EIGHTH ARMY PAMPHLET

on

THE USE OF ARTILLERY

1943

Headquarters,
Royal Artillery,
Eighth Army,

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INTRODUCTION

1. The object of this pamphlet is to put down in plain language what actually happens in war. It is interesting to know that theory and text books have usually proved right.

These facts have disclosed themselves at various times during the last fifteen months fighting under the command of General MONTGOMERY. During this period various corps and divisions have composed the army and we have been able to draw on the experiences of the divisions of the late First Army from TUNISIA as well as those of the Desert Army.

The pamphlet is in no way comprehensive and every endeavour has been made to avoid stating the obvious.

COMMAND

2. No commander should deal directly with more than one gunner and a higher commander should make it clear to his artillery adviser that he is equally concerned with all types of artillery - field, medium, heavy, anti-aircraft and coast defence. To-day all artillery brigadiers in the field army must understand thoroughly the training and employment of anti-aircraft artillery. The B.R.A. of an army can best exercise this command by treating his anti-aircraft brigadiers just as C.R.A. of a division; it is for him to give orders as to policy, organisation and areas of responsibility, leaving the anti-aircraft brigadiers to carry out the detail. In the case of anti-aircraft in support of an army, and coast defence, the B.R.A. is a commander in the true sense of the word.

ORGANISATION

3. Continuity of doctrine and training are important and for this reason the permanent Order of Battle of regiments under command of Cs.R.A., Cs.A.G.R.A., or anti-aircraft brigadiers should not be changed unnecessarily. It stands to reason that, both from the personal side and from the technical side, better results must be obtained if this policy is adhered to. Only too often do we come across wandering regiments who have been nobody's children for ages, and from the personal side that unhelpful expression of opinion: "I do not know this officer," is bound to recur.

4. It has been found best to give one anti-aircraft brigade the task of covering the R.A.F. units immediately supporting the Army, while another brigade covers ports and rear areas. This ensures good liaison with the Navy, with the Air Force and with the L. of C commanders.

5. "The attack will be supported by the Corps Artillery under command of the C.C.R.A."

There are probably some doubts as to exactly how this works out and how far the C.C.R.A. butts in on the divisional commanders.

It makes no difference whether the attack is being carried out by a battalion, a brigade or by more than one brigade; the procedure for gunners is the same and the action by the C.C.R.A. is as follows:-

Find out the outline plan and discuss it with the Corps Commander, and get his approval for the distribution of artillery resources and for the general outline artillery plan. The detailed plan must, of course, be made by the C.R.A. of the attacking division and he must know on how much artillery he can depend before making it.

The C.C.R.A. must take charge at the earliest moment, since initial mistakes are difficult to overcome later. He calls an early conference of Cs.R.A. and C.A.G.R.A., at which he gives out:-

Distribution of artillery and command.
Division and A.G.R.A. gun areas.
Orders for moving in - this involves traffic control and must be settled with Corps Q.
Orders for dumping - also with Corps Q.
C.B. policy.

He must then keep touch with the C.R.A. of the attacking division, give him all the help he can, and watch the formation of the fire plan. It should be his aim to take as much work off this C.R.A. as possible. He does not interfere unless he does not approve, in which case he should first argue the matter out with the Divisional Commander, enlisting the help of the Corps Commander if necessary. The

Corps Commander must be able to rely on his C.C.R.A. to ensure that the best possible artillery plan is produced. Meanwhile, the C.C.R.A. personally works out the C.B. plan with C.A.G.R.A., who controls C.B.O.

It follows that, in order to carry out this rather tricky task, the C.C.R.A. must be persona grata at Divisional Headquarters - trusted, even if he is not liked. He must try to be an ambassador.

The following tips are worthy of note:-

(i) Don't overload the C.R.A. Keep A.Gs.R.A. under your own orders and in support. In case of naval support, this certainly should be arranged by the C.C.R.A.

(ii) Ensure 100% efficient line communication to C.A.G.R.A. and Gs.R.A. at the commencement of the battle, with wireless as an alternative.

(iii) If C.C.R.A's wireless link is really to work, it must be in constant practice while the battle is not on. so that everyone gets used to it.

(iv) Don't hesitate to interfere if you think all is not well. No divisional commander objects to anyone trying to help him, and you may be able to save lives.

(v) Always include principal R.A. staff officers at your conferences (B.Ms. and G.S.Os. II).

6. General

Promiscuous concentrations at suspected areas chosen either on the ground or from a map will seldom achieve any results; these used to be classified, rightly, as "ploughing the desert". Information of the enemy can chiefly be obtained by observation, patrolling and air photographs, and these sources must be tapped to their full.

