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A TANK ARMY.

1. **INTRODUCTION.** Unless this War ends in a disarmament and a temporary universal peace there can be little doubt that the present unarmoured and unprotected Soldier will cease to exist and a tank army take his place. A present day army could never fight an army consisting of say 2,000 tanks. Such an army would have an initial cost of some £12,000,000, but the personnel required would only be in the neighbourhood of 100,000 men, and the cost of the tank army would therefore be no greater than that of a modern army under peace conditions.

2. **TANK ARMIES.** Let us therefore see what form a tank army will take, and what will be the main principles of future tank warfare.

3. **TANK BASES.** All tanks will operate from a tank base. With the British Empire these bases will be established in all our foreign possessions and colonies, and in certain centres in the United Kingdom. A continental country such as France would establish bases near her frontier. She would probably establish three bases, one each near Amiens, Rheims, and Sangrée.

Her tank armies would mobilize at these points which are some fifty miles behind her frontier and about 100 miles apart, and all operations would be carried out from these bases.

Any tank base will be very strongly defended against tank attacks. Wire entanglements will disappear as an obstacle in tank warfare, and in its place we shall find any or all of the following, which will be constructed all round the tank bases:-

(1) A trench impassable to tanks.

(2) Continuous land mines.

(3) Pillars of wood or concrete sunk deep into the ground in a vertical position and projecting several feet from the ground, thus making an artificial forest of strong tree trunks.

The bases will also be protected by a tank garrison and probably by a fixed armament.

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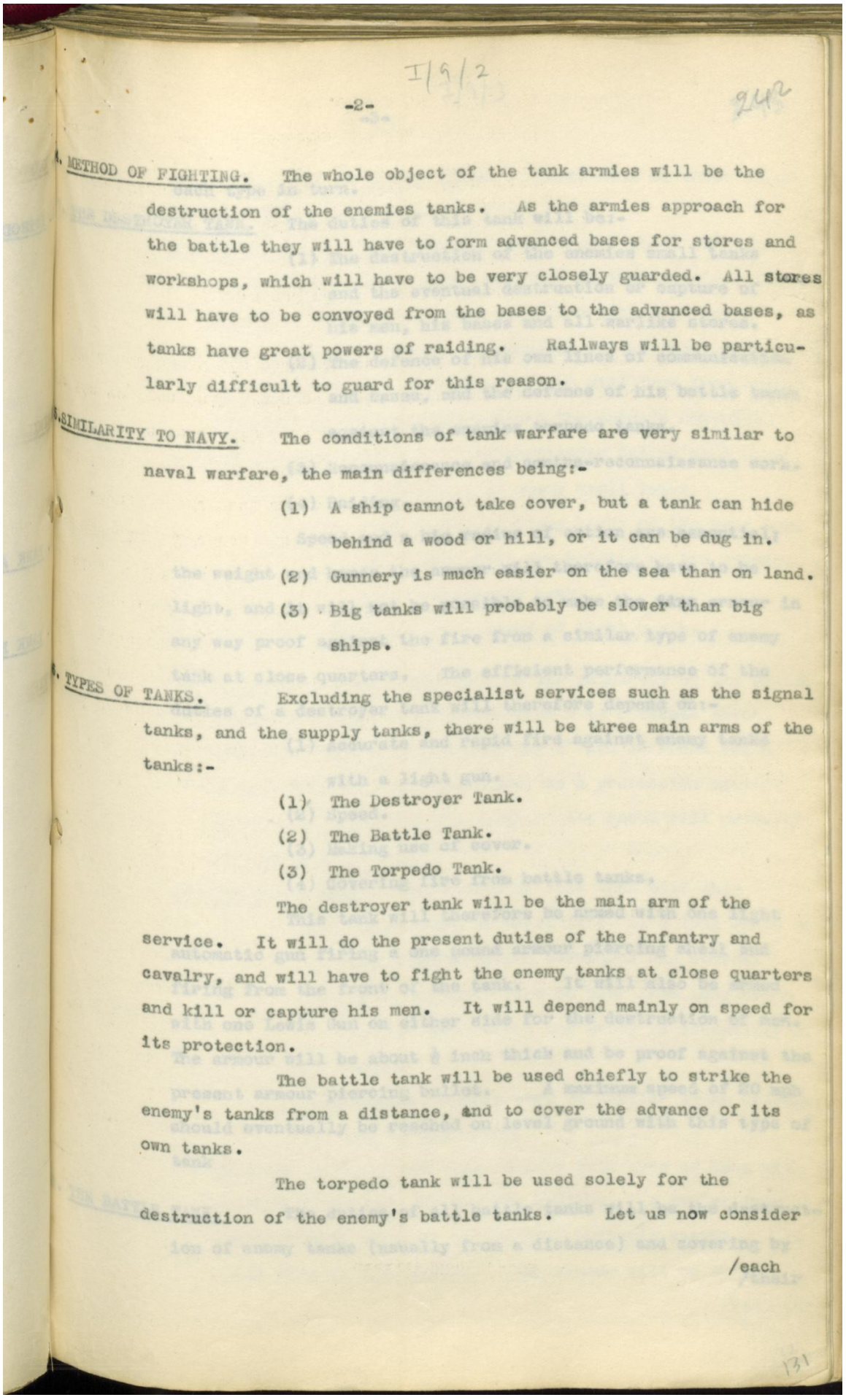

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4. METHOD OF FIGHTING. The whole object of the tank armies will be the destruction of the enemies tanks. As the armies approach for the battle they will have to form advanced bases for stores and workshops, which will have to be very closely guarded. All stores will have to be convoyed from the bases to the advanced bases, as tanks have great powers of raiding. Railways will be particularly difficult to guard for this reason.

5. SIMILARITY TO NAVY. The conditions of tank warfare are very similar to naval warfare, the main differences being:-

(1) A ship cannot take cover, but a tank can hide behind a wood or hill, or it can be dug in.

(2) Gunnery is much easier on the sea than on land.

(3) Big tanks will probably be slower than big ships.

6. TYPES OF TANKS. Excluding the specialist services such as the signal tanks, and the supply tanks, there will be three main arms of the tanks:-

(1) The Destroyer Tank.

(2) The Battle Tank.

(3) The Torpedo Tank.

The destroyer tank will be the main arm of the service. It will do the present duties of the Infantry and cavalry, and will have to fight the enemy tanks at close quarters and kill or capture his men. It will depend mainly on speed for its protection.

The battle tank will be used chiefly to strike the enemy's tanks from a distance, and to cover the advance of its own tanks.

The torpedo tank will be used solely for the destruction of the enemy's battle tanks. Let us now consider

/each

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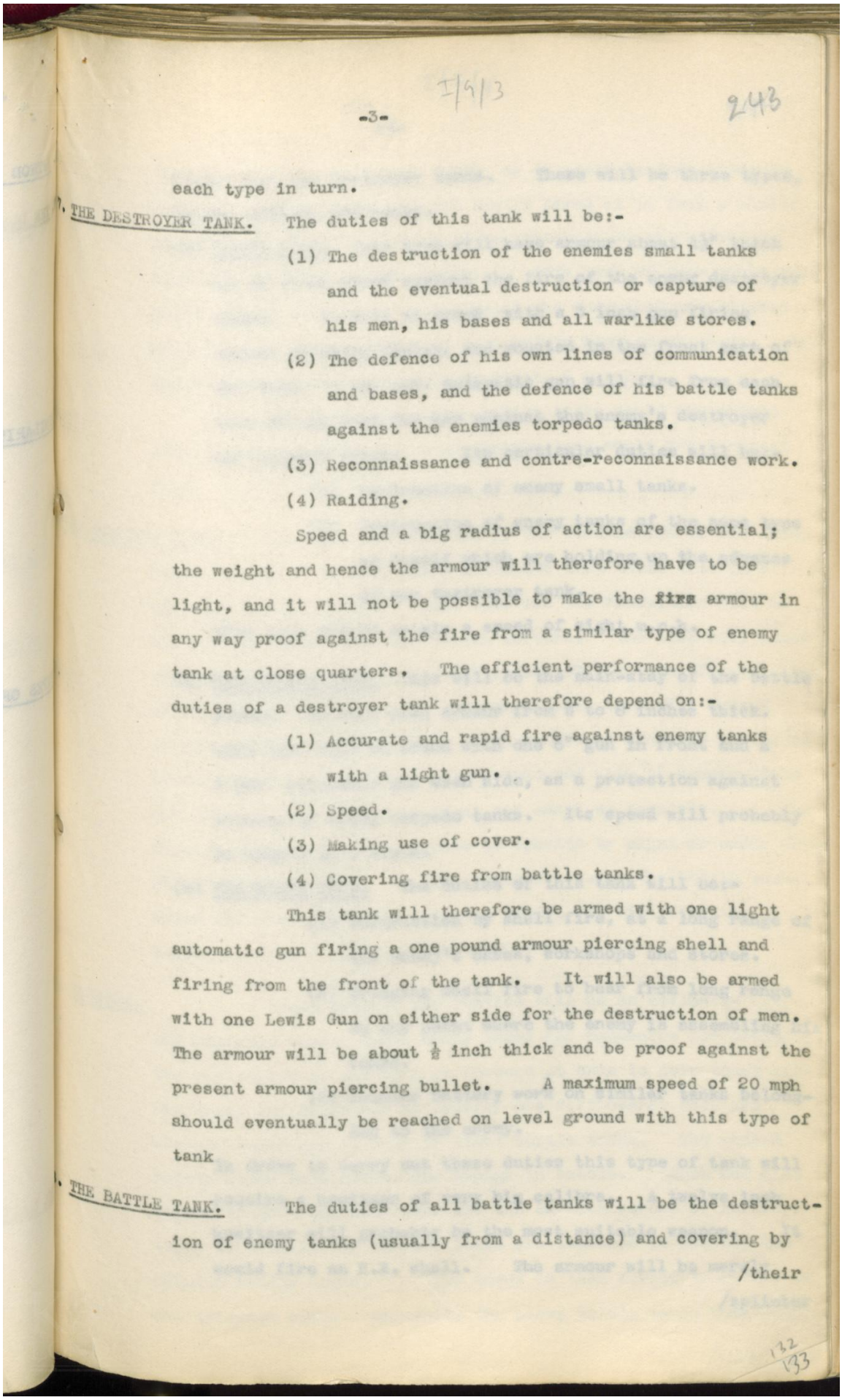

each type in turn.

7. THE DESTROYER TANK. The duties of this tank will be:-

(1) The destruction of the enemies small tanks and the eventual destruction or capture of his men, his bases and all warlike stores.

(2) The defence of his own lines of communication and bases, and the defence of his battle tanks against the enemies torpedo tanks.

(3) Reconnaissance and contre-reconnaissance work.

(4) Raiding.

Speed and a big radius of action are essential; the weight and hence the armour will therefore have to be light, and it will not be possible to make the ~~fire~~ armour in any way proof against the fire from a similar type of enemy tank at close quarters. The efficient performance of the duties of a destroyer tank will therefore depend on:-

(1) Accurate and rapid fire against enemy tanks with a light gun.

(2) Speed.

(3) Making use of cover.

(4) Covering fire from battle tanks.

This tank will therefore be armed with one light automatic gun firing a one pound armour piercing shell and firing from the front of the tank. It will also be armed with one Lewis Gun on either side for the destruction of men. The armour will be about ½ inch thick and be proof against the present armour piercing bullet. A maximum speed of 20 mph should eventually be reached on level ground with this type of tank

8. THE BATTLE TANK. The duties of all battle tanks will be the destruction of enemy tanks (usually from a distance) and covering by

/their

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their fire the destroyer tanks. There will be three types, light, medium, and heavy.

(a) LIGHT TYPE. This type will have armour about 1½" thick so as to be proof against the fire of the enemy destroyer tanks. It will be armed with a 3 inch gun firing armour piercing shells, and mounted in the front part of the tank. A one pdr. automatic gun will fire from each side of the tank for use against the enemy's destroyer and torpedo tanks. Its particular duties will be:-

(1) Destruction of enemy small tanks.

(2) Destruction of enemy tanks of the same type as itself which are holding up the advance of our destroyer tank.

This type should attain a speed of eight m.p.h.

(b) THE MEDIUM TYPE. This will be the main-stay of the battle class. It will have armour from 6 to 8 inches thick. Each tank will be armed with one 6" gun in front and a 1 pdr. automatic gun each side, as a protection against attacks by enemy torpedo tanks. Its speed will probably be only 2 or 3 m.p.h.

(c) THE HEAVY TYPE. The duties of this tank will be:-

(1) Destruction by shell fire, at a long range of the enemy's bases, workshops and stores.

(2) Bringing shell fire to bear from long range on any point where the enemy is assembling his tanks.

(3) Counter battery work on similar tanks belonging to the enemy.

In order to carry out these duties this type of tank will require a howitzer of very big calibre. A twelve inch howitzer will probably be the most suitable weapon. It would fire an H.E. shell. The armour will be merely

/splinter

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splinter proof, say ½ inch thick, as it would be impossible to keep out a direct hit from the shells fired at it from a similar type of enemy tank. It would be protected by an escort of destroyer or light battle tanks. This type of tank would take very little part in an action until the enemy had established himself at a certain point or been driven back on his base. The speed of this tank would only be about 2 m.p.h.

The light and medium battle tanks would use direct fire almost entirely; the heavy battle tank would use indirect fire.

C. THE TORPEDO TANK. The duty of this tank is the destruction of the enemy battle tanks. It will carry a torpedo tube which will fire straight to the front. This tube and the ammunition will be similar to the present big trench mortars. The tank will carry five torpedoes, which will weigh about 100 lbs each; it will also carry one Lewis gun. The success of this tank will depend almost entirely on the speed, which should be about 30 m.p.h. on level ground. The tank will be armoured with ½" armour plate and will be constructed as light and small as possible. The torpedo tank will probably have to operate by night or under cover of a smoke barrage. It will advance towards the battle tanks, using its speed, and all existing cover, and will fire its torpedoes from a range of about 500 yds.

D. TACTICS. Very briefly the tactics will be as follows:-
The opposing armies leave their bases and manoeuvre for position. The destroyers of one side go forward at once to gain touch with the enemy and endeavour to destroy his destroyers. They are closely supported in this by light battle tanks. The medium battle tanks then arrive and engage in battle. When one side begins to gain the advantage and the enemies screen of destroyer tanks is broken, the torpedo tanks are launched to destroy the enemies battle tanks. The enemy is then forced to retire to his defended base. Meanwhile the heavy battle tanks have been

/arriving

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arriving. They may take part in the later stages of the fight, or they may not be used till the enemy is surrounded or driven back to his base, in which case they would very soon bring about his surrender.

4. ORGANISATION. The whole tank force will be organised in two or three armies, and each Army will be organised as shown on the diagram.

The following abbreviations are used:-

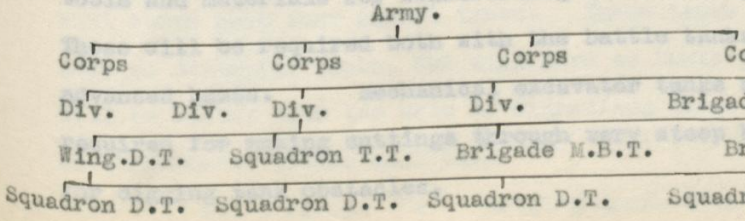
Destroyer tank..... D.T.
Torpedo tank..... T.T.
Battle tank, heavy..... H.B.T.
medium.....M.B.T.
light..... L.B.T.

Every squadron of D.T. or T.T. is organised in four groups of five tanks each, the group commander being in one of these tanks.

Every Brigade of Battle tanks consists of four batteries of two tanks each.

Specialist branches, supply tanks, workshops etc, are not shown on the diagram, and omitting these and Headquarter tanks, the totals are:-

One Army.		Total	No. of tanks.
Each Army,	4 Corps.	4 Corps.	
Each Corps,	4 Divisions.	16 Divisions.	
	1 Brigade, H.B.T.		8
Each Divn.	1 Wing D.T.	16 Wings.	1280
	1 Squadron, T.T.	16 Squadrons.	320
	1 Brigade M.B.T.	16 Brigades.	128
	1 Brigade L.B.T.	16 Brigades.	128
			1864.



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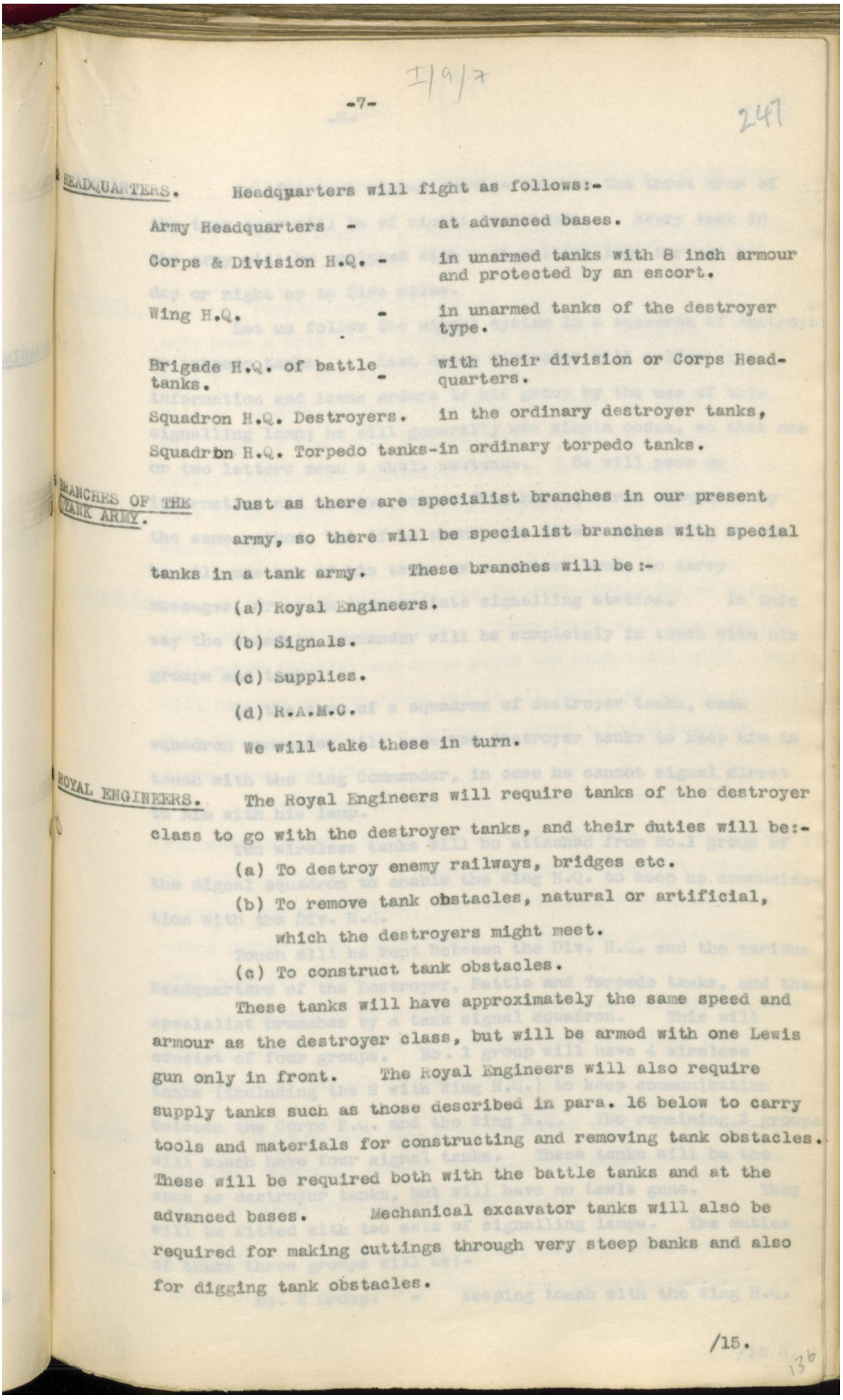

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HEADQUARTERS. Headquarters will fight as follows:-

Army Headquarters	-	at advanced bases.
Corps & Division H.Q.	-	in unarmed tanks with 8 inch armour and protected by an escort.
Wing H.Q.	-	in unarmed tanks of the destroyer type.
Brigade H.Q. of battle tanks.	-	with their division or Corps Headquarters.
Squadron H.Q. Destroyers.		in the ordinary destroyer tanks,
Squadron H.Q. Torpedo tanks		in ordinary torpedo tanks.

