went down to attack one Ju.88. Good shooting practice maybe, but it is most fortunate that the Me.109s were not sitting above.



KEEP ABOVE YOUR CONVOY—NOT UNDERNEATH IT!



Something wrong, thinks P.O. Prune.

Some pilots engaged on convoy duty seem to imagine that it's a good idea to perform low aerobatics all round the ships. Quite why they do this we don't know but we do know (from the Captain of one of the ships) that his crew and gunners who were all keyed up for enemy attacks and didn't want to take any risks, very nearly loosed off at an aircraft which insisted on doing this.

Besides, low aerobatics over the sea are not a particularly safe form of amusement. Only the other day an escorting aircraft when turning low struck the water with a wing tip and so, instead of continuing the turn, went straight on to the bottom of the sea. Thus not only

was Davy Jones plus one perfectly good aircraft and crew, which he didn't really want, but the convoy was from then on minus its protection—which it did want. Not very helpful!

PILOT'S NOTES AMENDMENTS

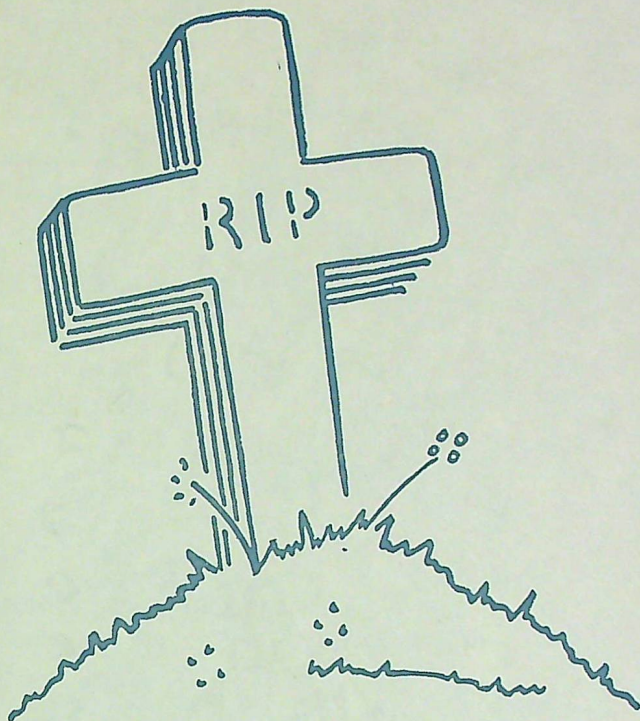
HERE is the latest list of important amendments. The full list (as we have said before) you will find monthly in A.M.O.'s N Series.

<i>Pilot's Notes General</i>	A.P.2095/6.	A revised sheet giving new instructions for the use of Inertia and Direct Cranking Starters.
	A.P.2095/10.	A revised note on "Ditching."
<i>Kingfisher I</i>	A.P.2339A.	Pilot's Notes issued.
<i>Boston III</i>	A.L.4/c	Revised engine limitations and fuel consumptions.
<i>Havoc II</i>	5/c	Advice on range flying, etc.
<i>Catalina I & II</i>	6/F	Amended to cover Mk. I.B.
<i>Liberator II</i>	1	Auxiliary fuel tank operation.
<i>Martlett II & III (2nd Ed.)</i>	1	Revised engine limitations.
<i>Maryland I & II.</i>	4	Revised engine limitations.
<i>Mustang I</i>	1/A	Revised Sections 1 and 2.
<i>Whitley V</i>	29/G	Amended to cover Mk. VII.
	30/H	

(The Editor would welcome any indication as to whether these brief monthly lists of recent important amendments are of value to you. If so, we'll continue to print them: otherwise, we can always use the space for something else.)

IT CAN BE DONE!

A pilot recently, flying a Halifax, met severe icing conditions at 12,000 feet. The aircraft got out of control and into a spin. Some people might think that a heavy four-breasted job in a spin was Goodbye To All That. The pilot, however, though baling his crew out at 9,000, stuck to it and managed to bring her out of the spin at 1,000 feet—and quite low enough in our opinion! A nice job of work.



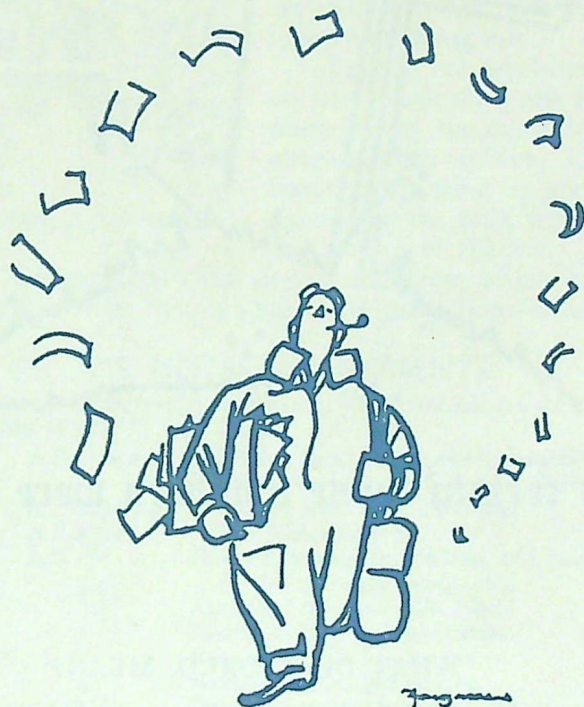
“He was certain those bombers were unescorted”

WHAT DOES O.U.O. MEAN?

It means for “Official Use Only.” TEE EMM is an O.U.O. publication. This— if you follow our reasoning—means TEE EMM 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 *not* for civilians, or people who feel they'd like to see it because they've heard it's interesting, or because they have a boy who's thinking of going into the Air Force but isn't in it yet, or whose friend is in the writing business and would love to have a look at a copy, or, etc., etc. It is a Service Training Memorandum written *for* the Service and issued *by* the Service in the person of the Air Member for Training.

Pilot Officer Tommy Marshall
Krisjanson

1104.77.7



NOT to be taken into the air