There are three principles to observe in making out fire plans:-

(a) Always aim at the enemy if you know where he is, either by registered or predicted fire. If known enemy posts are contained within an area selected by a commander for concentration, these posts must be engaged.

(b) If, as is usual, information is vague, the gunner must make it quite clear to the infantry or tank commander that he can only neutralise and not destroy.

(c) A position neutralised by fire must be entered as soon as that fire lifts and the timing of concentrations must be just as accurate as that of a barrage.

7. In this army, many barrages and concentrations have been fired during the last fifteen months and the number of dead bodies resulting from them has been very disappointing. Slit trenches give great protection against percussion H.E., and we have not yet had enough time fuzes to mix them up with percussion.

8. Rates of Fire.

No detachment can keep up a higher rate of fire than 2 rpg pm over a long period at night, and even by day it is doubtful. There is a strong reason why the normal rate of fire for field artillery should be 2 rpg pm instead of 3. In all natures of artillery it pays you to rest one gun per troop periodically, giving opportunity for a detachment to have a "Stand Easy" and for proper gun maintenance to be carried out. This really means that only three guns per troop should be counted upon in calculating density of shells in the arrival area.

9. Barrages.

If there is any doubt about the start line, the opening line of a barrage should be fired for at least five minutes, so that the infantry can form up behind it. This is particularly important at night and, in fact, a barrage at night is the best means of maintaining the direction of an attack. A barrage can be either tight or indicator, the tight barrage being normal and the kind of barrage which is laid down in training manuals. The indicator barrage can be fired in front of a purely tank attack, a few guns on a wide front designed to maintain the direction of the attack and to create some sort of smoke screen in front of the attack. It was used in the opening stages of the Battle of EL HAMMA in desert country with the sun behind.

Divide your barrage tables into serials so that whenever necessary part or all can be repeated. The gunner is quite wrong if he states that he cannot do this. When unexpected minefields are met the barrage will run away and be useless.

When re-starting a barrage at a certain line it is essential to keep up a very slow rate on that line

[redacted]ring the pause to prevent infantry or tanks from str[redacted]ng beyond it and thus getting caught in their own fire.

10. Stonks and Murders.

The drill for these must be first class and all R.A. Commanders must appreciate their proper use.

By putting the axis at 90° to the line of a straight road harassing fire can be easily and accurately placed.

11. Night Attacks.

In order to maintain direction of the infantry or tanks in a night attack, directional fire from Bofors is most useful. So that the enemy may not know exactly where the attack is coming, it will be advisable to fire other Bofors in other places as well. During the crossing of the Army from SICILY to ITALY, direction of the landing craft was assisted by Bofors, anti-tank guns, 25-prs firing smoke and tracer A tk shell, and vertical beams from searchlights. 12 sec tracer ammunition is particularly useful.

12. It has been conclusively proved that minefields cannot be destroyed by gunfire and that, in fact, gunfire tends to make the mines more sensitive than before, and certainly more difficult for the mine detectors to find.

WEAPONS

13. Field.

The 25-pr is entirely satisfactory as a gun. The fact that we had no proper British S.P. gun led to the introduction of the American 105mm, which is very popular. Its popularity lies more with the shell than

with the gun, and the shell again depends on the fuze. The American M 48 and M 54 fuzes are a good deal better than anything we have got for field guns and the shell gives a magnificent air burst with accuracy. It should be noted that the authorities at home are now busy producing a time fuze for the 25-pr., but we have not as yet had the opportunity of trying it out properly. The Germans make great use of the 88 mm and it is heartily disliked by all who meet it, be they in an armoured vehicle or walking along a road by themselves. This is due almost entirely to the fact that it can produce an unheralded explosion just over your head. The high velocity shell is a match-winner and, if it is burst at a suitable height, devastating. For this reason the 3.7 anti-aircraft gun is often quoted as the future all-purpose gun. There is no intention of entering into this argument here, but it is obviously desirable to make the best use of such guns as we have, and training should be devoted to the efficient use of this excellent gun, its primary use still being for anti-aircraft.

14. Mediums.

The new organisation of medium regiments will make it possible to affiliate medium regiments to divisions, so that when the battle is fluid they can form part of the division. This is particularly necessary in an armoured division, when the O.P. officers must understand an armoured battle and accustom themselves to observing from a tank. Immediately the battle shows signs of becoming static, it pays every time to hook the mediums up under C.R.A.G.R.A., who has probably been moving along behind with a small group of reinforcing artillery. By this means heavy concentrations can be ensured and we have proved time and again that these heavy concentrations are the best means of subduing the enemy artillery and other troops.