BRANCHES OF THE TANK ARMY. Just as there are specialist branches in our present army, so there will be specialist branches with special tanks in a tank army. These branches will be:-

(a) Royal Engineers.

(b) Signals.

(c) Supplies.

(d) R.A.M.C.

We will take these in turn.

ROYAL ENGINEERS. The Royal Engineers will require tanks of the destroyer class to go with the destroyer tanks, and their duties will be:-

(a) To destroy enemy railways, bridges etc.

(b) To remove tank obstacles, natural or artificial, which the destroyers might meet.

(c) To construct tank obstacles.

These tanks will have approximately the same speed and armour as the destroyer class, but will be armed with one Lewis gun only in front. The Royal Engineers will also require supply tanks such as those described in para. 16 below to carry tools and materials for constructing and removing tank obstacles. These will be required both with the battle tanks and at the advanced bases. Mechanical excavator tanks will also be required for making cuttings through very steep banks and also for digging tank obstacles.

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6. SIGNALS. An efficient signal service between the three arms of the tank army will be of utmost importance. Every tank in the army will be equipped with a signalling lamp for use by day or night up to five miles.

Let us follow the signal system in a squadron of destroyer or torpedo tanks. Each Group Commander will collect the information and issue orders to his group by the use of this signalling lamp; he will generally use simple codes, so that one or two letters mean a whole sentence. He will pass on information and receive orders from his squadron commander by the same method, but if he cannot get direct signalling to him he will use one of his tanks as a contact tank, to carry messages, or as an intermediate signalling station. In this way the squadron commander will be completely in touch with his groups and tanks.

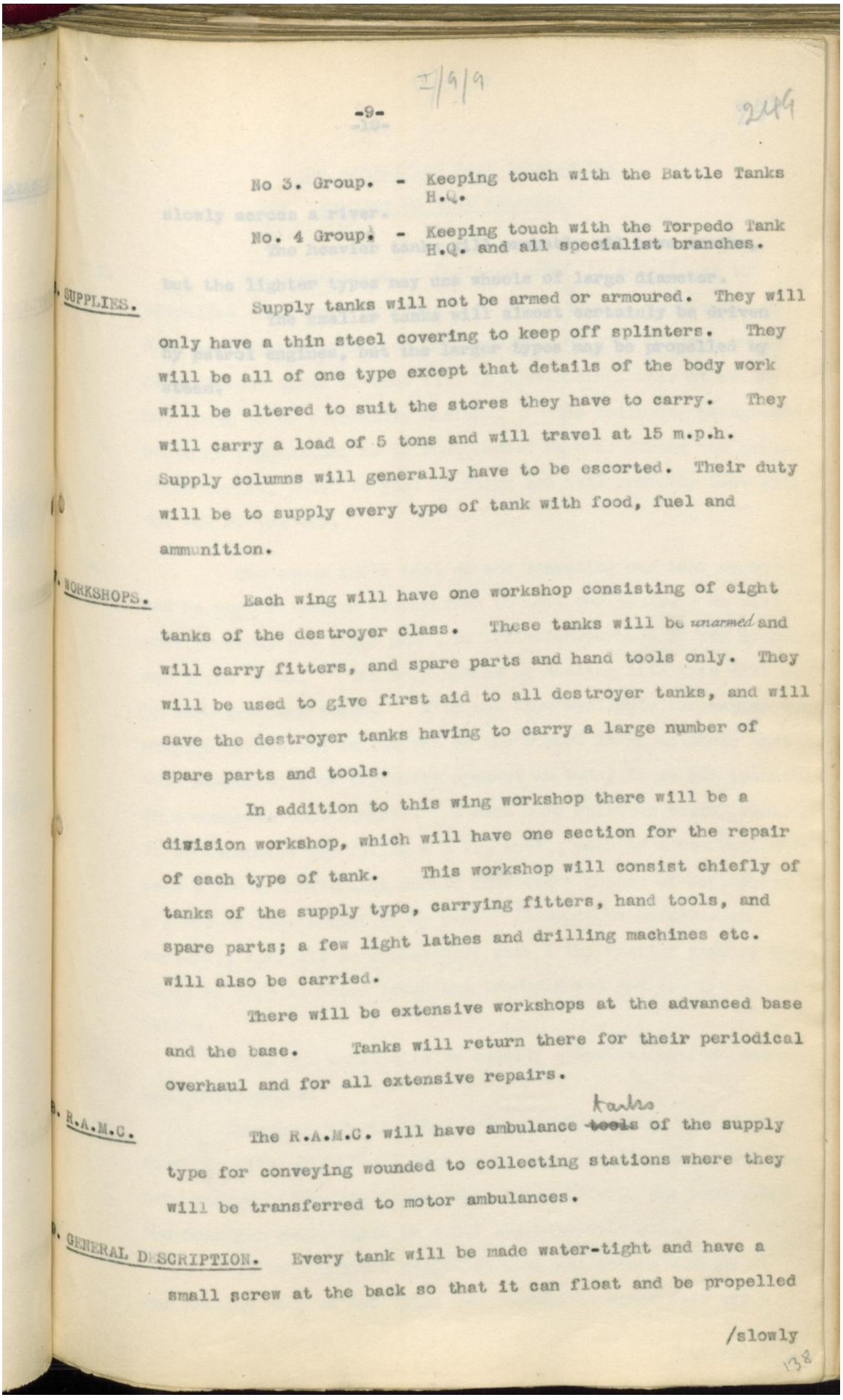
In the case of a squadron of destroyer tanks, each squadron commander will have two destroyer tanks to keep him in touch with the Wing Commander, in case he cannot signal direct to him with his lamp.

Two wireless tanks will be attached from No.1 group of the Signal squadron to enable the Wing H.Q. to keep up communication with the Div. H.Q.

Touch will be kept between the Div. H.Q. and the various Headquarters of the Destroyer, Battle and Torpedo tanks, and the specialist branches by a tank signal squadron. This will consist of four groups. No. 1 group will have 4 wireless tanks (including the 2 with Wing H.Q.) to keep communication between the Corps H.Q. and the Wing H.Q. The remaining 3 groups will reach have four signal tanks. These tanks will be the same as destroyer tanks, but will have no Lewis guns. They will be fitted with two sets of signalling lamps. The duties of these three groups will be:-

No. 2 Group. - keeping touch with the Wing H.Q.

/No 3.



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No 3. Group. - Keeping touch with the Battle Tanks H.Q.

No. 4 Group. - Keeping touch with the Torpedo Tank H.Q. and all specialist branches.

6. SUPPLIES. Supply tanks will not be armed or armoured. They will only have a thin steel covering to keep off splinters. They will be all of one type except that details of the body work will be altered to suit the stores they have to carry. They will carry a load of 5 tons and will travel at 15 m.p.h. Supply columns will generally have to be escorted. Their duty will be to supply every type of tank with food, fuel and ammunition.

7. WORKSHOPS. Each wing will have one workshop consisting of eight tanks of the destroyer class. These tanks will be unarmed and will carry fitters, and spare parts and hand tools only. They will be used to give first aid to all destroyer tanks, and will save the destroyer tanks having to carry a large number of spare parts and tools.

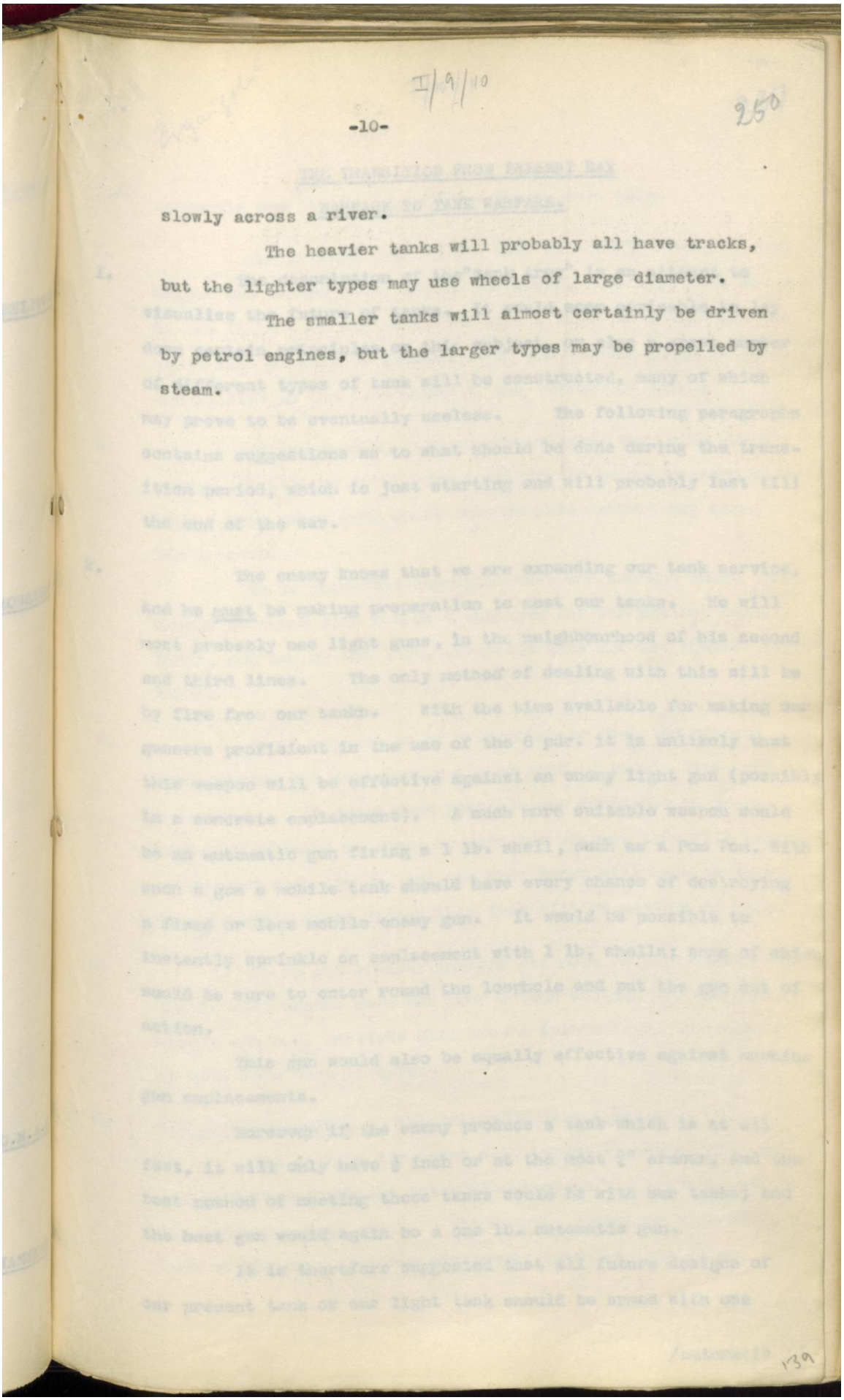
In addition to this wing workshop there will be a division workshop, which will have one section for the repair of each type of tank. This workshop will consist chiefly of tanks of the supply type, carrying fitters, hand tools, and spare parts; a few light lathes and drilling machines etc. will also be carried.

There will be extensive workshops at the advanced base and the base. Tanks will return there for their periodical overhaul and for all extensive repairs.

8. R.A.M.C. The R.A.M.C. will have ambulance ~~tools~~ tanks of the supply type for conveying wounded to collecting stations where they will be transferred to motor ambulances.

9. GENERAL DESCRIPTION. Every tank will be made water-tight and have a small screw at the back so that it can float and be propelled

/slowly



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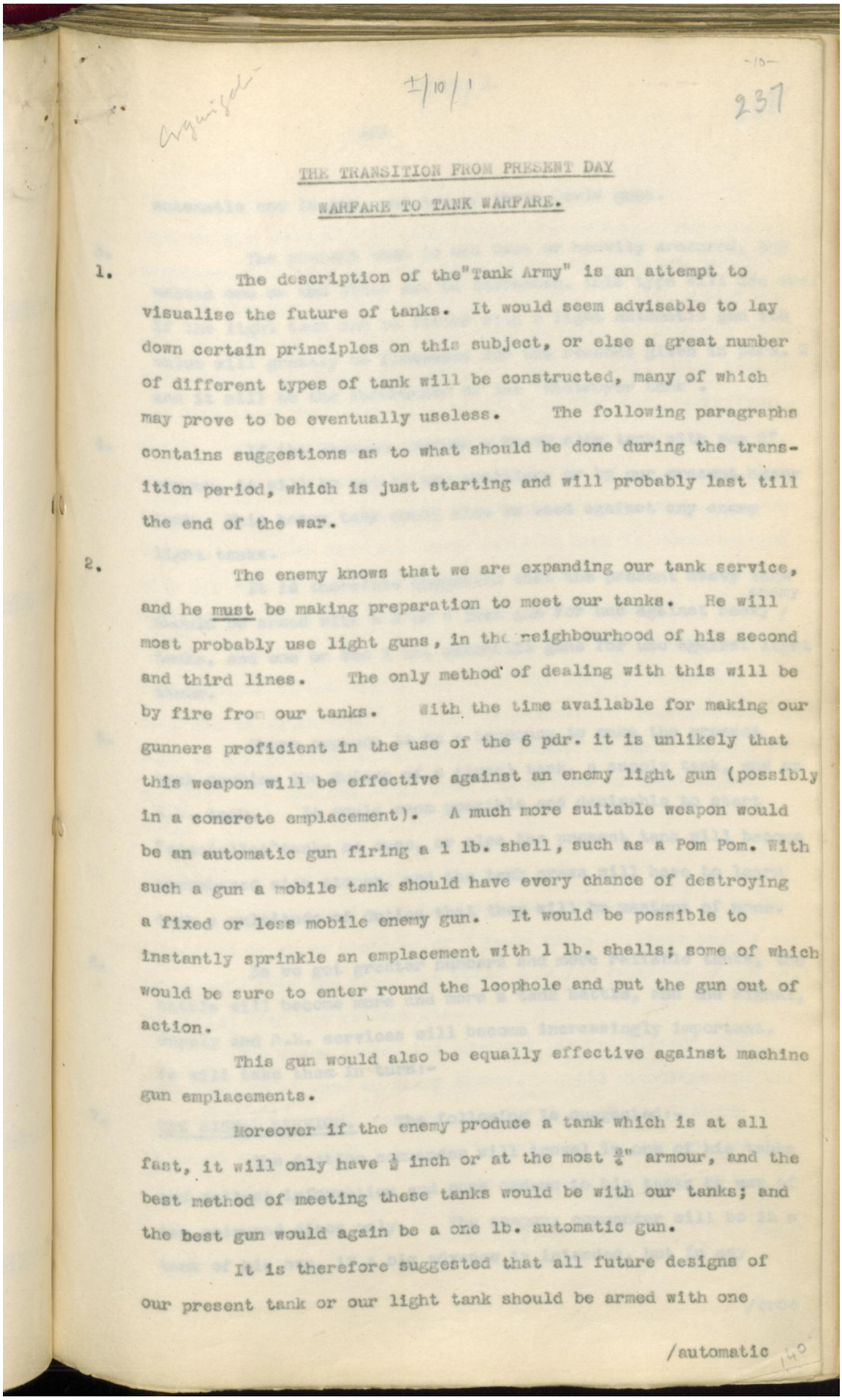
slowly across a river.

The heavier tanks will probably all have tracks, but the lighter types may use wheels of large diameter.

The smaller tanks will almost certainly be driven by petrol engines, but the larger types may be propelled by steam.



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THE TRANSITION FROM PRESENT DAY

WARFARE TO TANK WARFARE.

1. The description of the "Tank Army" is an attempt to visualise the future of tanks. It would seem advisable to lay down certain principles on this subject, or else a great number of different types of tank will be constructed, many of which may prove to be eventually useless. The following paragraphs contains suggestions as to what should be done during the transition period, which is just starting and will probably last till the end of the war.

2. The enemy knows that we are expanding our tank service, and he must be making preparation to meet our tanks. He will most probably use light guns, in the neighbourhood of his second and third lines. The only method of dealing with this will be by fire from our tanks. With the time available for making our gunners proficient in the use of the 6 pdr. it is unlikely that this weapon will be effective against an enemy light gun (possibly in a concrete emplacement). A much more suitable weapon would be an automatic gun firing a 1 lb. shell, such as a Pom Pom. With such a gun a mobile tank should have every chance of destroying a fixed or less mobile enemy gun. It would be possible to instantly sprinkle an emplacement with 1 lb. shells; some of which would be sure to enter round the loophole and put the gun out of action.

This gun would also be equally effective against machine gun emplacements.

Moreover if the enemy produce a tank which is at all fast, it will only have ½ inch or at the most ⅝" armour, and the best method of meeting these tanks would be with our tanks; and the best gun would again be a one lb. automatic gun.

It is therefore suggested that all future designs of our present tank or our light tank should be armed with one

/automatic

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automatic one lb gun, and two or three Lewis guns.

3. The present tank is not fast or heavily armoured, and unless one or the other can be increased, this type will die out. If the light tank can be fitted with a light automatic gun its value will greatly be increased for the reasons given in para. 2 and it will be the forerunner of the "destroyer tank".

4. If the Germans produce a heavy slow tank with say 2" armour, it will be met by our artillery or by our present heavy tank. This heavy tank would also be used against any enemy light tanks.

It is therefore suggested that the present heavy tank should be armed with a 3 or 4 inch gun for use against heavy / enemy tanks, and one or two 1 lb. automatic guns for use against light tanks.

5. There appears to be a tendency to make the present tank combine the duties of a signal tank, a supply tank, and an R.E. tank. It would seem possible and desirable to start "specialist"tanks at once, or else the present tank will become encumbered with stores, and the tank crews will have to learn such a multitude of duties that they will be masters of none.

6. As we get greater numbers and more reliable tanks, the battle will become more and more a tank battle, and the Signal, Supply and R.E. services will become increasingly important. We will take them in turn:-

7. <u>THE SIGNAL SERVICE.</u> The following is suggested:-

The section commander will travel in one of his tanks and collect information and pass orders to his tanks by use of the coloured discs only. The company commander will be in a tank of his own, if a big advance is intended, but in any

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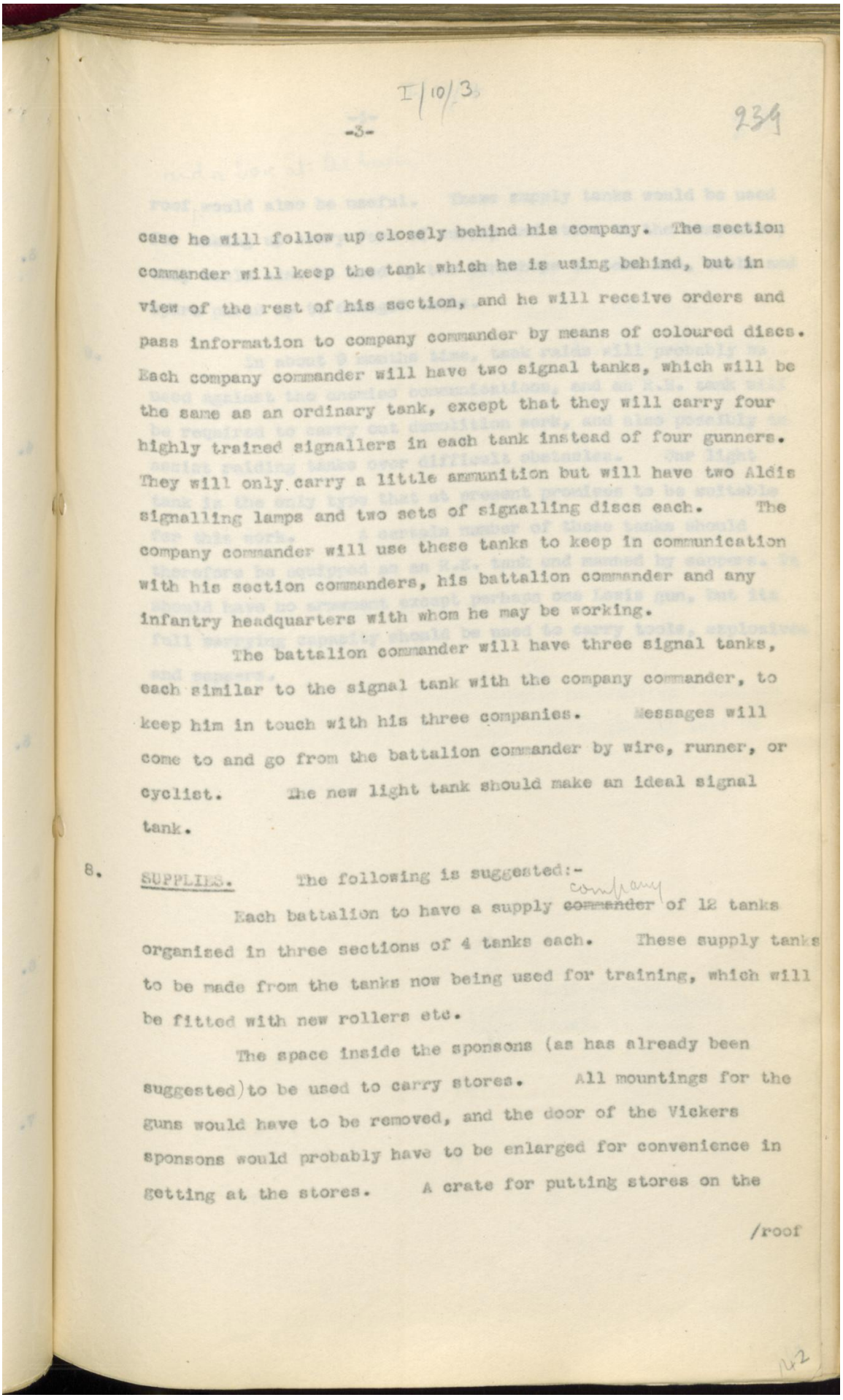

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case he will follow up closely behind his company. The section commander will keep the tank which he is using behind, but in view of the rest of his section, and he will receive orders and pass information to company commander by means of coloured discs. Each company commander will have two signal tanks, which will be the same as an ordinary tank, except that they will carry four highly trained signallers in each tank instead of four gunners. They will only carry a little ammunition but will have two Aldis signalling lamps and two sets of signalling discs each. The company commander will use these tanks to keep in communication with his section commanders, his battalion commander and any infantry headquarters with whom he may be working.

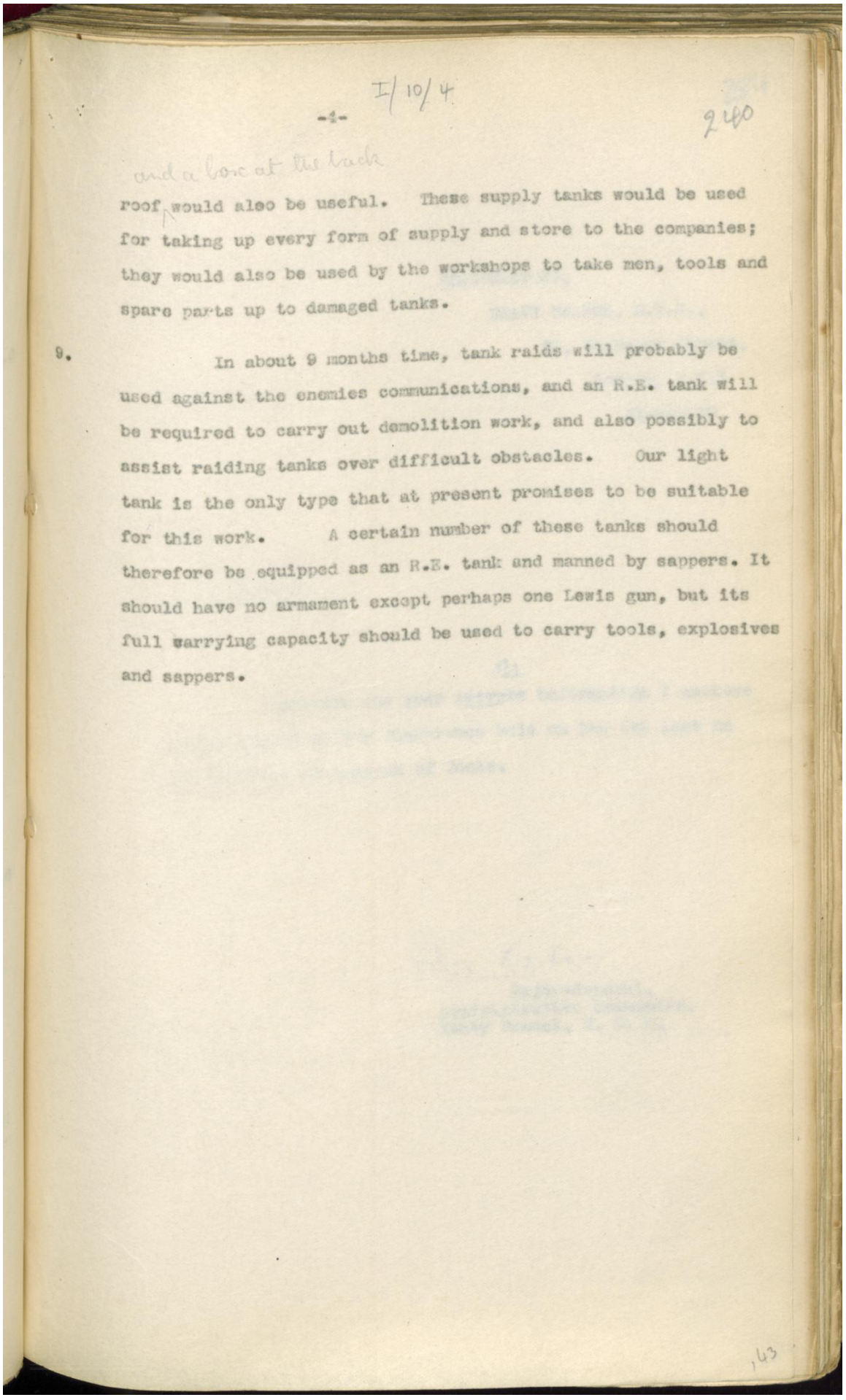
The battalion commander will have three signal tanks, each similar to the signal tank with the company commander, to keep him in touch with his three companies. Messages will come to and go from the battalion commander by wire, runner, or cyclist. The new light tank should make an ideal signal tank.

8. SUPPLIES. The following is suggested:-

Each battalion to have a supply ~~commander~~ company of 12 tanks organised in three sections of 4 tanks each. These supply tanks to be made from the tanks now being used for training, which will be fitted with new rollers etc.

The space inside the sponsons (as has already been suggested) to be used to carry stores. All mountings for the guns would have to be removed, and the door of the Vickers sponsons would probably have to be enlarged for convenience in getting at the stores. A crate for putting stores on the

/roof



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and a box at the back

roof would also be useful. These supply tanks would be used for taking up every form of supply and store to the companies; they would also be used by the workshops to take men, tools and spare parts up to damaged tanks.

9. In about 9 months time, tank raids will probably be used against the enemies communications, and an R.E. tank will be required to carry out demolition work, and also possibly to assist raiding tanks over difficult obstacles. Our light tank is the only type that at present promises to be suitable for this work. A certain number of these tanks should therefore be equipped as an R.E. tank and manned by sappers. It should have no armament except perhaps one Lewis gun, but its full warrying capacity should be used to carry tools, explosives and sappers.

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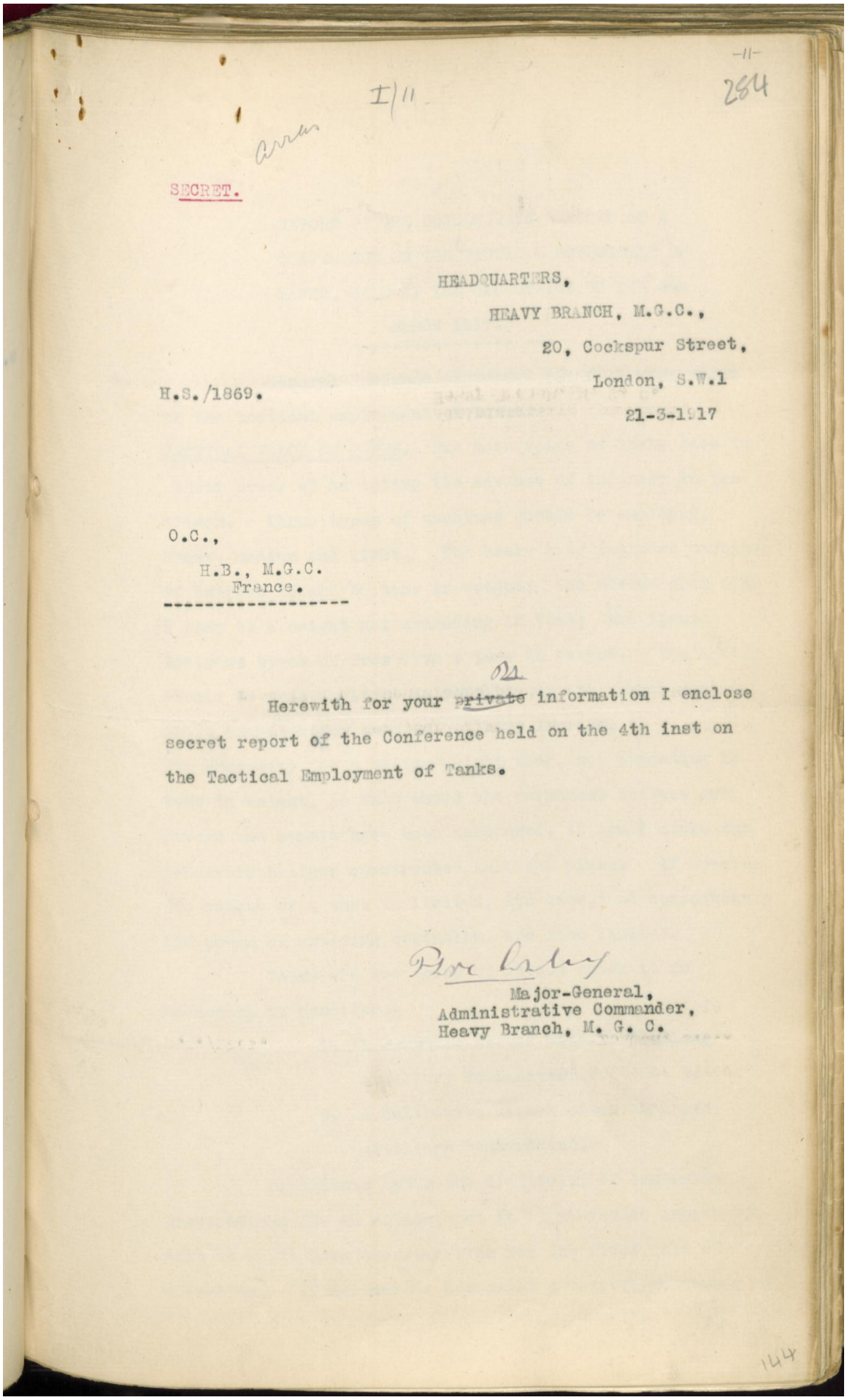

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SECRET.

HEADQUARTERS,
HEAVY BRANCH, M.G.C.,
20, Cockspur Street,
London, S.W.1
21-3-1917

H.S./1869.

O.C.,
H.B., M.G.C.
France.

Herewith for your ~~private~~ information I enclose secret report of the Conference held on the 4th inst on the Tactical Employment of Tanks.

Major-General,
Administrative Commander,
Heavy Branch, M. G. C.

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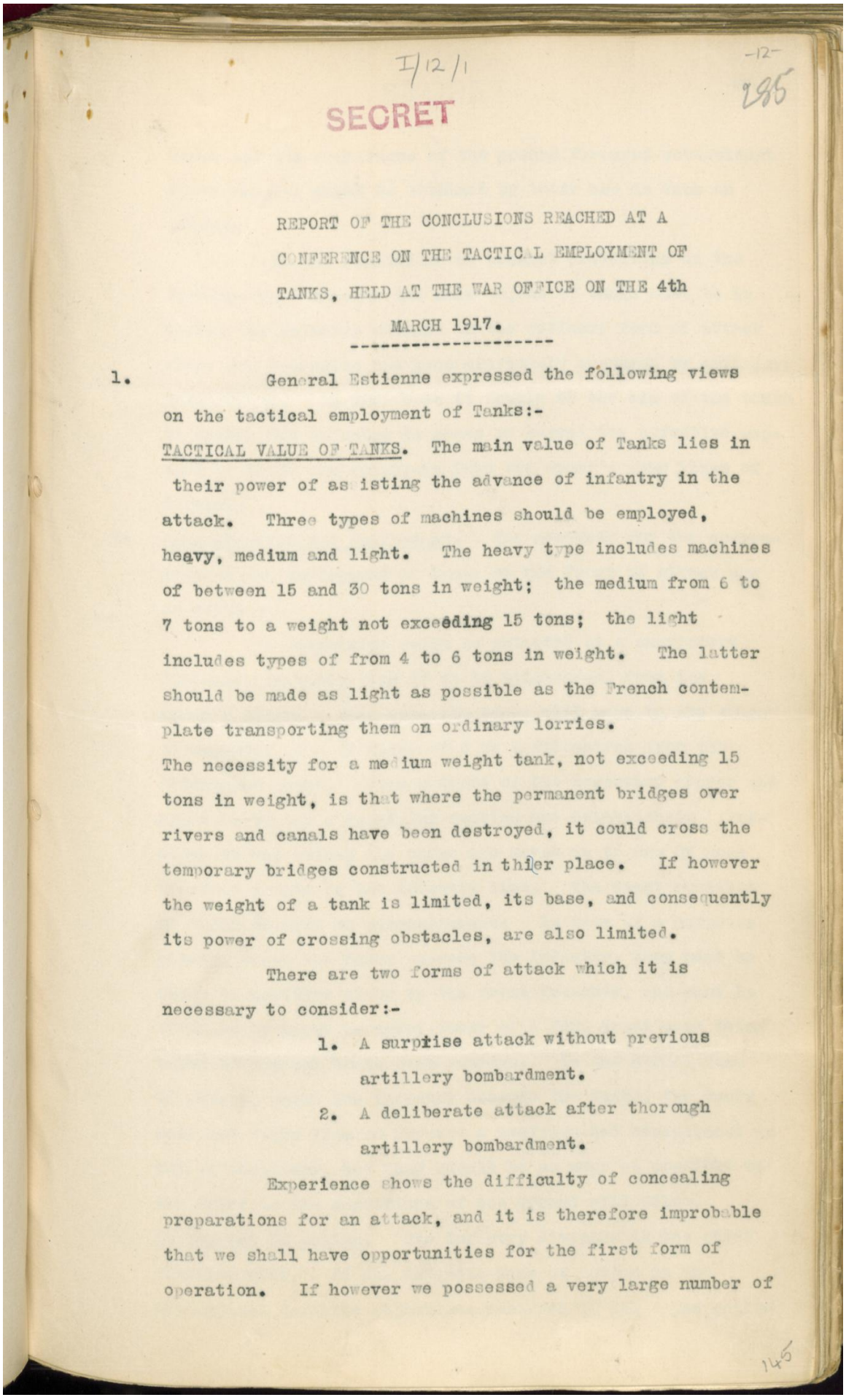

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SECRET

REPORT OF THE CONCLUSIONS REACHED AT A CONFERENCE ON THE TACTICAL EMPLOYMENT OF TANKS, HELD AT THE WAR OFFICE ON THE 4th MARCH 1917.

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1. General Estienne expressed the following views on the tactical employment of Tanks:-

TACTICAL VALUE OF TANKS. The main value of Tanks lies in their power of assisting the advance of infantry in the attack. Three types of machines should be employed, heavy, medium and light. The heavy type includes machines of between 15 and 30 tons in weight; the medium from 6 to 7 tons to a weight not exceeding 15 tons; the light includes types of from 4 to 6 tons in weight. The latter should be made as light as possible as the French contemplate transporting them on ordinary lorries.

The necessity for a medium weight tank, not exceeding 15 tons in weight, is that where the permanent bridges over rivers and canals have been destroyed, it could cross the temporary bridges constructed in thier place. If however the weight of a tank is limited, its base, and consequently its power of crossing obstacles, are also limited.

There are two forms of attack which it is necessary to consider:-

1. A surprise attack without previous artillery bombardment.
2. A deliberate attack after thorough artillery bombardment.

Experience shows the difficulty of concealing preparations for an attack, and it is therefore improbable that we shall have opportunities for the first form of operation. If however we possessed a very large number of

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Tanks and the conditions of the ground favoured concealment great results might be obtained by their use in such an attack.

In the conditions at present prevailing on the Western front however the main object of tanks must be to assist the infantry advance in the ordinary form of attack where the operation has been previously prepared by artillery bombardment. In this case it should be the aim of the tanks to enable the infantry to press on beyond the effective support of their own artillery into the enemy's rear lines of defence.