The medium gun is just as mobile as any field gun, owing to the good performance of the matador.

We have in this army favoured the 4.5" gun over the 5.5", despite its smaller shell. Quite apart from its extra range, it is important that all officers should appreciate the value of the high velocity shell and the 4.5" gives no warning of arrival up to 9,600 yards; an astonishing proportion of medium shells, calculated over a period of a year, have been 4.5", working with an equal number of 4.5" and 5.5", and this proportion has sometimes been as much as 4 to 1. This gives an indication, if not proof, that the 4.5" is more useful than the 5.5". Whether the increased range we are promised for the 5.5" will restore the situation or not remains to be seen, but until this shell is in production the 4.5" must remain.

15. Anti-tank.

We are convinced that the 17-pr is an excellent gun and that its sights should give us its full potential. This means the addition of a sight clinometer at least.

Sniping with Anti-tank H.E. has become popular and, as well as annoying the enemy, gives the Anti-tank gunners more to live for.

16. Heavy Anti-aircraft.

Mention has already been made of the power of the 3.7 heavy anti-aircraft gun, but its full power cannot be developed until a suitable fuze is designed. The bulk of fuzes we have used has been the 199 and this only gives us a ground range air burst of 9,200; even the 207 and 208 cannot go further than 16,300. This may be enough for anti-aircraft, but it is certainly not enough for a field role, and the defect should be rectified.

The use of the 3.7 in a field role is perfectly

easy for any trained battery, but it is important to remember that a regiment is not capable of turning itself into a field regiment, owing to lack of signal and other facilities. We have decided that a troop is the largest unit which should be used for this purpose and very little extra gear is needed.

PHOTOGRAPHY

17. Photography is an essential part of a modern battle and is of supreme importance to the artillery. Information must be of the very latest and for that reason it is usually necessary to keep a C.B.O. interpreter at the airfield to sift out the information as soon as the photographs are developed. Sometimes when the squadron is a long way away, and no wireless is really 100%, it is better to drop the photos at the C.B.O. for interpretation there, but this is abnormal. Use of an Air O.P. aircraft for this purpose is necessary and justified.

For a night or dawn attack it should always be the aim to get photographic information the day before. This need not delay the issue of orders, since the information can be sent out later in the form of additional or altered targets.

Morton obliques have been used whenever the battle slows down and becomes static. They are not much liked by the R.A.F. but are particularly useful for Air O.P. pilots.

SURVEY

18. Survey has become quite automatic and it can be fairly stated that there is no doubt in the mind of any commander on the value of survey. We have employed composite batteries (known in the First Army as DOGs) and are quite convinced that this is the best organisation; batteries are normally attached to the

same divisions and liaison is now first class.

R.H.Q. of the regiment is normally alongside H.Q. A.G.R.A. since, when the battle becomes static, C.A.G.R.A., Survey Comd. and C.B.O. must work very closely together.

Radio link has proved its worth.

C.B.O.

19. Although it appears that there is little that the C.B.O. can do when the battle is moving, we have no doubts that a C.B.O. detachment should always move well forward and be thoroughly in touch with the situation. There is no knowing when the battle will slow down and it is then that counter battery is very badly needed. Hostile battery reports keep on coming in and, unless there is a C.B.O. organisation to receive them, no one takes the slightest notice.

ARTY/R

20. We have had the luck to work with the same squadron, and many of the same pilots, for many months and they are all unanimous in begging us not to alter anything or make anything more difficult. All they really want to know is the position and description of the target. The position of the troop must be known to them already, action having been taken to ensure this. The "agreed point" is not a procedure, but merely a method of describing where the first round is to fall, i.e. it appears in the demand for Arty/R instead of the map reference of the target.

AIR OPs.

21. The value of the Air O.P. has been great and cannot really be appreciated until after use. One squadron can well carry out anything required in a Corps of two divisions and it is thought that, if any more squadrons

are produced, they will automatically be used for intercommunication. During the advance through the Toe of ITALY, when communications were extremely bad, most of the squadron was used for maintaining touch from front to rear, which at the time was the best use to which it could be put. As gunners, therefore, we do not want to be too narrow minded about the Air O.P.

22. The Air O.P. can be of assistance to the Chief Engineer, apart from all the R.A. duties. It may be the only available means to recce demolitions. This is a legitimate misuse.

23 Information from prisoners shows that there is no fire and no movement while the Air O.P. is up.

NAVAL FIRE

24. Bombardment liaison officers always get to know their ships, because they live in them. That is not the case with F.O.Os. unless action is taken to make it so; and it is important that this should be done. A signal exercise or two with bombardment ships is essential before any operation.

It should be remembered that ships carrying out a bombardment cruise about for quite a long time under threat of air and submarine attack, and every possible step, therefore, should be taken to avoid any mishap in observation or communications.

25 The Naval F.O.O. needs to be mobile on shore, just the same as any other F.O.O. We give every F.O.O. a white scout car with a No. 19 set for his own. Since this has been done, observation has been on a satisfactory basis. It is quite useless to rely on units to supply this vehicle - they don't.

The Naval F.O.O. job itself falls into two distinct parts - first, the support of the landing,

and second, any support possible either inland or along the coast. For the first, he should be landed on foot, but his O.P. vehicle should be landed as soon as possible behind him to enable him to carry out the second.

26. We did not get much good out of L.C.Gs. and it is considered that this is a waste of a good landing craft. The L.C.Rs. seem excellent, but they should be in large numbers, so that the beaches can be really neutralised up till the last possible moment.

27. There is a tendency on the part of R.A. commanders ashore to issue a large list of target code names and target numbers. Action must be taken by the highest R.A. authority to limit the lists given to ships to only those targets which are likely to be essential.

S.P.

28. We are still learning more and more every day, but apart from the obvious lessons which have already been advertised, there are three which are interesting and important:-

(i) If S.P. is used in support of infantry, it is probable that it will be in the forefront of the battle all day; special measures must be taken to see that the unit gets the night free for maintenance and rest.

(ii) The American M 10 S.P. anti-tank gun is being used by them for sniping. The German use of S.P. artillery during their recent withdrawals has been excellent and it is most disconcerting and difficult to deal with.

(iii) The S.P. anti-tank gun is NOT a tank, its tactical use being quite different.

DEPLOYMENT

29. Certain changes in the ordinary rules for deployment were forced on us by the bad road communications in SICILY and the toe of ITALY, the most important being that no forward R.V. was ever possible. Seconds in command moved forward close behind the leading troops in order to recce respective gun areas as early as possible. As soon as regiments were to move forward, seconds in command ordered working parties with the recce groups to prepare positions for occupation, so that the guns when they arrived could go straight in without waiting on the road. It was probable that the guns went forward alone, being followed later by ammunition echelon and other vehicles.

SMALL ARMS TRAINING

30. In the type of battle we have been fighting, stray gunner parties often found themselves much nearer to the enemy than they previously suspected, and were compelled to defend themselves with their personal weapons.

ARMOURED O.P. VEHICLES.

31. It is very difficult to get any agreement amongst gunners as to what type of armoured O.P. vehicle is the best and the answer is that there is no one vehicle that can compete with every situation. A tank O.P. may sound attractive, but it is quite out of place in an infantry division. A good tracked O.P. is the most popular, but we have not got one, and we really live a hand to mouth existence now, using such armoured cars and carriers as are available. The chief objection to the carrier is that it is very bad on mines, whereas in an armoured O.P. the O.P. officer can often get away with it. There are other objections, which O.P. officers know only too well.

We have decided, therefore, in this Army, that

since an O.P. supporting an armoured attack must be in a tank, each armoured regiment shall keep an artillery tank immediately available for a gunner officer. This gets over all difficulties of maintenance, recovery and replacement. In armoured divisions only gunner regiments have tank O.Ps. according to ordinary W.E.

It must, however, always be remembered that universal satisfaction is never reached on this subject and that the artillery commander responsible for policy must ride rough shod over objections from the minority.

OFFICERS

32. Despite our declared Regimental policy, the tendency abroad is for a split to appear between anti-aircraft and the rest of the regiment. Coast Defence now absorbs few officers, and in mobile operations, such as the advance from ALAMEIN to TUNIS, coast defence was mostly undertaken by anti-aircraft units; but in anti-aircraft there are many officers who have been in the same unit for years, and the regulars amongst them must have the feeling that they are stuck. Promotion is slow and there is little military training beyond pure anti-aircraft.

Apart from the personal side, there is the bigger picture of the command of the artillery of a formation which must be exercised by one man. It is essential that we should educate our future senior officer to handle all types of artillery in the field.

Ignorance has led to the installation of separate anti-aircraft commanders and staff officers, and this ignorance must be removed. The simplest way to do this is to insist on free and frequent interchange of officers early in their service and, later on, to ensure that future stars are given the opportunity to shine properly. Our aim should be that all Cs.R.A. and those in the running should be able to give intelligent orders to anti-aircraft formations and units.