2. Concentration and deployment. The measures for the concentration and deployment of tanks on the front of attack are as follows:-

A detraining point is selected at a sufficient distance, probably from 10 to 12 kilometres, from the enemy's lines. From here the tanks will move to the place of assembly at a distance of 5 or 6 kilometres from the detraining point. Here a depot of the necessary stores and spare parts and a repairing section are established. Previous to the attack the tanks are moved up to one or more starting points in the infantry line. The exact position of these depends on circumstances. In case of a surprise attack, where the tanks precede the infantry, they must be ready in position close to the front trenches, and must be moved up by night or under cover of a fog, great care being taken to conceal these preparations. In the normal form of attack, where the infantry precede the tanks, the tanks need not start from so forward a position and concealment is not so necessary, but they should be as near as possible to the front as the conditions of the ground will allow.

3. Employment in action. The infantry division is the chief fighting unit. It has definite zone of action in the attack with definite objectives assigned to it. The action

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of the tanks must be co-ordinated with that of the divisions, and in the attack must be under the orders of the divisional commander. Let us suppose the front of attack of one division is 800 metres. One company on that front must be attached to the tank unit operating with that division, in order to maintain the liaison with the infantry and ensure community of objective. This company will detach 2 or 3 men to follow each tank for the purpose of rallying the rest of the infantry to the tanks.

The tanks will not under normal circumstances come into action until the infantry advance is checked by the enemy's strong points which may still be holding out in parts of the German line, and which have not been subjected to sufficient artillery bombardment.

The tanks then do the work which the artillery has been unable to accomplish. They move forward in lines of columns and then deploy on coming into action. They destroy machine gun emplacements and barbed wire and thus bring on the infantry after them in the later stages of the attack, and enable them to carry the successive enemy lines of defence.

The tank commander must assign some point where the tanks can reform after the attack.

4. Organisation.

A group of tanks should be allotted to each Army Corps and the Army Corps Commander should arrange for their distribution among the divisions. He should also if possible keep a reserve of tanks for use as may be required.

An ideal organisation for a tank unit would be one heavy, 3 or 4 medium and one light machine, the latter for the commander, but there are practical difficulties in the way of effecting it.

5. Role of different types of tanks.

The principles governing the employment of heavy, medium and light machines are as follows:-

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In an attack where success depends not on the element of surprise or on superior mobility but solely on weight of numbers and weight of metal, heavy tanks must be used. Even in a surprise attack on a strongly entrenched line/would be required to sweep away the wire and crush the where the tanks precede the infantry heavy machines enemy's resistance. There are, however, many cases where the lighter types would be of greater value. For instance, after a successful attack when the enemy has been forced out of his main positions, a reserve of medium and light tanks which can be rapidly brought up will be most useful in continuing the attack. In the defensive also light tanks which can be quickly brought up to support a counter-attack would be extremely effective. In open warfare especially the opportunities for light tanks would be very great. The French authorities also intend using their light type as an armoured motor car for commanders to visit the battle-field in order to maintain supervision of the progress of operations. The employment of the three types depends on the amount of mobility required and the nature of the country. The North of France, where there are comparatively few obstacles, is more suited to the employment of heavy machines than is the country in which the French Army is operating.

6. ARMAMENT.

In general, half the tanks should be armed with 75 m/m guns and half with machine guns.

The British representatives concurred in the general principles expressed above by General Estienne for the tactical employment of tanks.

7. Lt. Col. Stern and Sir E.T. d'Eyncourt, representing the Ministry of Munitions, raised the question of the use of tanks as an independent arm and of restricting their employment to ground not previously subjected to heavy bombardment.

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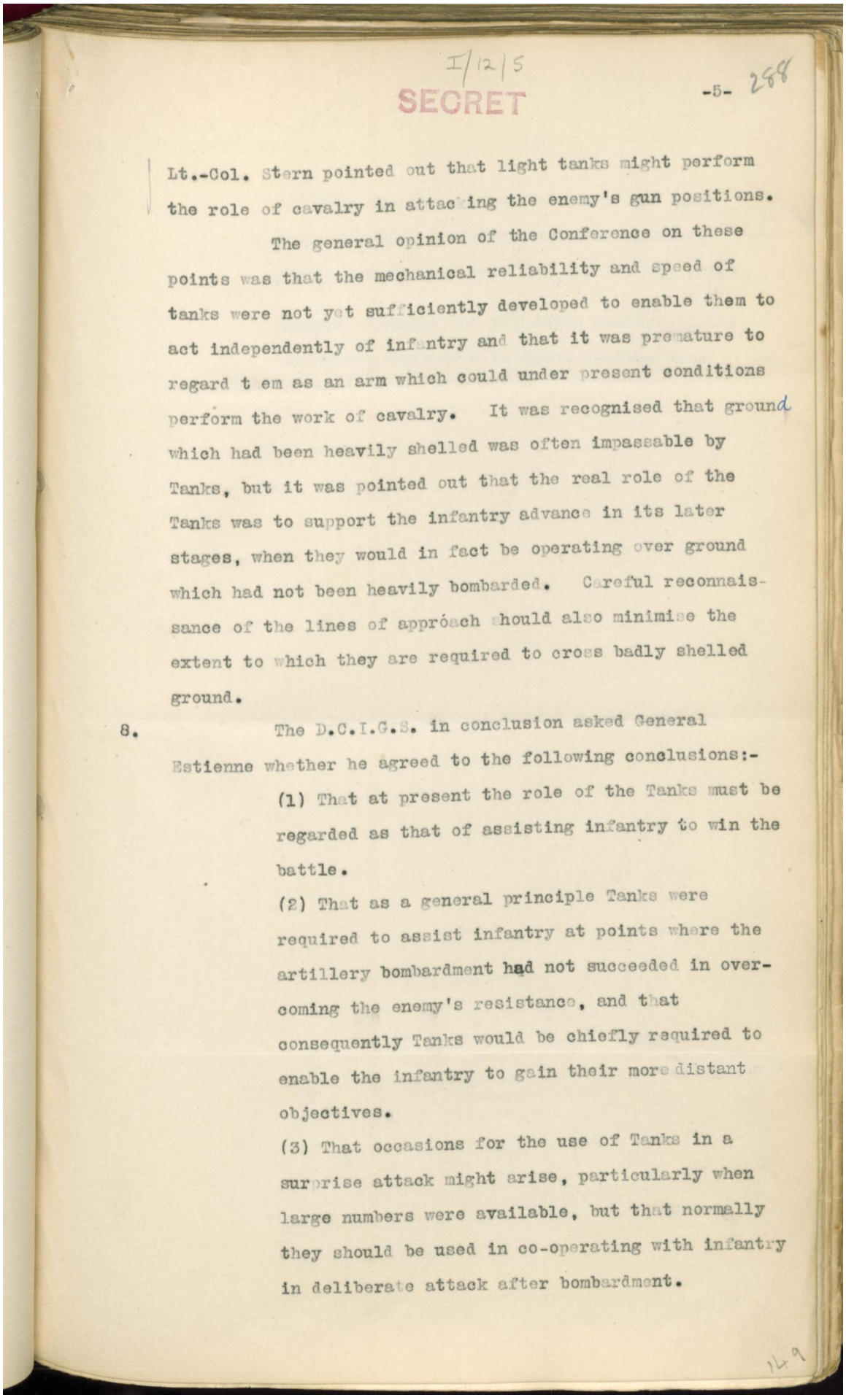

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Lt.-Col. Stern pointed out that light tanks might perform the role of cavalry in attacking the enemy's gun positions.

The general opinion of the Conference on these points was that the mechanical reliability and speed of tanks were not yet sufficiently developed to enable them to act independently of infantry and that it was premature to regard them as an arm which could under present conditions perform the work of cavalry. It was recognised that ground which had been heavily shelled was often impassable by Tanks, but it was pointed out that the real role of the Tanks was to support the infantry advance in its later stages, when they would in fact be operating over ground which had not been heavily bombarded. Careful reconnaissance of the lines of approach should also minimise the extent to which they are required to cross badly shelled ground.

8. The D.C.I.G.S. in conclusion asked General Estienne whether he agreed to the following conclusions:-

(1) That at present the role of the Tanks must be regarded as that of assisting infantry to win the battle.

(2) That as a general principle Tanks were required to assist infantry at points where the artillery bombardment had not succeeded in overcoming the enemy's resistance, and that consequently Tanks would be chiefly required to enable the infantry to gain their more distant objectives.

(3) That occasions for the use of Tanks in a surprise attack might arise, particularly when large numbers were available, but that normally they should be used in co-operating with infantry in deliberate attack after bombardment.

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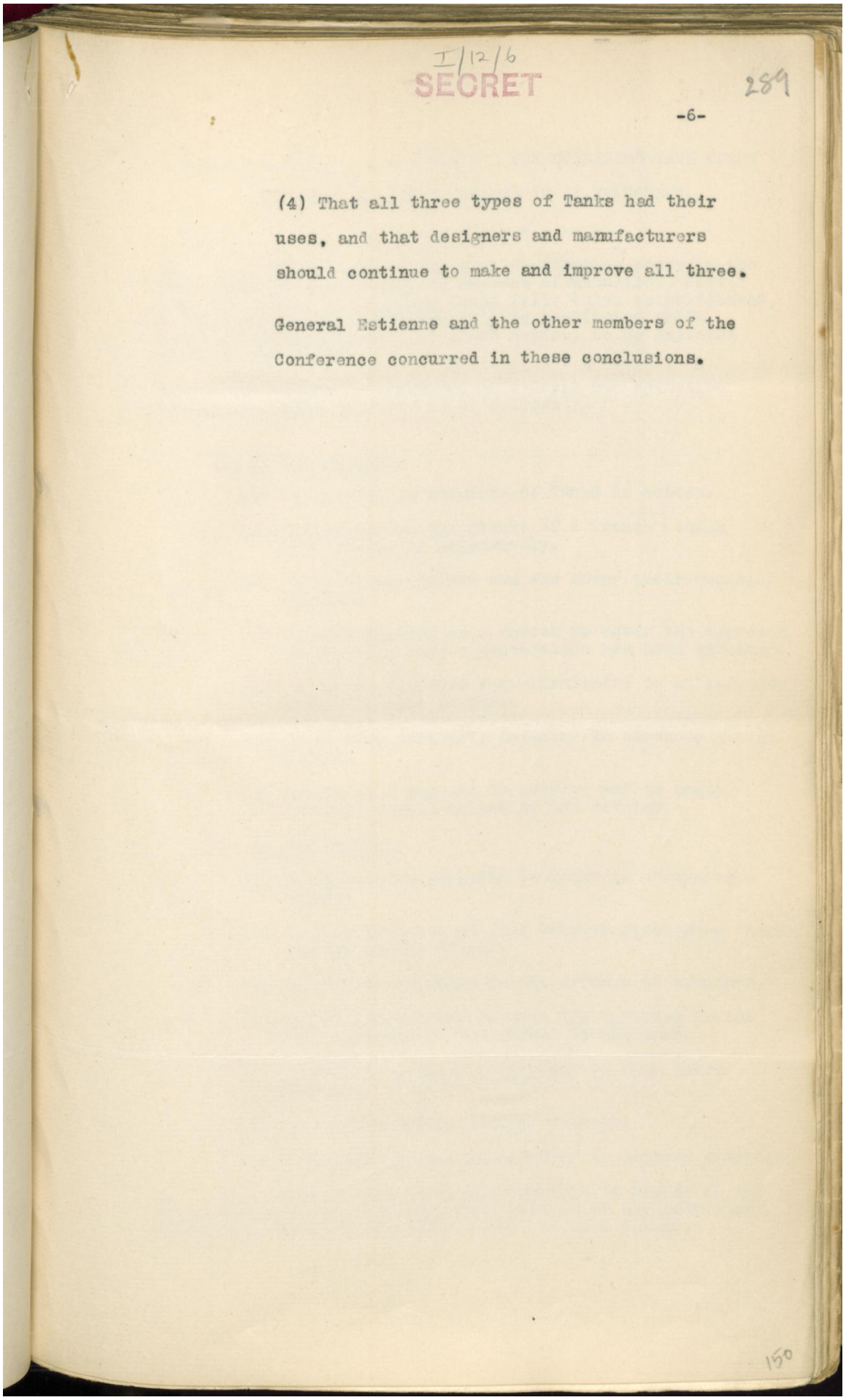

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(4) That all three types of Tanks had their uses, and that designers and manufacturers should continue to make and improve all three.

General Estienne and the other members of the Conference concurred in these conclusions.

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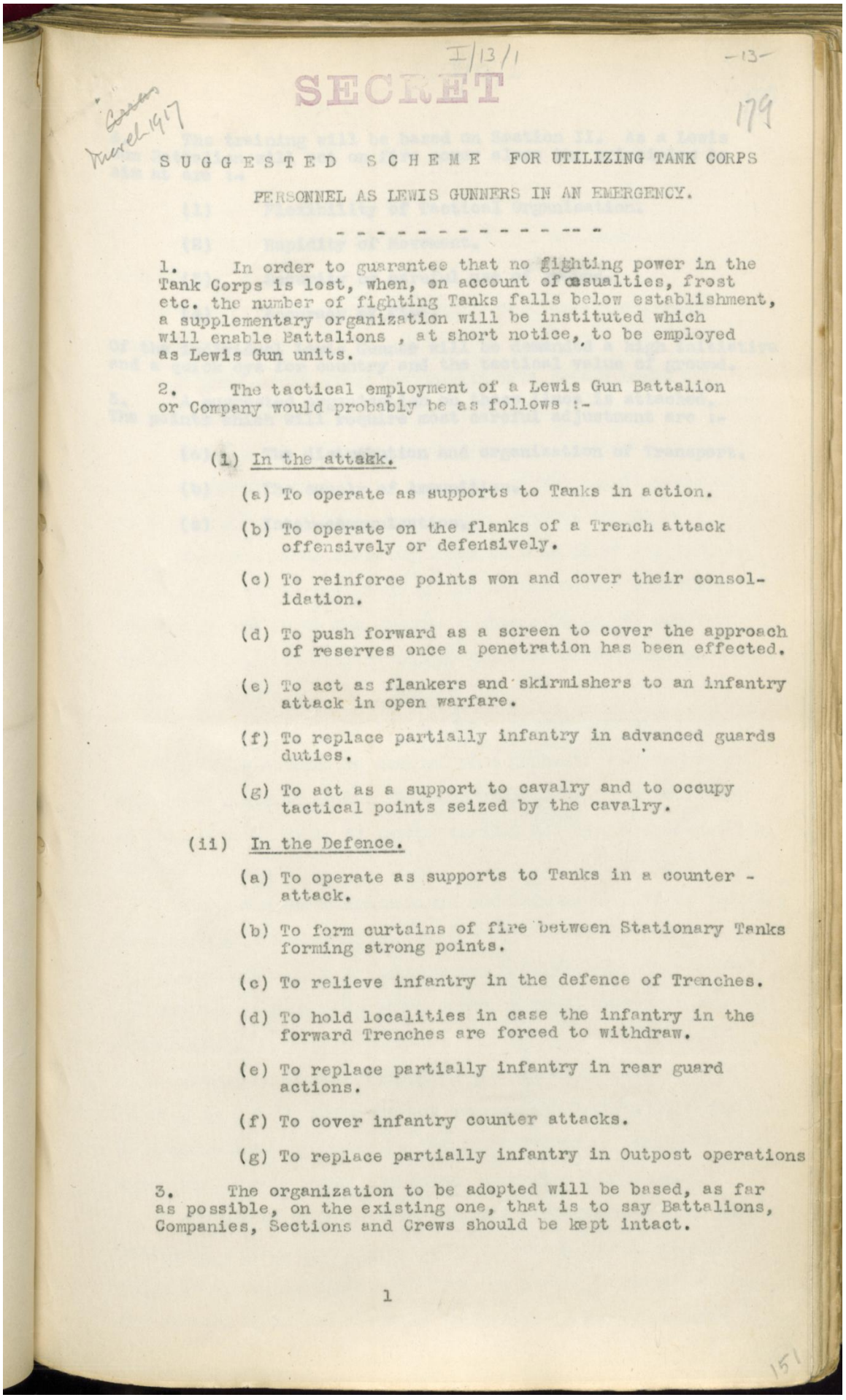

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S U G G E S T E D S C H E M E FOR UTILIZING TANK CORPS

PERSONNEL AS LEWIS GUNNERS IN AN EMERGENCY.

- - - - - - - - - - - - - - -

1. In order to guarantee that no fighting power in the Tank Corps is lost, when, on account of casualties, frost etc. the number of fighting Tanks falls below establishment, a supplementary organization will be instituted which will enable Battalions , at short notice, to be employed as Lewis Gun units.

2. The tactical employment of a Lewis Gun Battalion or Company would probably be as follows :-

(i) In the attack.

(a) To operate as supports to Tanks in action.

(b) To operate on the flanks of a Trench attack offensively or defensively.

(c) To reinforce points won and cover their consolidation.

(d) To push forward as a screen to cover the approach of reserves once a penetration has been effected.

(e) To act as flankers and skirmishers to an infantry attack in open warfare.

(f) To replace partially infantry in advanced guards duties.

(g) To act as a support to cavalry and to occupy tactical points seized by the cavalry.

(ii) In the Defence.

(a) To operate as supports to Tanks in a counter - attack.

(b) To form curtains of fire between Stationary Tanks forming strong points.

(c) To relieve infantry in the defence of Trenches.

(d) To hold localities in case the infantry in the forward Trenches are forced to withdraw.

(e) To replace partially infantry in rear guard actions.

(f) To cover infantry counter attacks.

(g) To replace partially infantry in Outpost operations

3. The organization to be adopted will be based, as far as possible, on the existing one, that is to say Battalions, Companies, Sections and Crews should be kept intact.