REINFORCEMENTS

33. It is important that the whole system of R.A. reinforcements should be closely supervised by the B.R.A. A forward pool at army roadhead transit camp is formed from the C.R.U. and postings are made to regiments from this pool on the B.R.A's orders.

It is always our intention to return officers and men to their own regiment.

We maintain an Eighth Army R.A. training team at the Army reinforcement camp which keeps the officers and men occupied and is very useful indeed.

GUNNERY AND EQUIPMENT

34. Rate of Fire.

As already stated, the highest rate of fire that can be maintained by field guns at night is 2 rpg, and any increase in this leads to faulty laying. It is open to question, therefore, whether the normal rate should not be decreased from 3 to 2.

35. Prematures.

We have had a good many prematures one way and another and a great many of them can be attributed to leaving a shell in a hot gun during a gap or pause in a time programme. Therefore, if you are going to have a gap or pause, always empty guns.

36. Shock Absorber.

A spent cartridge case is a useful shock absorber to prevent the platform buckling. It should be cut so that it fits over the central pivot of the platform with protuding teeth engaging between the spokes, and placed so that when the cartridge case is in position the base has the axle of the gun resting on it.

37. Picket Lights.

Oil lamps as used by the military police are the most suitable.

38. Torch Batteries.

These are always in short supply and make apparatus illuminating sights a necessary item of equipment.

39. Organisation of Ammunition Parties.

One driver and five men for each 3-ton lorry, working in three pairs.

(a) Driver and one on lorry stacking.

(b) Two lifting ammunition from ground to lorry.

(c) Two feeding the lifters.

With the above organisation, 3-ton lorries have regularly been loaded in five minutes and unloaded in three and a half minutes.

ANTI-AIRCRAFT

GENERAL

40. A.A.D.Cs.

Every heavy and light regimental commander must be prepared to act as an A.A.D.C. He should be prepared to command heavy anti-aircraft, light anti-aircraft, searchlights, smoke, A.A.O.R., and do all the necessary liaison. He should have his own improvised G.O.R. ready in case there is no proper A.A.O.R.

41. Early Warning.

(a) All possible sources of early warning broadcast should be exploited, as in early stages formation signals will be unable to give you line communication to S.O.R., M.O.R.U. or M.A.R.U., etc. Make sure your G.O.R. has receivers to take the likely broadcasts and go and see the provider of early warning at earliest. Often they don't realise you require a broadcast and have not arranged one.

(b) In planning an operation, the anti-aircraft brigade commander should contact R.A.F. at the earliest stage. By discussion you may persuade R.A.F. to site early warning centre conveniently for anti-aircraft communications.

42. System of Communication at a Permanent V.A.

A tried out system in initial occupation of a V.A. is as under:-

(a) Immediately - 24 hours watch on unit wireless to A.A.O.R.

(b) Within 24 hours - Omnibus line A.A.O.R. to all gun positions.

(c) Within 72 hours - Direct lines A.A.O.R. to all gun positions.

(d) Within 72 hours - Each heavy anti-aircraft position connected by lateral to another site making use of the omnibus circuit which is now cut.

(e) After 72 hours - Make good and build lines.

(f) At convenience - Second lateral line for each heavy anti-aircraft position, preferably by a different route.

Lines from A.A.O.R. to N.O.I.C., R.A.F., early warning centre, G.C.I. (if any), area headquarters, light anti-aircraft and searchlight control, smoke and coast defence control take priority over (e) above if necessary, but generally they are laid concurrently by brigade while regimental signals lay the gun lines.

43. Light Anti-Aircraft Control.

In order to control light anti-aircraft in a large area such as a port, it has been found that the establishment of a sub G.O.R. at light anti-aircraft regimental headquarters is the best method.

In order that the normal broadcast shall be received from G.O.R., a 208 receiver is a necessity.

44. Light anti-Aircraft Barrages.

Overseas, the necessity for light anti-aircraft barrages by night has been firmly established. In considering the light anti-aircraft barrage, the following considerations arise:-

(a) Siting of guns.

(b) Control of fire.

(c) Directing of fire.

(a) Siting of Guns

In order to produce a volume of fire over the prescribed area for the primary barrage, it may often be necessary to accept an inferior performance to that laid down in the latest manuals. The importance of alternative positions necessitated by recurrent obstructions such as ships, railway trucks, etc., must be stressed.