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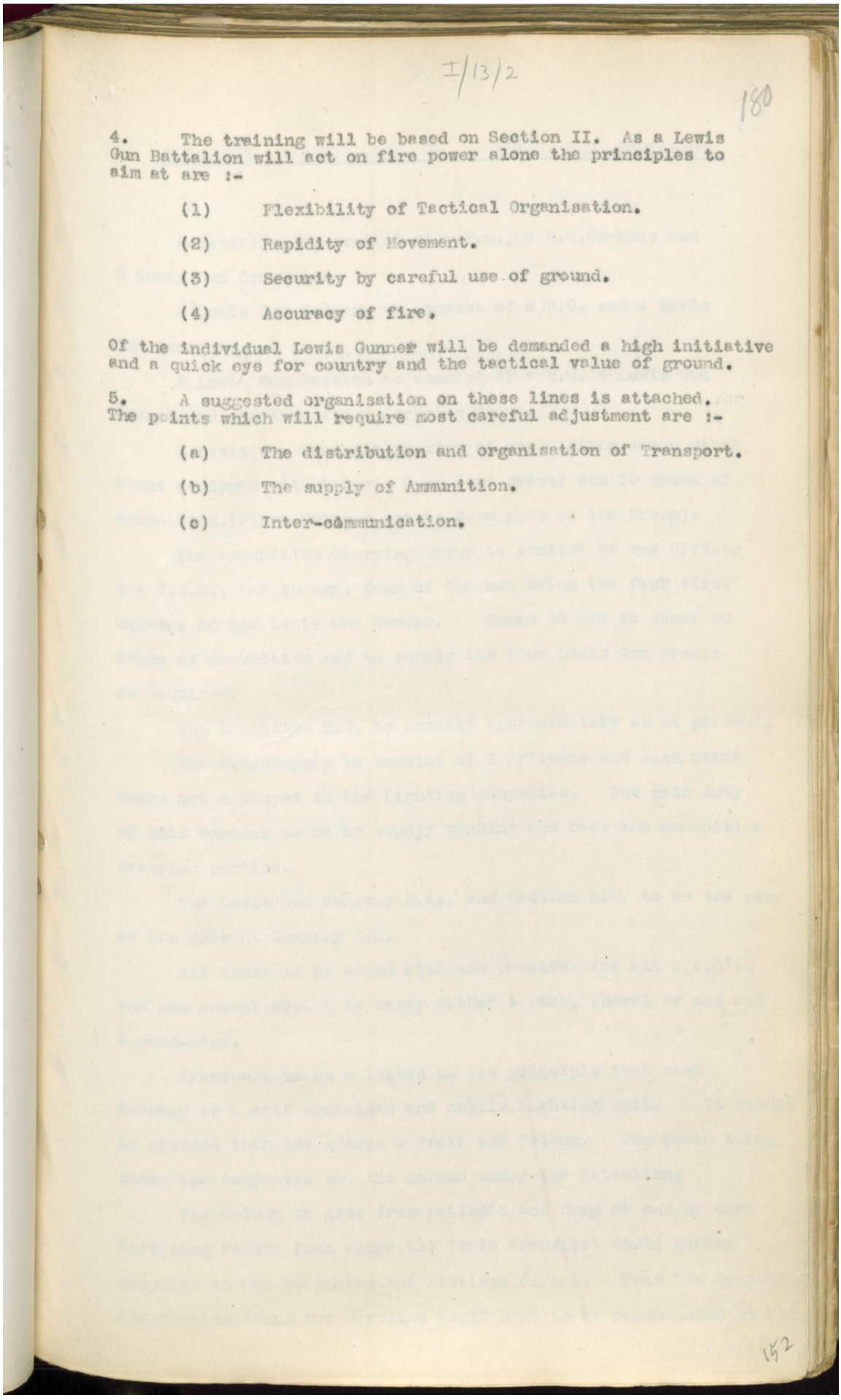

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4. The training will be based on Section II. As a Lewis Gun Battalion will act on fire power alone the principles to aim at are :-

(1) Flexibility of Tactical Organisation.

(2) Rapidity of Movement.

(3) Security by careful use of ground.

(4) Accuracy of fire.

Of the individual Lewis Gunner will be demanded a high initiative and a quick eye for country and the tactical value of ground.

5. A suggested organisation on these lines is attached. The points which will require most careful adjustment are :-

(a) The distribution and organisation of Transport.

(b) The supply of Ammunition.

(c) Inter-communication.

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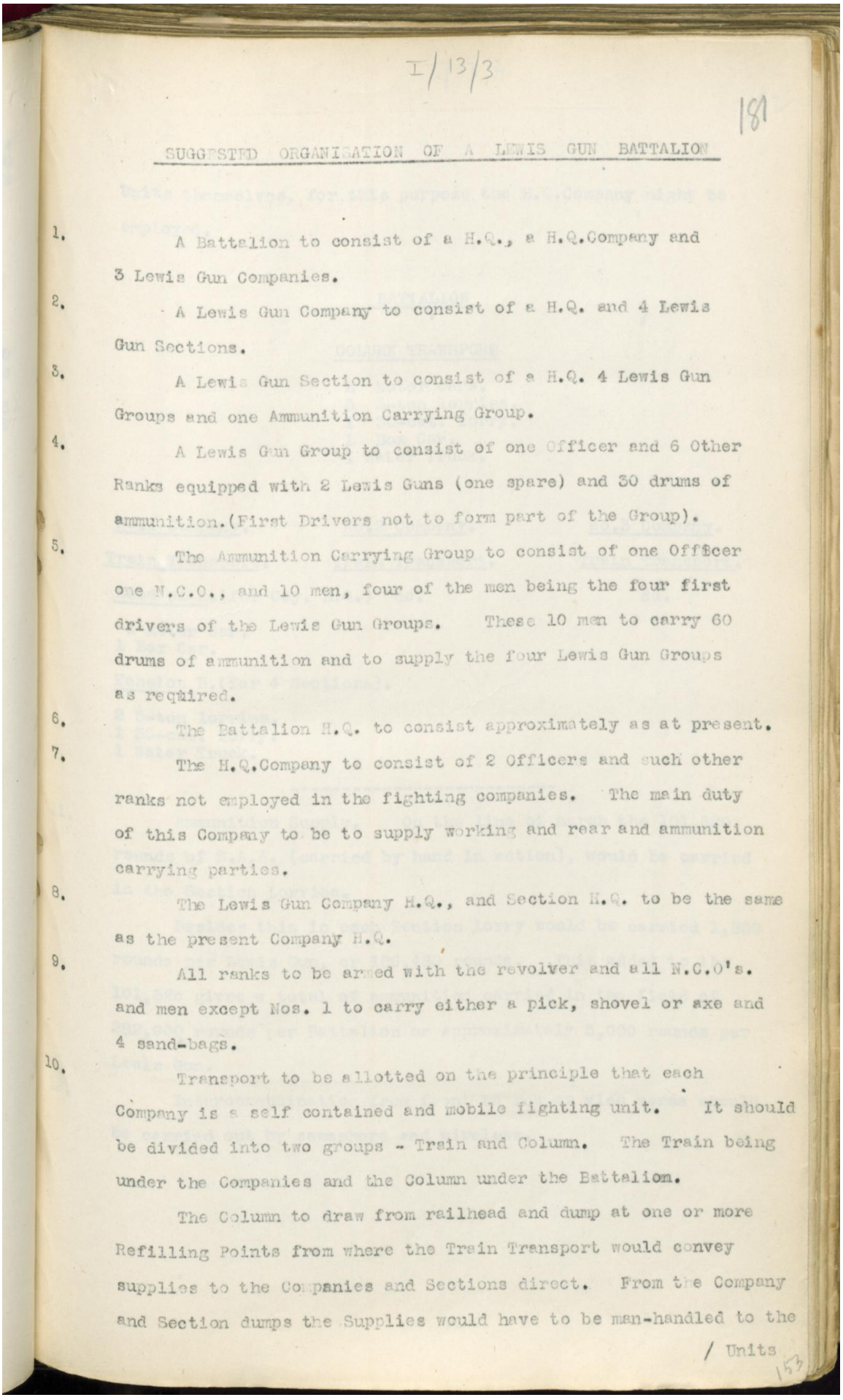

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SUGGESTED ORGANISATION OF A LEWIS GUN BATTALION

1. A Battalion to consist of a H.Q., a H.Q.Company and 3 Lewis Gun Companies.

2. A Lewis Gun Company to consist of a H.Q. and 4 Lewis Gun Sections.

3. A Lewis Gun Section to consist of a H.Q. 4 Lewis Gun Groups and one Ammunition Carrying Group.

4. A Lewis Gun Group to consist of one Officer and 6 Other Ranks equipped with 2 Lewis Guns (one spare) and 30 drums of ammunition.(First Drivers not to form part of the Group).

5. The Ammunition Carrying Group to consist of one Officer one N.C.O., and 10 men, four of the men being the four first drivers of the Lewis Gun Groups. These 10 men to carry 60 drums of ammunition and to supply the four Lewis Gun Groups as required.

6. The Battalion H.Q. to consist approximately as at present.

7. The H.Q.Company to consist of 2 Officers and such other ranks not employed in the fighting companies. The main duty of this Company to be to supply working and rear and ammunition carrying parties.

8. The Lewis Gun Company H.Q., and Section H.Q. to be the same as the present Company H.Q.

9. All ranks to be armed with the revolver and all N.C.O's. and men except Nos. 1 to carry either a pick, shovel or axe and 4 sand-bags.

10. Transport to be allotted on the principle that each Company is a self contained and mobile fighting unit. It should be divided into two groups - Train and Column. The Train being under the Companies and the Column under the Battaliom.

The Column to draw from railhead and dump at one or more Refilling Points from where the Train Transport would convey supplies to the Companies and Sections direct. From the Company and Section dumps the Supplies would have to be man-handled to the

/ Units

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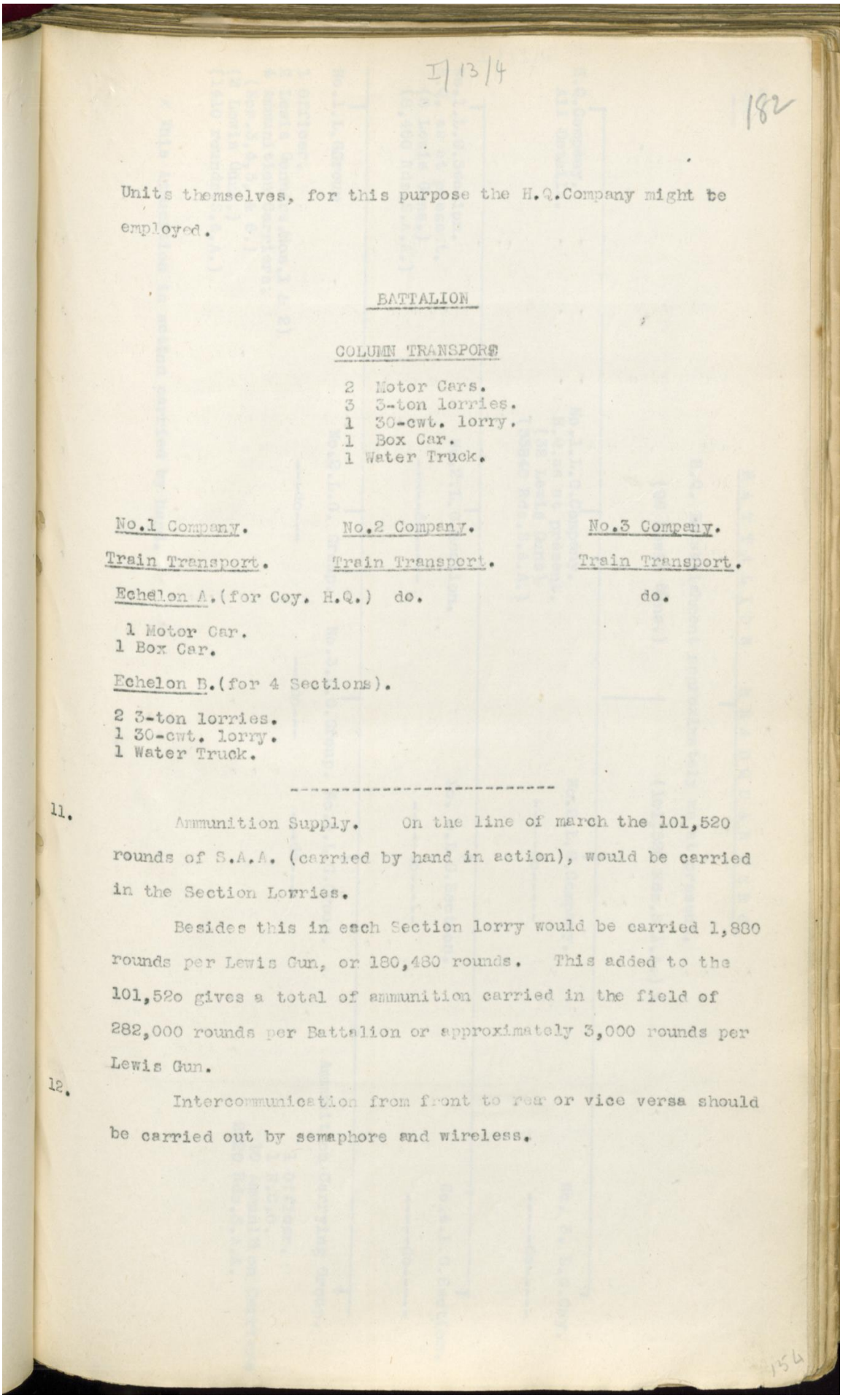

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Units themselves, for this purpose the H.Q.Company might be employed.

BATTALION

COLUMN TRANSPORT

2 Motor Cars.
3 3-ton lorries.
1 30-cwt. lorry.
1 Box Car.
1 Water Truck.

No.1 Company.	No.2 Company.	No.3 Company.
Train Transport.	Train Transport.	Train Transport.
Echelon A.(for Coy. H.Q.)	do.	do.
1 Motor Car. 1 Box Car.		
Echelon B.(for 4 Sections).		
2 3-ton lorries. 1 30-cwt. lorry. 1 Water Truck.		

---

11. Ammunition Supply. On the line of march the 101,520 rounds of S.A.A. (carried by hand in action), would be carried in the Section Lorries.

Besides this in each Section lorry would be carried 1,880 rounds per Lewis Gun, or 180,480 rounds. This added to the 101,520 gives a total of ammunition carried in the field of 282,000 rounds per Battalion or approximately 3,000 rounds per Lewis Gun.

12. Intercommunication from front to rear or vice versa should be carried out by semaphore and wireless.

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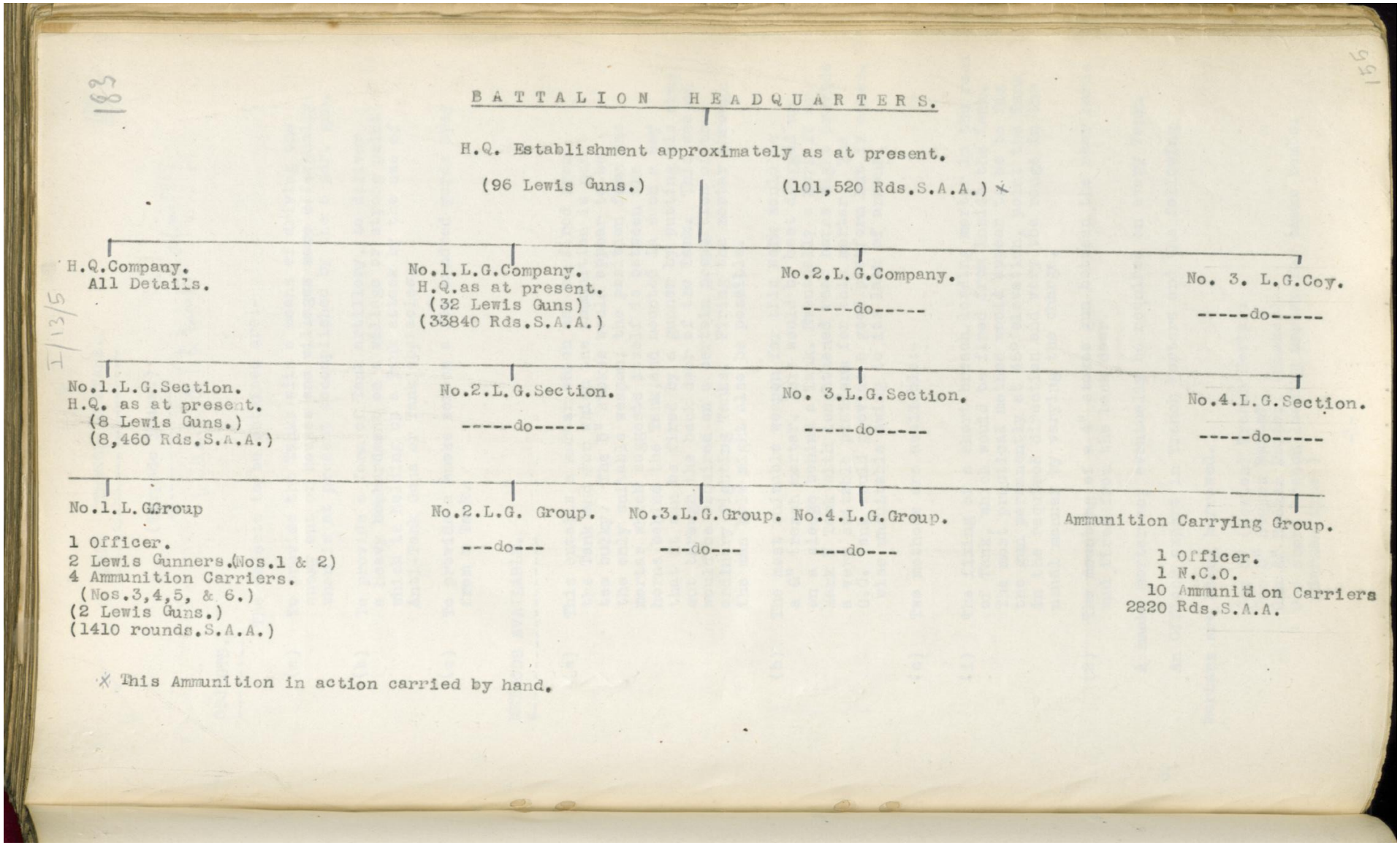

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BATTALION HEADQUARTERS.

H.Q. Establishment approximately as at present.

(96 Lewis Guns.) (101,520 Rds.S.A.A.) ✕

H.Q.Company.
All Details.

No.1.L.G.Company.
H.Q.as at present.
(32 Lewis Guns)
(33840 Rds.S.A.A.)

No.2.L.G.Company.
-----do-----

No. 3. L.G.Coy.
-----do-----

No.1.L.G.Section.
H.Q. as at present.
(8 Lewis Guns.)
(8,460 Rds.S.A.A.)

No.2.L.G.Section.
-----do-----

No. 3.L.G.Section.
-----do-----

No.4.L.G.Section.
-----do-----

No.1.L.G.Group

1 Officer.
2 Lewis Gunners.(Nos.1 & 2)
4 Ammunition Carriers.
(Nos.3,4,5, & 6.)
(2 Lewis Guns.)
(1410 rounds.S.A.A.)

No.2.L.G. Group.
---do---

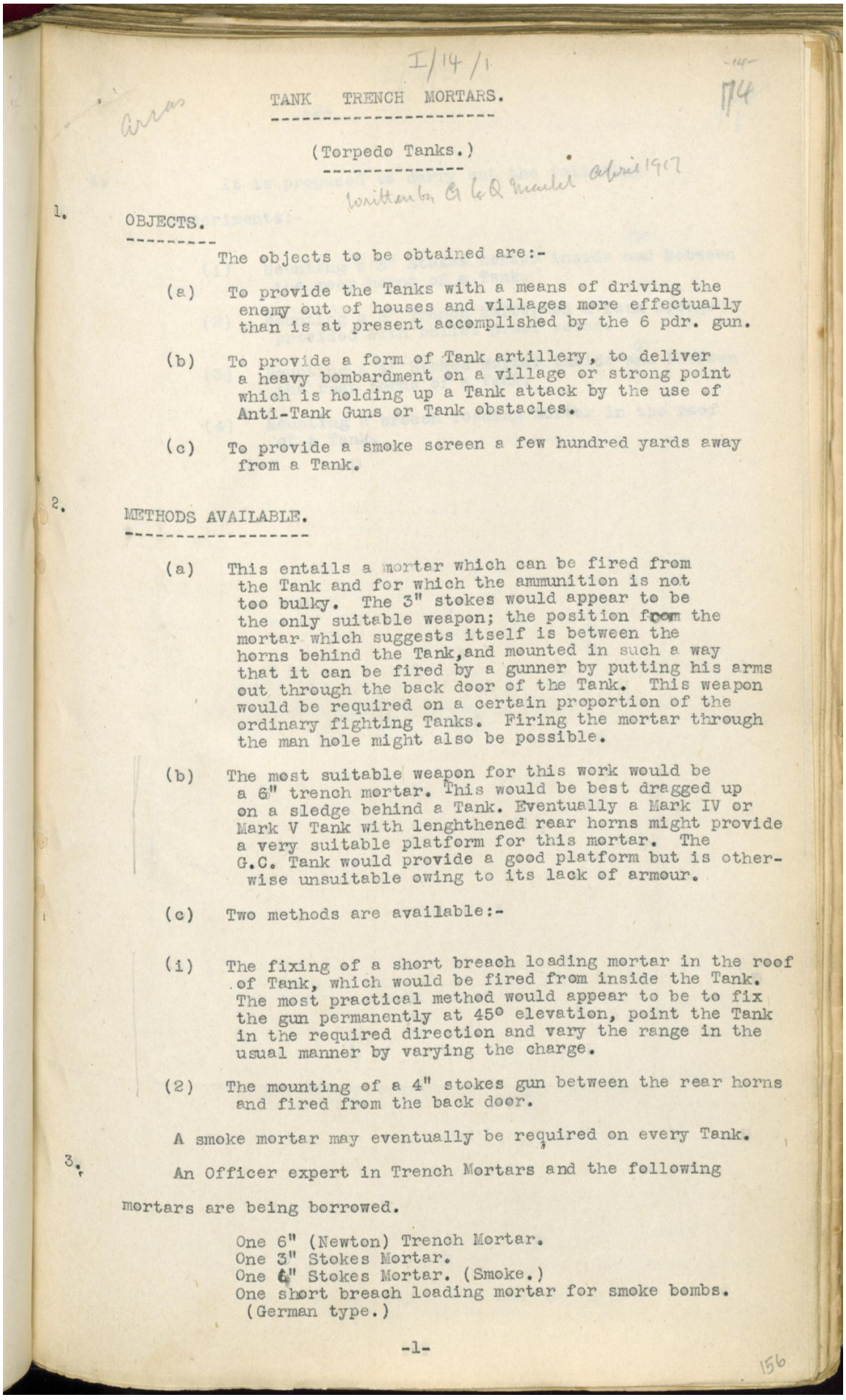
No.3.L.G.Group.
---do---

No.4.L.G.Group.
---do---

Ammunition Carrying Group.

1 Officer.
1 N.C.O.
10 Ammunition Carriers
2820 Rds.S.A.A.

✕ This Ammunition in action carried by hand.



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Areas

TANK TRENCH MORTARS.

(Torpedo Tanks.)

Written by G & Q Manuel about April 1917

1. OBJECTS.

The objects to be obtained are:-

(a) To provide the Tanks with a means of driving the enemy out of houses and villages more effectually than is at present accomplished by the 6 pdr. gun.

(b) To provide a form of Tank artillery, to deliver a heavy bombardment on a village or strong point which is holding up a Tank attack by the use of Anti-Tank Guns or Tank obstacles.

(c) To provide a smoke screen a few hundred yards away from a Tank.

2. METHODS AVAILABLE.

(a) This entails a mortar which can be fired from the Tank and for which the ammunition is not too bulky. The 3" stokes would appear to be the only suitable weapon; the position from the mortar which suggests itself is between the horns behind the Tank, and mounted in such a way that it can be fired by a gunner by putting his arms out through the back door of the Tank. This weapon would be required on a certain proportion of the ordinary fighting Tanks. Firing the mortar through the man hole might also be possible.

(b) The most suitable weapon for this work would be a 6" trench mortar. This would be best dragged up on a sledge behind a Tank. Eventually a Mark IV or Mark V Tank with lenghthened rear horns might provide a very suitable platform for this mortar. The G.C. Tank would provide a good platform but is otherwise unsuitable owing to its lack of armour.

(c) Two methods are available:-

(i) The fixing of a short breach loading mortar in the roof of Tank, which would be fired from inside the Tank. The most practical method would appear to be to fix the gun permanently at 45° elevation, point the Tank in the required direction and vary the range in the usual manner by varying the charge.

(2) The mounting of a 4" stokes gun between the rear horns and fired from the back door.

A smoke mortar may eventually be required on every Tank.

3. An Officer expert in Trench Mortars and the following mortars are being borrowed.

One 6" (Newton) Trench Mortar.
One 3" Stokes Mortar.
One 4" Stokes Mortar. (Smoke.)
One short breach loading mortar for smoke bombs. (German type.)

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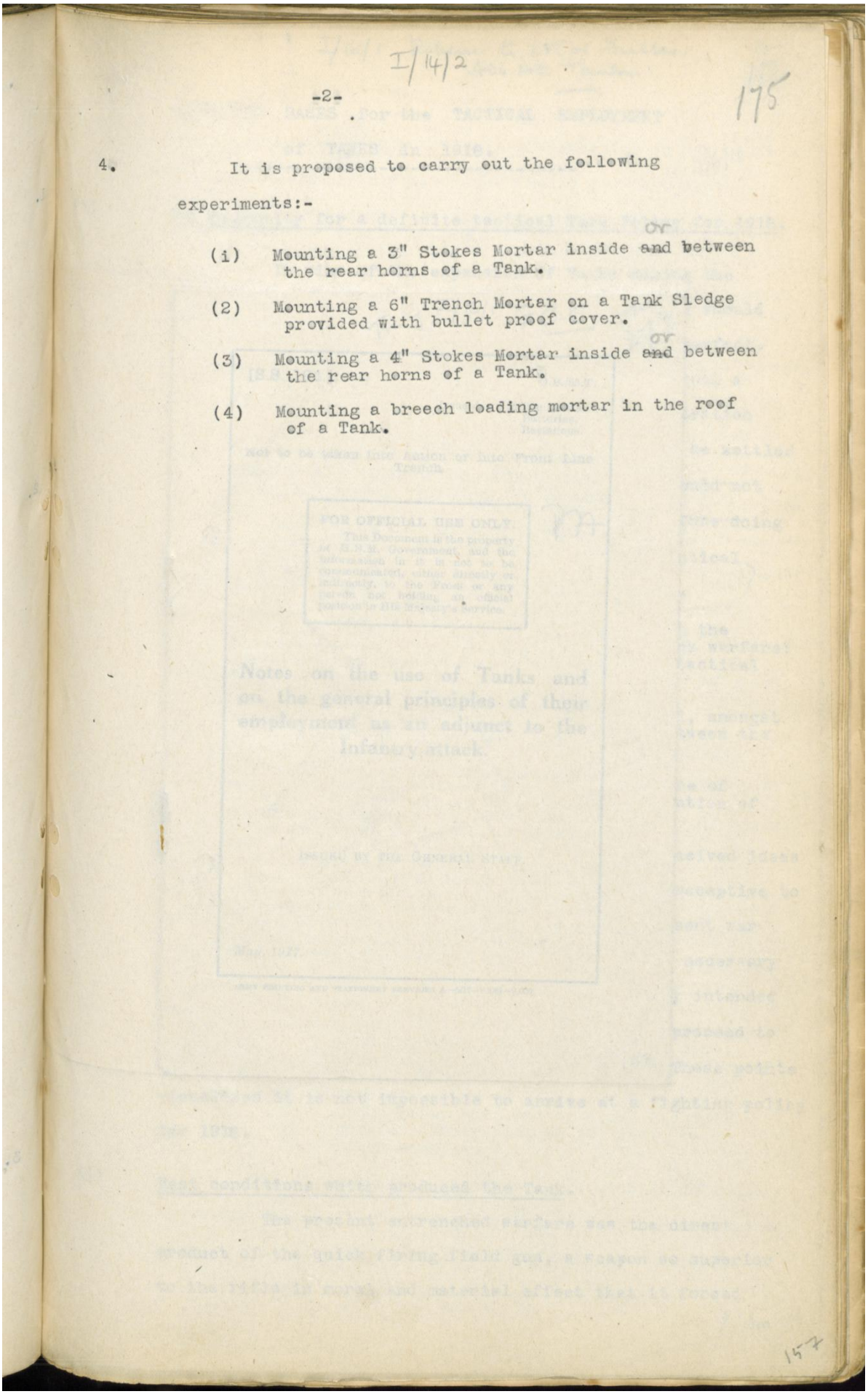

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4. It is proposed to carry out the following experiments:-

(1) Mounting a 3" Stokes Mortar inside ~~and~~ or between the rear horns of a Tank.

(2) Mounting a 6" Trench Mortar on a Tank Sledge provided with bullet proof cover.

(3) Mounting a 4" Stokes Mortar inside ~~and~~ or between the rear horns of a Tank.

(4) Mounting a breech loading mortar in the roof of a Tank.

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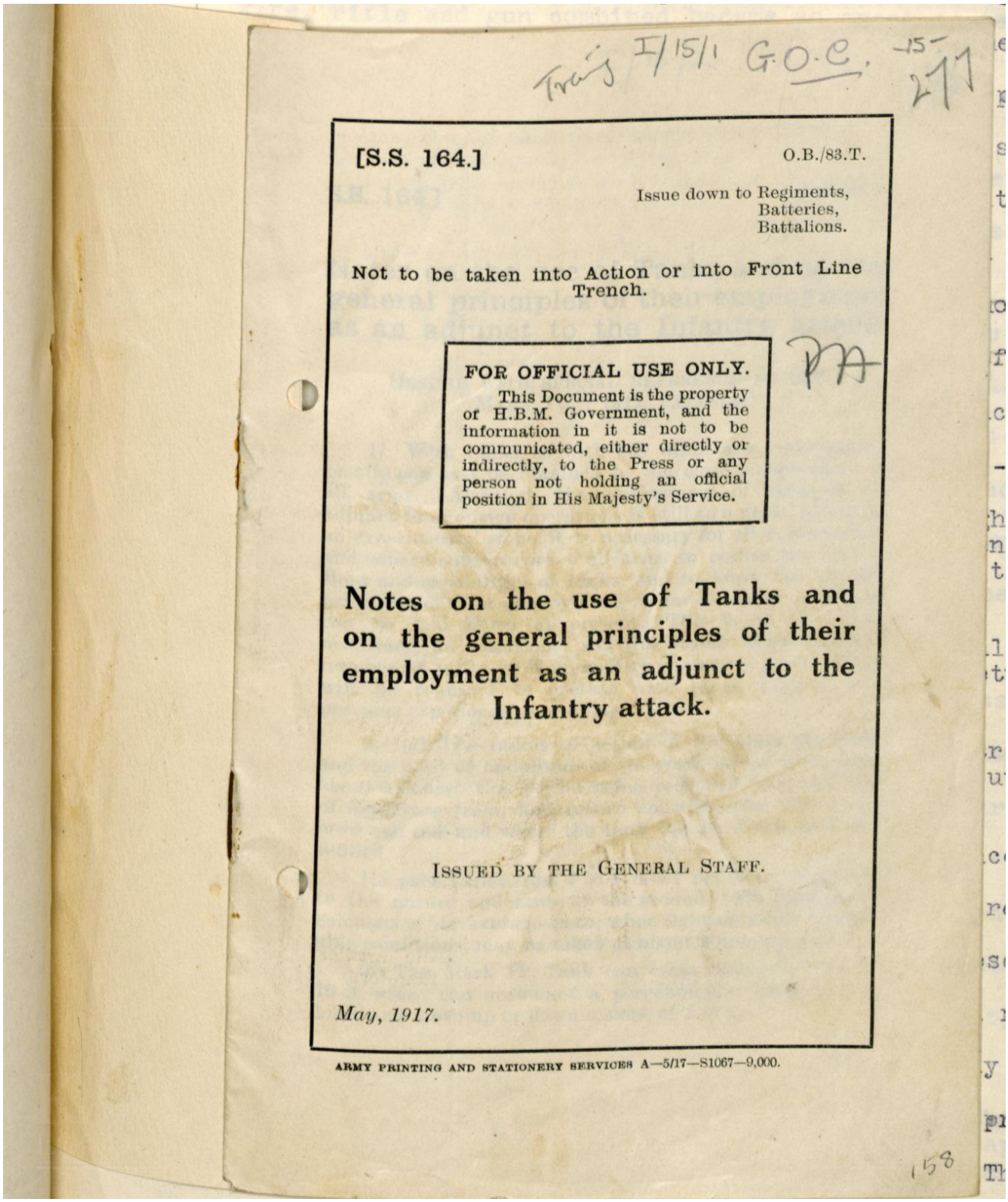

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[S.S. 164.] O.B./83.T.

Issue down to Regiments,
Batteries,
Battalions.

Not to be taken into Action or into Front Line Trench.

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PA

Notes on the use of Tanks and on the general principles of their employment as an adjunct to the Infantry attack.

ISSUED BY THE GENERAL STAFF.

May, 1917.

ARMY PRINTING AND STATIONERY SERVICES A—5/17—S1067—9,000.

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S.S. 164.] [O.B./83.T.

Notes on the use of Tanks and on the general principles of their employment as an adjunct to the Infantry attack.

(ISSUED WITH SPECIAL REFERENCE TO THE "MARK IV.", 1917, PATTERN.)

Coop

1. With tanks, as with any other arm, satisfactory results can only be obtained by the close co-operation of all arms. Although the employment of tanks as an adjunct to offensive operations is still to a great extent in an experimental stage, it is necessary for all commanders and subordinate leaders of all arms to realise the limitations and capabilities of tanks, and to know the general principles of their employment, so far as these principles can be laid down at present. This is all the more necessary, as occasions will inevitably arise (as the number of tanks in this country increases) when troops will be required to operate with tanks without any previous experience or training.

2. (*a*) The radius of action of the Mark IV. Tank, and the limit of endurance of its crew, is not more than about 8 hours; this period being reckoned from the time of departure from, and return to, a position where the crew can rest and where the tank can be overhauled and refilled.

Its pace varies from ½ to 4 miles per hour, according to the nature and state of the ground. For purposes of calculation its average pace, when fighting under favourable conditions, may be taken at about 2 miles per hour.

(*b*) The Mark IV. Tank can cross trenches 9 ft. to 10 ft. wide; can surmount a perpendicular obstacle 4 ft. high, and move up or down a slope of 1 in 2.

3

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visualized it is not impossible to arrive at a fight

So long as the bottom is hard, mud or water, to a depth of 2 ft. or so, is no bar to its progress; but, owing to its weight, ground that has been very heavily shelled, or is very sodden to a considerable depth, is unfavourable to its employment.

(*c*) Wire entanglements do not form any obstacle to tanks, but the passage of a single tank will only as a rule flatten two passages 2 ft. wide through the wire. The passage by infantry in single file may, therefore, be made easier, but the wire remains more or less an obstacle.

Tanks can pass easily through thick hedges or thick woods composed of small trees, but large stumps of broken trees are difficult to see, and form a serious obstacle to tanks.

In villages they can operate with success so long as the streets are recognisable; but when the village is reduced to heaps of rubble, tanks are liable to get ditched in the cellars.

(*d*) Although the Mark IV. Tank has an improved silencer, it can still be heard when in movement within 250 yards, unless the noise is covered by a certain amount of machine gun or artillery fire. The approach of a tank to its final position preparatory to attack should always, therefore, be covered by a certain amount of shooting.

3. Against infantry or machine guns tanks are almost invulnerable (the Mark IV. Tank is practically proof against the German armour-piercing bullet) and have great moral effect, as well as considerable fire power; but the effect that each tank exercises is purely local. On the other hand, when stationary, they form an easy target for the enemy's artillery, though hard to hit effectively when in motion. In addition, they are easily put out of action by a hostile anti-tank gun.

It follows, therefore, that—

(i.) It is essential that the action of the artillery and the employment of tanks should be carefully co-ordinated. Tanks always draw hostile artillery fire, and counter-battery work is, therefore, of particular importance.

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(ii.) An artillery barrage will usually be necessary both to assist tanks in overcoming stationary anti-tank armament, and to cover the advance of the infantry in the usual way.

(iii.) Tanks should keep constantly in motion unless they are covered from hostile artillery fire, *e.g.*, by the configuration of the ground or being amongst the enemy's troops.

4. The power of tanks is considerably limited by poor vision, which makes it difficult to recognise objectives or to follow complicated routes. As a general rule, therefore, the most suitable objective for tanks is a clearly defined line of trenches. In any case, the objectives assigned should be visible and obvious, and the task simple, definite and limited.

In detailing tanks to objectives, it should be borne in mind that:—

(i.) As far as possible, the general direction of their advance should be parallel to that of the infantry. Movements of tanks diagonal to that of the infantry have been found to draw the latter off their objective or line of advance.

(ii.) The best moral effect is obtained, where conditions are suitable, from the employment of large numbers of tanks attacking several objectives simultaneously.

On the other hand, to provide for emergencies, and to replace tanks which from one cause or another have been unable to reach their objective, a proportion of tanks should be kept in reserve.

These conflicting requirements must be carefully balanced according to the circumstances of each case.

(iii.) As a general rule it is useless to give tanks the task of *finding* objectives; such as detailing a single tank to look for a machine gun which has not been located. If machine guns have been accurately located, tanks are most useful to overcome them.

(iv.) The fewer the tanks employed on a given front, the easier it will be for the enemy to concentrate his guns on the tanks, and the greater will be

5

visualized it is not impossible to arrive at a fight

the proportion of tanks knocked out. Also, owing to accidents of ground, or mechanical trouble, it is not safe to rely on all tanks reaching their objectives. For these reasons it will seldom be advisable to detail less than a section of tanks for any one objective.

(v.) Tanks can force their way into almost any objective, but cannot halt to hold them in the open, where they are exposed to direct hits by hostile artillery. The position gained must be taken over by the infantry. When this has been done, tanks should move on to another objective or to the rallying point. If the infantry are not able to reach the tanks, it will seldom be any use for the tanks to continue their advance.

5. The frontage to be covered by tanks is governed by the particular situation of objectives and by the facilities of approach. They should not normally work less than 100 yards apart.

Very careful previous reconnaissance is essential in order that tanks should not be deliberately committed to an impracticable route. A plentiful supply of aeroplane photographs must be supplied to the tanks for this purpose.

In addition, the routes to the starting point require very detailed examination in order to ensure tanks arriving in time.

6. It should seldom be necessary to employ tanks at the commencement of an offensive to assist the infantry assault on a hostile front system of trenches, which can be adequately dealt with, and destroyed, by our own artillery bombardment.

As the appearance of tanks will immediately bring down a hostile artillery barrage, they should not usually precede, or even start, with infantry at the commencement of an attack.

Normally, tanks should wait concealed at first, and go out later :—

(i.) To deal with pockets of the enemy and strong points holding out in the objectives captured.

(ii.) To deal with defences beyond the hostile front system which are interfering with the progress of the battle by holding up the advance of the leading troops.

(iii.) When the infantry has reached the furthest objective and there is sufficient space beyond, to work with infantry patrols and advanced guards and help them to deal with machine guns.

They may also be employed for special tasks such as :—

(iv.) Covering the formation of a defensive flank by working outwards so as to provide more room for consolidation.