(b) Control of Fire

In order that a light anti-aircraft barrage shall be effective, it is essential to exercise the tightest control, particularly in stopping it. Many methods have been tried out, but the most successful seems to be control by a vertical coloured searchlight beam. The barrage continues only during the time that the searchlight is exposed. The searchlight is controlled by an officer in an O.P. who is in direct communication with the light anti-aircraft sub G.O.R. An alternative is to stop fire by firing a distinctive vertical burst from a Breda or similar gun.

(c) Directing of Fire.

Directional barrages are controlled and directed by means of a master gun which, if possible, should

become firing tracer ammunition of a distinctive colour. This may not be possible with British equipment, but early acquisition of enemy anti-aircraft guns will generally overcome the difficulty.

(d) General

It is essential for standing barrages to be cut up into bursts of fire, not normally exceeding 20 seconds. This is necessary to enable the controlling officer at the O.P. to hear the approach of low-flying attackers. In periods of special emergency it may often be advisable to establish additional observation and listening posts by day and by night with communications to the light anti-aircraft sub G.O.R.

45. Siting Light Anti-Aircraft.

In hilly country there is a tendency to regard defiles on roads as the most likely targets for enemy aircraft, whereas in such stretches the road is usually so twisty and enclosed by hills as to make it a difficult target for low level attack. In practice, enemy attacks are invariably made on stretches of straight, open road between defiles and light anti-aircraft guns should be sited to protect M.T. moving on these, rather that at the defiles themselves.

In this connection, it must be impressed on light anti-aircraft troop commanders that the guns must be sited well off the road, in order to get clear of the dust and obstructions on the road, and avoid being shot up during the engagement; they should not be so far off that the target becomes a crosser instead of head-on - 150 yards is about correct.

46. G.P. Sets.

It is not within the scope of an ordinary gunner

to understand the inner workings of the G.L. equipment and of all its satellites, such as L.W. sets and Ba[redacted] Maggies, but commanders must know the results to be expected and the type of country in which these sets can function.

The experts have issued a great deal of theory in the matter of siting, which has often been proved pessimistic. In SICILY the G.L. 2 equipment worked very well in difficult physical conditions, and in very close country. In BARI one set had two main wire telephones lines within 50 yards of it, the main railway line and several houses quite near, and yet excellent results were obtained. It is not desirable to go into any technical arguments on the subject, but the fact remains that the equipment is fickle, and that we should not be too biased by theoretical statements, however theoretically accurate they might be.

G.L. is more difficult to site than guns and it is generally advisable to subordinate the siting of guns to that of the G.L.

At certain stages we have been compelled to work with only one G.L. set per battery; a satellite system was tried out, but it has not been satisfactory and we are quite definite that the 8-gun site is more desirable from the point of view of results.

47. Searchlights Layout.

(a) There is a great scope for adventurous use of searchlights, e.g. surprise on likely lines of approach, to fill in where R.D.F. coverage is poor or anti-aircraft R.D.F. are unable to operate efficiently, to control light anti-aircraft fire, etc. Huns are generally very nervous of searchlights and seem to think more of avoiding them than aiming their bombs.

Homing beacons are always popular with the R.A.F. Don't wait till they come to you - ask them if they

want one. (Don't forget communications difficulties.)

(b) Always consult R.N. or R.A.F. before finally deciding layout. R.N. dislike searchlights which might illuminate the harbour, etc.

TECHNICAL

48. Regimental G.O.Rs.

(a) It is normal for regimental commanders, both heavy and light anti-aircraft, to be called upon to run regimental G.O.Rs. at small ports or V.Ps. Regiments, particularly light regiments, do not carry sufficient equipment such as switchboards, telephones, cable, plotting equipment and so on. It is generally possible to collect captured or improvised equipment and commanding officers should start collecting from the beginning of the operation and make up a G.O.R. 'pack'. Some regiments have even improvised a mobile G.O.R. in a captured trailer. Switchboards can also be made up from old switchboards and spare parts.

(b) A useful tip is that No.17 and No.21 wireless sets can both be received on 208 receivers (No.17 on 50 - 52 m/cs and 21 on 19 - 31 m/cs).

49. Testing R.208.

It has been found in practice that there is always a tendency for wireless personnel to switch R.208s from the operational frequency in order to receive broadcasts of interest, such as the B.B.C. news.

In order that personnel on sites shall receive the news and still preserve their operational frequency, it has been found a workable plan to re-diffuse news bulletins on the operational frequency and use these broadcasts as periodical tests. A high grade receiver at A.A.C.s, such as H.R.O. 106 is excellent for this.

A further method of utilising routine tests to advantage is for the broadcaster to give a description of an aircraft. At the receiving end recognition competitions can be organised.