(v.) Flattening sunken or concealed wire which cannot be cut by artillery fire. The chances of success are not great, and their use for such an abnormal purpose should be rare.

The role of tanks stated above will usually entail their passing through the hostile barrage. This can be effected without undue loss, so long as the tanks keep moving.

7. From the foregoing, the general principles of the employment of tanks may be summarised as follows :—

(i.) Each tank formation should be disposed in depth so that if the leading tanks become casualties, others can move up to carry out the task.

(ii.) The tanks should follow the infantry immediately after the first assault, with a view to:—

(*a*) Assisting the infantry to mop up pockets of the enemy.

(*b*) To push on to special objectives, or carry out suitable tasks, which will usually be found in and beyond the second objective of the main infantry attack.

(iii.) The tasks and role of the tanks should be worked out by the commanders concerned in the same way, and in co-ordination with, the artillery programme, and each tank attack should be supported by mopping up parties and sufficient infantry to consolidate and hold the objectives when gained.

8. Both for the reason that a tank draws fire and on account of its liability to lose direction, infantry should not as a rule, immediately follow tanks (except for the purpose of passing through wire entanglements), and any tendency to bunch behind the tank should be checked.

From the limited experience available, it would appear at present that the most suitable formation for the infantry to adopt is to follow tanks in small groups, in the intervals between the tanks. The advance of the infantry to the objective being controlled in the ordinary manner, independent of any deviation of route taken by the tanks.

9. For purposes of administration, tanks are G.H.Q. Troops, and will be allotted in Brigades to Armies for certain operations.

The Army will allot tanks in Brigades or Battalions to the Corps, in accordance with the general plan. The tank units so allotted become, for purposes of the battle, Corps Troops, and their objectives will be decided by the Corps. The details of the movements of tanks to gain these objectives will be worked out in conjunction with the Division under whose orders they are placed for the specific operation.

10. The signal arrangements of the Heavy Branch, Machine Gun Corps are not yet completely organised, but are being framed with a view to providing communication between—

The O.C. Tank Brigade and the Army or Corps Commander.

The O.C. Tank Battalion and the Corps or Divisional Commander.

The O.C. Tank Company and the Divisional or Brigade Commander, under whose orders he is operating.

The O.C. Tank Section and the Infantry Commander on the spot.

The fighting tanks and the forward troops (and by pigeons to the commander of the operations).

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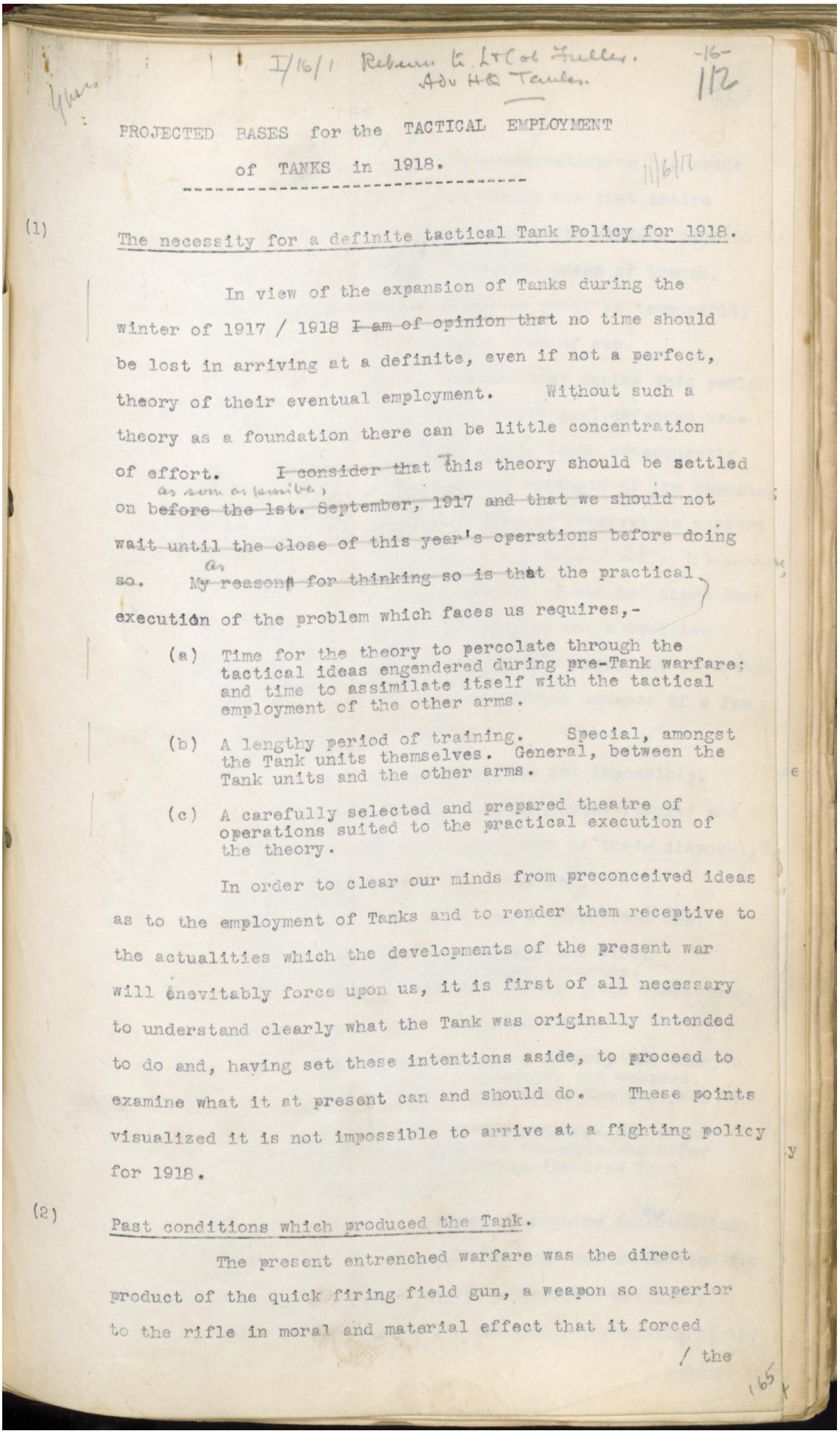

I/16/1 Return to LtCol Fuller. Adv HQ Tanks. -16- 112

Yours

PROJECTED BASES for the TACTICAL EMPLOYMENT of TANKS in 1918.

11/6/17

(1) The necessity for a definite tactical Tank Policy for 1918.

In view of the expansion of Tanks during the winter of 1917 / 1918 ~~I am of opinion that~~ no time should be lost in arriving at a definite, even if not a perfect, theory of their eventual employment. Without such a theory as a foundation there can be little concentration of effort. ~~I consider that~~ this theory should be settled as soon as possible on ~~before the 1st. September, 1917 and that we should not~~ wait until the close of this year's operations before doing so. ~~My reasons~~ As for thinking so is that the practical execution of the problem which faces us requires,-

(a) Time for the theory to percolate through the tactical ideas engendered during pre-Tank warfare; and time to assimilate itself with the tactical employment of the other arms.

(b) A lengthy period of training. Special, amongst the Tank units themselves. General, between the Tank units and the other arms.

(c) A carefully selected and prepared theatre of operations suited to the practical execution of the theory.

In order to clear our minds from preconceived ideas as to the employment of Tanks and to render them receptive to the actualities which the developments of the present war will inevitably force upon us, it is first of all necessary to understand clearly what the Tank was originally intended to do and, having set these intentions aside, to proceed to examine what it at present can and should do. These points visualized it is not impossible to arrive at a fighting policy for 1918.

(2) Past conditions which produced the Tank.

The present entrenched warfare was the direct product of the quick firing field gun, a weapon so superior to the rifle in moral and material effect that it forced / the

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2.

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the infantryman to rely for self-preservation on his spade rather than on his rifle. The result was that entire fronts were entrenched and wired and mobile warfare came to a standstill. In fact during 1914 & 1915 the protective power of trench, wire, rifle and gun combined became so great as temporarily to render the defence the strongest form of war.

It is important to remember that during this period (The supremacy of the quick firing field gun) defences were purely linear. They possessed little depth consequently practically the whole of the fighting strength of the opposing sides was stretched out with a minimum of reserves to support it. On account of a strongly entrenched line behind which to manoeuvre,

Seldom throughout the history of war has there been a more favourable opportunity for carrying out a decisive attack against some portion of the enemy's front and of breaking his defencesin two, if only an infantry advance of a few thousand yards could be maintained.

This advance was, however, all but impossible, because :- the resistance offered by obstacles flanked and covered by fire was, (with the weapons then at their disposal,) too great for the endurance of the attackers.

During this period the problem to be solved was a three-fold one.

(a) How to move infantry through the wire.
(b) How to move infantry across trenches.
(c) How to protect infantry during these operations.

Three solutions were attempted.

(a) By increasing gun power, to destroy the enemy's wire, trenches, personnel and weapons.
(b) By the use of gas to asphixiate the garrison of entire areas.
(c) By the construction of an armoured car which could cross wire and trenches and offer complete protection to its crew from minor missiles.

The first was too apparent to require accentuation; but though the difficulty of producing guns and ammunition was great, the difficulty of settling on a definite artillery tactics proved greater, and it was not until the battle of the

/ Somme

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I/16/3

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3.

Somme was nearing its zenith that, with us, they finally took form, and then as I will show a disastrous one.

The second was the simplest and the most brilliant, for it would have proved the most rapid and effective had the Germans been capable of grasping the " big idea " - The destruction of entire armies, by its use on extensive fronts.

The third was the most difficult, for it consisted not only in the construction of a new weapon but of its employment with no past experience. The necessity of keeping the weapon secret permitted of little exchange of Tactical ideas or the construction of a theory as to its co-operation with the other arms. Consequently the weapon which was produced in 1916, though it might have overcome the main tactical difficulties which existed when the idea which produced it was conceived, was unfitted to meet the changed situation brought about by an increase of the destructive and protective power of artillery. This increase of fire power forced the Defender to organize his defences in greater depth.

In the spring of 1915 the Mark I Tank, if it had existed would have been a potent weapon for war, because

(a) The enemy's defences were shallow.
(b) The ground over which it would have had to advance was but lightly shelled.

By September 1916 these conditions were completely changed.

(3) Present conditions and the modifications resulting to Tank employment.

Had thinking, in 1914, been carried out more logically and less individualistically, the main tactical trend, resulting from the creation of large numbers of heavy and super-heavy guns, might have been foreseen. Whilst in 1914 defence censisted in holding a line of little depth, time wherein to dig and the continual increase in the range and weight of

/ artillery

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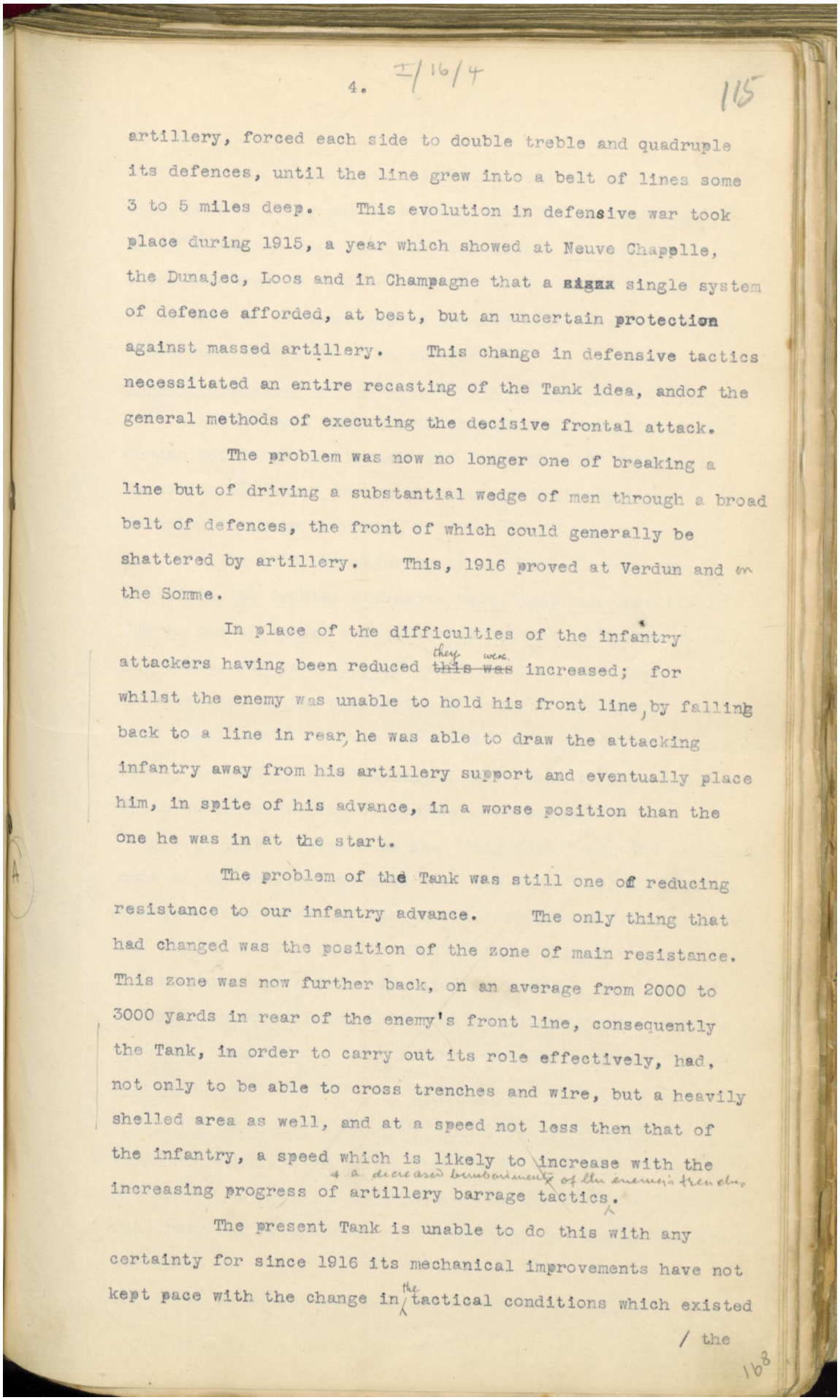

artillery, forced each side to double treble and quadruple its defences, until the line grew into a belt of lines some 3 to 5 miles deep. This evolution in defensive war took place during 1915, a year which showed at Neuve Chapplle, the Dunajec, Loos and in Champagne that a ~~signx~~ single system of defence afforded, at best, but an uncertain protection against massed artillery. This change in defensive tactics necessitated an entire recasting of the Tank idea, andof the general methods of executing the decisive frontal attack.

The problem was now no longer one of breaking a line but of driving a substantial wedge of men through a broad belt of defences, the front of which could generally be shattered by artillery. This, 1916 proved at Verdun and on the Somme.

In place of the difficulties of the infantry attackers having been reduced ~~this was~~ they were increased; for whilst the enemy was unable to hold his front line, by falling back to a line in rear, he was able to draw the attacking infantry away from his artillery support and eventually place him, in spite of his advance, in a worse position than the one he was in at the start.

The problem of the Tank was still one of reducing resistance to our infantry advance. The only thing that had changed was the position of the zone of main resistance. This zone was now further back, on an average from 2000 to 3000 yards in rear of the enemy's front line, consequently the Tank, in order to carry out its role effectively, had, not only to be able to cross trenches and wire, but a heavily shelled area as well, and at a speed not less then that of the infantry, a speed which is likely to increase with the increasing progress of artillery barrage tactics, a decreased bombardment of the enemy's trenches.

The present Tank is unable to do this with any certainty for since 1916 its mechanical improvements have not kept pace with the change in the tactical conditions which existed

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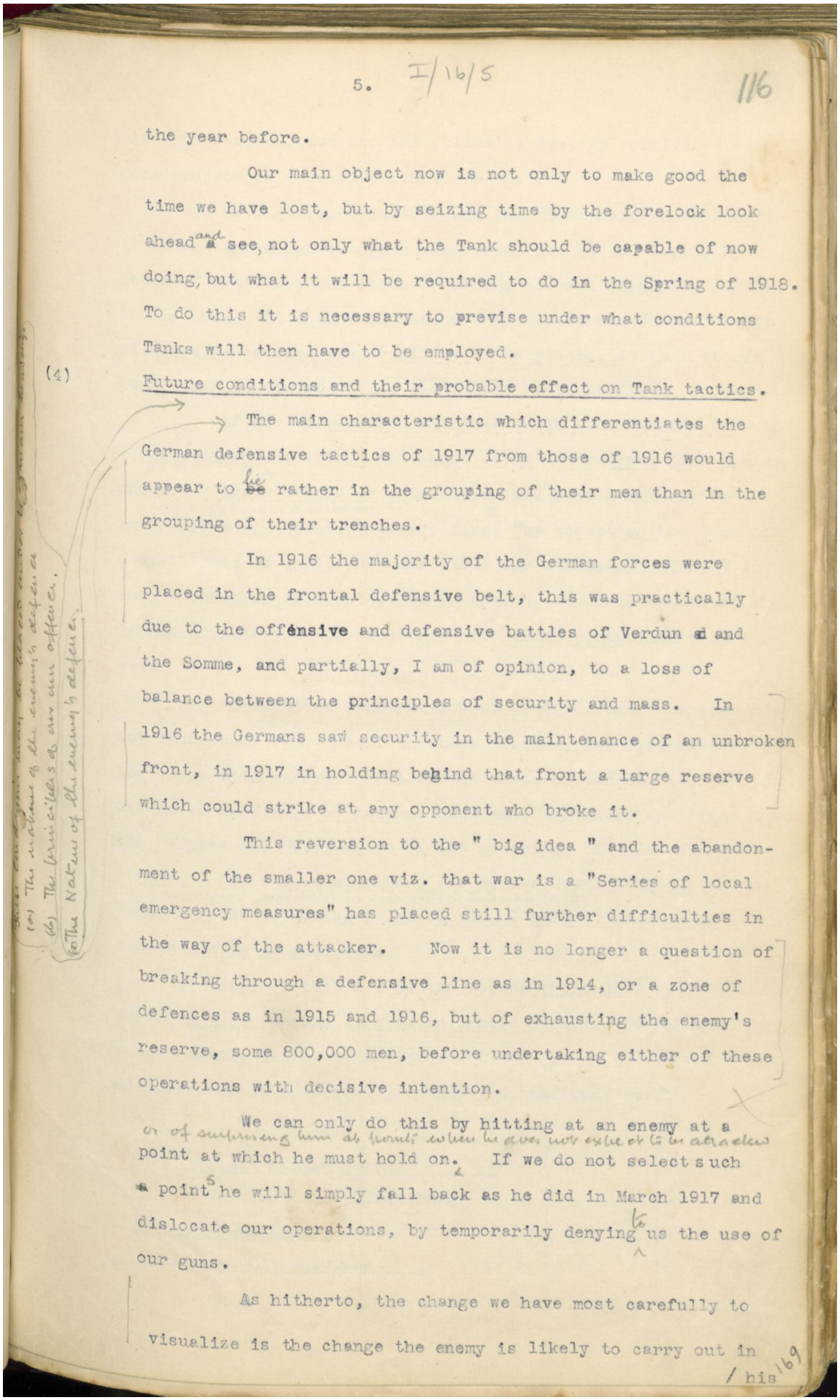

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the year before.