50. Winching

(a) When winching 3.7" guns, do NOT attach winch cable to trail eye on engine draught connector, but to the guideway step bolts or axle of gun. The gun can then be steered by movement of the E.D.C., which cannot be moved if the winch cable is attached to the towing eye.

(b) Before winching it is essential that the driver of the G.T.V. be clearly shown the problem.

(c) Whenever possible winching should be done from the front of the G.T.V. in order that driver can see what is happening and can obey hand signals of No.1.

(d) Winch early on soft ground, even when G.T.V. can only just make it. There is less strain on G.T.V. and gun. Skidding should always be loaded last thing in G.T.V.

(e) Two or even three G.T.Vs. can be used for winching in a bad situation. Training should be carried out in use of more than one G.T.V. for winching.

(f) Always have scotches ready when winching; neither gun hand brake nor winch brake are wholly to be trusted.

(g) G.L. personnel should be thoroughly trained in winching.

HEAVY ANTI-AIRCRAFT FIRE CONTROL

51. Plotting Control.

Plotting control is just as necessary in the field

as in A.D.G.B. It is essential that each troop carries its own plotting equipment complete. Get it before you leave - it is difficult to improvise in the field. Each troop should establish a normal set up for the plotting room which can be reproduced in each position occupied (unless fortunate enough to have one of the new mobile plotting rooms).

Small things like linkage gears, slant-ground range converters, grids, talc or kodatrace (generally quite unobtainable abroad), even gunnery data books, get forgotten.

52. Survey.

Survey is often difficult. Make full use of U.S. Army, R.E. or R.A. survey units in the district; they are never in the same place long.

A simple way of checking relative bearings of sites and orientation of G.L. to within $\frac{1}{2}^{\circ}$ is as follows:-

Line up G.L. receiver of one position upon the transmitter of another position and vice versa (e.g. D.F. the other position) and record bearings. Repeat for all positions in area until a complete network of bearings obtained. Discrepancies in frequencies of G.L. do not appreciably affect the accuracy of bearings.

53. Meteor.

This is normally obtained from R.A.F. sources, but sometimes regiments may have to produce their own. It is important, therefore, to calibrate aneroid barometers held by heavy anti-aircraft batteries.

54. G.L. Interference

Have a pair of earphones permanently connected to

a plug for the V 13 A socket. If you cannot D.F. by visual means, any interference, you may be able to do it orally. Always listen out for code calls and jot down conversations immediately in the station diary.

55. G.L. Calibration.

(a) If full balloon calibration is too lengthy, do a calibration on one leg along the line of zero slope or along the axis of the priority arc.

(b) Met. balloons carrying cross dipoles may be used effectively for the co-ordination of S.L.C. equipment. Also a source of jamming, such as the No. 17 wireless set, can be used effectively for the same purpose in conjunction with the J.L. switch.

(c) Aircraft calibration is rare, but an aircraft check of bearing and angle can sometimes be obtained by using a co-operating aircraft. Air co-operation is spasmodic, therefore units should prepare a drill and system of recording beforehand ready for use when required.

56. Mk.III I.F.F.

(a) It is difficult to be quite certain that Mk.III I.F.F. equipment is operating satisfactorily. Try to obtain from the R.A.F. an aircraft transponder, then set it up on the roof of a high building in the V.A. Switch it on at regular intervals so that all stations can check operation. The transponder can also be used for tuning the ground equipment. Should the equipment not be high enough, use a balloon cable as an aerial or some such improvisation.

(b) The wavemeter supplied as an integral part of the equipment R.D.F.A.A. No.4 Mk.II will cover the Mk.III I.F.F. waveband and can hence be used for tuning, provided there is a spare Maggie or light warning generator available.

57. Plotting

(a) Devise a means for central timing by 10 seconds pips at G.O.C. It saves men in the plotting room, produces more accurate plotting and simplifies analysis of air co-operation. A suitable system is to superimpose time pips on the 36 set broadcast by use of an electric or clockwork motor which keys a low frequency modulated oscillator.

(b) Copy the clutter diagram of the Rx on the plotting board as it will assist the T.C.O. in his control of the G.L.

With G.L. Mk.II equipment in the "search" position, high flying targets are often not picked up. Careful use of the "follow array" of the Tx during searching has been found useful because of its higher angle of radiation. Great care should be taken, however, to see that targets are not missed owing to the narrow Tx follow array beam (25°).

HEAVY ANTI-AIRCRAFT EQUIPMENT

58. Towing Hooks

(a) 3.7" gun

Over mountain roads and road diversions complete fracture of towing assemblies has been experienced. As a safeguard it has been found advisable to secure the winch rope (winch brake on) to the axle limber. The winch rope is given one turn round the engine draft connector, taken round the base of the gun legs and back to the engine draft connector, where it is made fast by a U bolt, either to the winch rope itself or to the axle limber. The rope is taken right round the gun legs in case the pintle comes adrift (as has happened).

(b) Tow Bars of G.L. Tx

Accidents have occurred owing to the welds of joints on the towing bar of transmitter parting. In order to obviate this, all welded joints of this nature have been reinforced with supporting bolts.

(c) A check on towing hooks and the tightness of bolts at every halt will well repay the trouble.

59. Spare Barrels

Owing to the distance which may be found between a troop position and the nearest ordnance depot, it is recommended that each troop should carry one spare barrel. This will serve as immediate replacement for a barrel damaged by bomb splinter or premature.

60. Spare Valves

The comprehensive list of valve equivalents, including all valves used by the five Army R.D.F. equipments, the Navy and the R.A.F. is extremely useful.

61. Starting of Baby Maggie or Light Warning Generators.

Starting of these generators can be assisted by shorting out the interference suppressor temporarily.

LIGHT ANTI-AIRCRAFT

62. Light Anti-Aircraft O.Ps.

The establishment of an O.P. within the regiment area manned by a troop officer, detailed by roster from convenient troops, has been found invaluable

both for establishing a measure of warning and for early identification. The latter is especially necessary in the case of units deployed in the forward areas where gun positions have in many cases to be defiladed from the front and consequently obtain a restricted arc of view.

The O.P. should be provided with a wireless set to broadcast to troop sets and 109 receivers. As an alternative means of communicating warning and to provide a stand by in the event of a break down of wireless, recourse should be had to the implementation of a warning gun, linked to the O.P. by means of a telephone. The warning gun fires 2 rds auto in the direction of approach.

A secondary and very important role of the O.P. is to provide information for "post mortems" after engagements. From the O.P. observations can often be made on the shooting of individual guns where it is not possible to do so from the gun position.

This applies more particularly to Divisional and Corps regiments deployed in the forward areas, but may well be adopted with advantage by units protecting rear installations for the reason given in the preceding paragraph.

63. Orientation of Girders

In bringing 40 mm equipments into action, it has been found to be an advantage if the girders point in the direction of the cardinal points of the compass, e.g. for directional barrages, early warning, etc.

64. 40 mm Barrels

Barrage fire by night results in high ammunition expenditure and, in order to preserve the accuracy of fire by day, it has been found advantageous to nominate a night and a day barrel.

In order to eliminate oil haze, the barrel mounted in the gun should be quite dry, and the barrel standing by cleaned and oiled.

PRACTICE

65. It is quite useless going into action with equipment that is not known and understood by everyone. For this reason there should never be a stinting of practice ammunition, even if it means reduction of reserves. It is quite realised that the M.V. suffers, that guns become worn and that the holding of ammunition behind first and second line becomes less, but these evils are nothing compared with lack of training. With anti-tank equipment especially practice is essential, because the men must have confidence in the weapon, which they can only get by firing at targets. The chances of live practice with anti-aircraft are, unfortunately, poor, and it is most difficult to persuade the R.A.F. to tow targets for us. No solution is offered for this, but anti-aircraft commanders should always investigate any possibility of bringing it off. Heavy anti-aircraft can obtain value from 180° lay off targets, but there is no easy way out for Bofors. We are trying to get captured aircraft for target towing, but we have not had any great satisfaction yet.

ENEMY WEAPONS

66.

(a) The enemy has a great respect for our counter battery organisation and his artillery usually lies back out of range of everything except possibly the 4.5" gun. He does not do much firing with any of his guns which are well within range until forced to. It is often necessary to put down a feint fire plan or smoke screen in order to force him to disclose his defensive fire, thus getting valuable H.B. locations.

The Mortar.

The German mortar is the greatest modern pest in the battlefield. Nebelwerfers, which are multiple mortars on the rocket principle, give a splendid advertisement when they fire, but apart from them all the enemy mortars have smokeless powder and are cleverly sited. They are cordially disliked by all, since they give no indication of their arrival and make a great noise. We have tried every possible means to pick them up, such as Sound Ranging, Air O.Ps. and ground O.Ps., but no proper solution has yet been reached. Constant watch and knowledge of the enemy's habits are of great assistance, but usually it becomes necessary to fire a great many shells, most of which hit nothing, in order to silence one or two mortars. The expenditure is justified.

A new sound ranging instrument to detect mortars is of urgent necessity.

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