Our main object now is not only to make good the time we have lost, but by seizing time by the forelock look ahead and see, not only what the Tank should be capable of now doing, but what it will be required to do in the Spring of 1918. To do this it is necessary to previse under what conditions Tanks will then have to be employed.

(4) Future conditions and their probable effect on Tank tactics.

The main characteristic which differentiates the German defensive tactics of 1917 from those of 1916 would appear to lie rather in the grouping of their men than in the grouping of their trenches.

In 1916 the majority of the German forces were placed in the frontal defensive belt, this was practically due to the offensive and defensive battles of Verdun and the Somme, and partially, I am of opinion, to a loss of balance between the principles of security and mass. In 1916 the Germans saw security in the maintenance of an unbroken front, in 1917 in holding behind that front a large reserve which could strike at any opponent who broke it.

This reversion to the " big idea " and the abandonment of the smaller one viz. that war is a "Series of local emergency measures" has placed still further difficulties in the way of the attacker. Now it is no longer a question of breaking through a defensive line as in 1914, or a zone of defences as in 1915 and 1916, but of exhausting the enemy's reserve, some 800,000 men, before undertaking either of these operations with decisive intention.

We can only do this by hitting at an enemy at a point at which he must hold on. If we do not select such a point he will simply fall back as he did in March 1917 and dislocate our operations, by temporarily denying us the use of our guns.

As hitherto, the change we have most carefully to visualize is the change the enemy is likely to carry out in his 169

his artillery tactics and the following must be considered as a mere project in this direction.

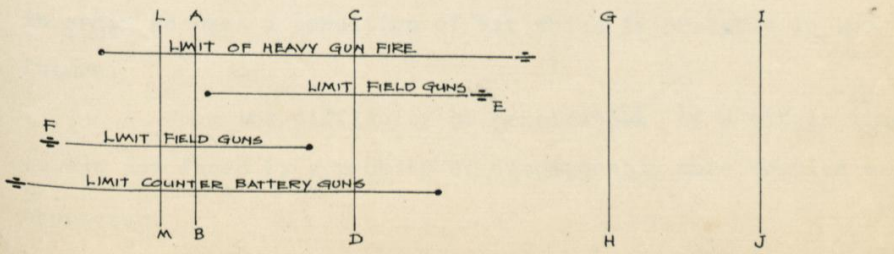
Having learnt in 1916 and the first half of 1917 that if the attacker makes up his mind to do it, he can carry, by means of artillery and infantry alone, several lines of trenches in one bound, it stands to reason that the German General Staff will not jeopardise its artillery by so placing it that it can be pounded to pieces during ~~the~~ attack on these lines.

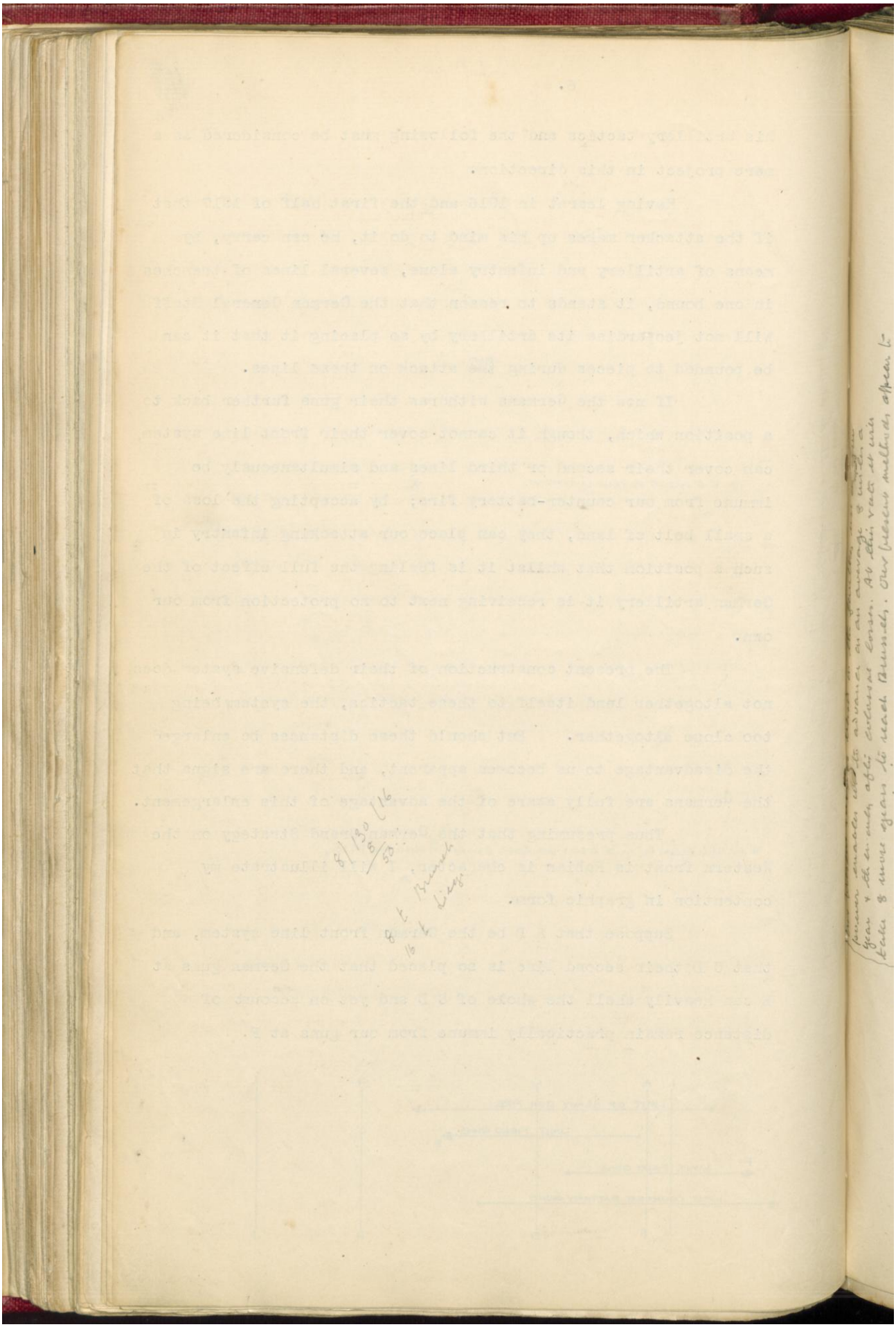
If now the Germans withdraw their guns further back to a position which, though it cannot cover their front line system, can cover their second or third lines and simultaneously be immune from our counter-battery fire; by accepting the loss of a small belt of land, they can place our attacking infantry in such a position that whilst it is feeling the full effect of the German artillery it is receiving next to no protection from our own.

The present construction of their defensive system does not altogether lend itself to these tactics, the systems being too close altogether. But should these distances be enlarged the disadvantage to us becomes apparent, and there are signs that the Germans are fully aware of the advantage of this enlargement.

Thus presuming that the German Grand Strategy on the Western front is Fabian in character, I will illustrate my contention in graphic form.

Suppose that A B be the German front line system, and that C D, their second line, is so placed that the German guns at E can heavily shell the whole of C D and yet on account of distance remain practically immune from our guns at F.





Suppose also that the area A B C D is strongly wired and well sprinkled with machine guns, who is going to suffer the most ? The attackers from L M, who will not only be perpetually worried by the machine guns and sharpshooters in A B C D but who will come more and more under the enemy's gun fire as they proceed towards C D., or the enemy's machine gunners occupying A B C D and his infantry in dug-outs along C D. Undoubtedly the former for they present the largest target and against them is being thrown the greater number of projectiles.

Suppose now the attackers capture C D, then at best they will only be able to **remain** there as impassive spectators to their own destruction until such time as the guns at F move forward.

To conclude these Fabian tactics, once the enemy's guns at E come under fire of those originally at F they can retire under cover of machine gun barrage directed on C D and on any subsequent line between C D and G H that the attackers may be forced to take up. A complete destruction of roads, buildings wells and trees in the area C D G H will add to the discomfort of the attackers; New and if a 3rd and 4th line system exist such as G H, I J, duplicating A B and C D, the progress of the attack may be made so costly and slow as to place the attackers, after several months of this type of warfare, at the mercy of the enemy's reserves.

We I will now analyse these difficulties ~~and~~ see whether the Tank can assist us to overcome them, ~~and further~~ From this may be surmised ~~whether~~ the ~~its~~ character of our present Tank or whether our ~~ob our~~ present Tank tactics require modification in order to meet a condition of war which is probable in the future.

From the difficulty of penetrat~~ion~~ing ~~of~~ a single line we are now faced by a problem of incomparably more complex a character.

/ (a)

(a) To draw in and exhaust the German Reserves.
(b) To capture the German Front Line and the area up to, let us suppose, their third line system in face of incessant machine gun fire.
(c) To hold this third line for several days without much artillery support and under every type of shell the enemy can fire at us.
(d) To see the enemy slip away from our grasp directly the approach of our guns makes a further advance possible.
(e) To move forward through a wilderness - roads destroyed, wells blown in, houses demolished, in face of a swarm of guerilla machine gunners.
(f) To recommence the battle all over again.

Outside the exhausting of the German Reserves which is a secondary issue to our problem, our main difficulty in this defensive warfare arises from the enemy's machine guns and not as here-to-fore from his artillery. For if we can by some means neutralize the enemy's Machine Gun fire, there is no insuperable difficulty in moving infantry forward, not merely under a rolling barrage produced by a line of stationary field guns, but by two or more such barrages produced by two or more echelons of these weapons, one passing forward through the other as the other is firing. If we can further produce mobile echelons of heavy and super-heavy guns and howitzers and keep these supplied irrespective of road destruction, the maintenance by the Germans of their delaying tactics will simply accelerate their ~~own destruction~~ downfall.

To solve this problem ~~all that we need~~ what we must realize is this: ~~that the whole of this problem is~~ how are we going to maintain forward movement in face of bullets and shells? We cannot do it by means of unarmoured infantry and teams of horses. We can do it by means of Tanks and bullet proof motor-~~tractors~~ transporters. All that we need decide now, and there is no time to be lost, is what types of Tanks and ~~tractor~~ Transporters we should employ to meet the probable eventualities of 1918.

To run through the difficulties seratim the requisites / are

are these :-

(a) In order to exhaust the enemy's reserves. To select an area of attack from which the enemy cannot withdraw without acknowledging serious defeat, and of employing Tanks in this area in order to economise loss of Infantry.

(b) To move forward Tanks and infantry under a protective barrage, the Tanks replacing the artillery barrage, as resistance reducers immediately the barrage becomes inoperative. Following these
(i) Echelons of Medium Tanks.
(ii) ~~Tractor drawn~~ artillery.
(iii) Armoured cars cavalry and tractor drawn infantry.

(c) To attack at once the enemy's guns by means of Medium Tanks and special parties of infantry directly the enemy's defences in front of these guns have been captured.

(d) Directly this attack has succeeded to launch every Medium Tank available, independent of guns and infantry, into the destroyed area in rear of the enemy's gun position, and clear this area of machine guns in order to enable our Armoured Cars, tractor drawn infantry and cavalry to pursue.

The above operation embraces the use of a large number of Tanks, in fact there can hardly be too many. Firstly there are those for the wearing down operation, an operation which may last for three months. Secondly those for the decisive blow. Thirdly those for the capture of the enemy's guns and fourthly those for the pursuit.

Though it is not my object here to discuss infantry and artillery tactics, it must be borne in mind, when contemplating this problem, that, as the success of the Heavy Tank is dependent on artillery and infantry cooperation, so also is the success of the Medium Tank, which must be closely supported by artillery and infantry. Whilst moving forward this artillery and infantry must be rendered invulnerable to Machine Gun bullets. This means that armoured tractors and cars which can move across country will have to be provided and provided in number.

(5) <u>Selection of the Tank theatre of operations.</u>

The selection of a theatre of operations depends

/on

on the objective to be gained; the gaining of the objective depends on the breaking down of the enemy's resistance; consequently the weapon which will most speedily overcome this resistance must be considered first, and the area of attac in the theatre of operations chosen must be selected as far as possible with reference to its powers.

In the present instance we find that the chief resistance to our infantry advance comes from the enemy's machine guns. We dare not concentrate all our artillery onto these for if we do we should release his guns, which, free, can put up a stronger resistance than his machine guns on account of their superior range. Further, whilst by sound and flash ranging and aeroplane observation we can discover his main gun positions, no means have yet been discovered to locate his machine guns other than advancing on them and risking casualties. Tanks and especially light Tanks, must, therefore, be employed to do this in order to clear the way for the infantry advance. Consequently if sufficient Tanks are forthcoming, in order to guarantee ~~a po possible~~ and a decisive success, it is no longer a question of the Tank as a spare wheel to the car, in case of an unforseen puncture in our operations, but as the motor force of the car itself, the infantry being merely its armed occupants. Without these occupants the car is valueless.

Our area of operations should be

(a) Suitable to the rapid movement of the Tank.

(b) Unsuitable to anti-tank defences.

Further it should be chosen with reference to the Tactical possibilities and characteristics of this arm. Once chosen, all other weapons should be deployed to facilitate the advance of the Tank because it is the chief maintainer of infantry endurance, and it is the infantryman with his machine gun + bayonet who is going to decide the battle.

C

/ (6)

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(6) Tank Grand Tactics.

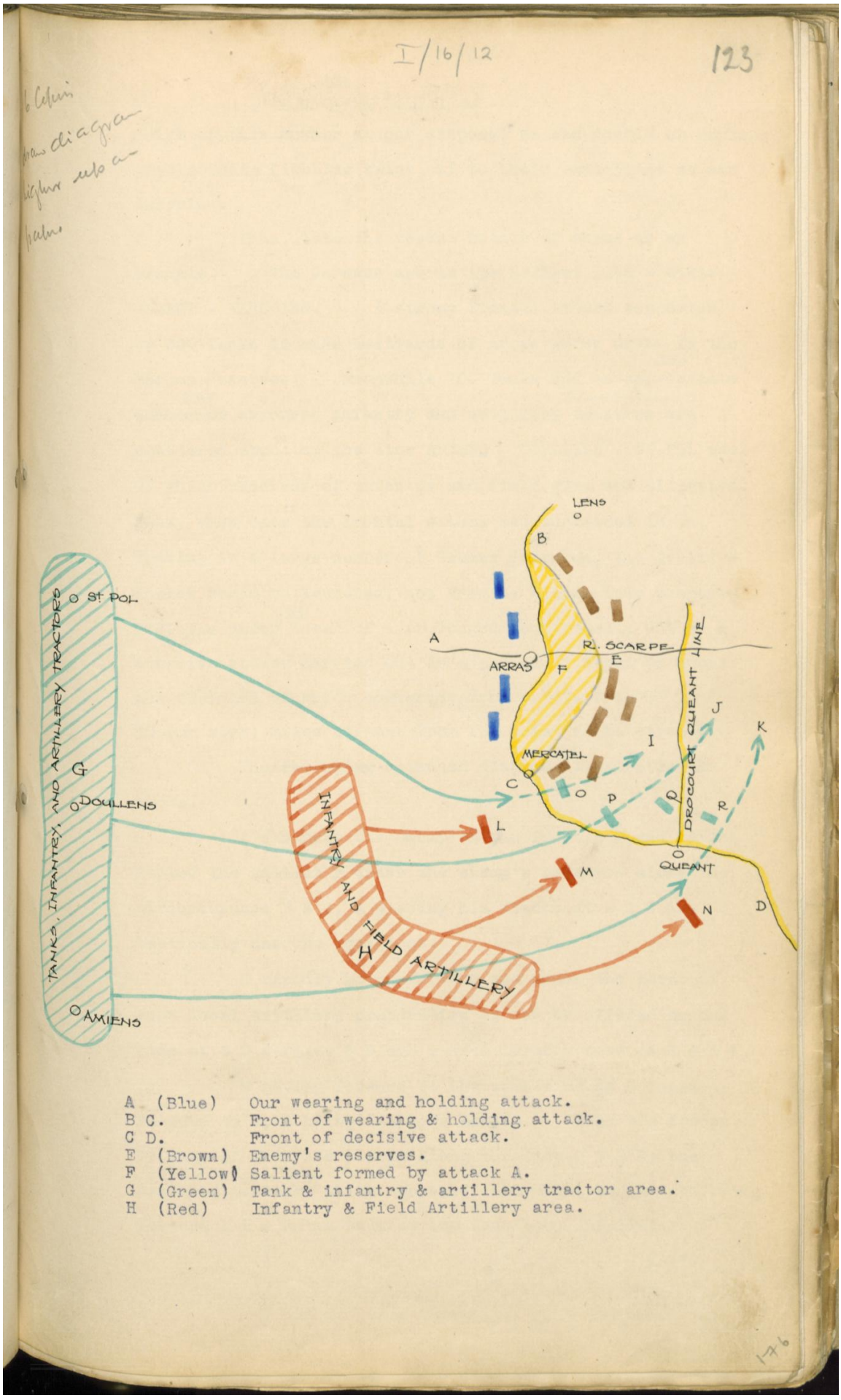
The two Grand Tactical acts of battle are Envelopment and Penetration. In a war like the present the second becomes a prelude to the first. Artificial flanks are formed and are rolled up or their communications to them threatened. In this war, however, the non-existence of flanks is not the main difficulty, but the impossibility of secrecy, on account of the necessary massing of guns and ammunition which must inevitably precede an attack on a grand scale. If the preparatory measures preceding an attack could be reduced from weeks to days or hours Surprise could be gained or, at least, sufficient time to deliver a knock out blow before the enemy had time to meet it. The mechanical endurance of the Tanks, its power of moving 30 miles in 24 hours and of carrying its own ammunition enables this time to be gained and surprise to be effected.

(8) Tank Tactics of Envelopment

The power of the Tank to effect a penetration of the enemy's defences on those lines is too apparent to require explanation. It, however, must be remembered that though direct penetration may enable our infantry to pass through the gaps created, unless in the creating of it the enemy has lost a great number of his men a sufficient exhaustion will not have been produced to negative his reserves. If the enemy has 400,000 men behind his line and we can capture 250,000 men in his line and pass 300,000 through the gap created by this capture, the chances are that the general écroulement of those parts of the line on the flanks of the penetration will so lower the moral and bewilder the action of the reserve that our own field army will be able to defeat an army numerically superior to it.

Such a rupture as this if attempted ~~attended~~ ~~purely~~ frontally would require as the above shows more Tanks, Translater than we are likely to command, ~~probably 3,000~~. Assuming that we have only ~~a~~

third



A (Blue) Our wearing and holding attack.
B C. Front of wearing & holding attack.
C D. Front of decisive attack.
E (Brown) Enemy's reserves.
F (Yellow) Salient formed by attack A.
G (Green) Tank & infantry & artillery tractor area.
H (Red) Infantry & Field Artillery area.

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13.

1000 Tanks + 500 Transporters

third of this number at our disposal we can double or perhaps treble their fighting value, if to their employment we add surprise.

Thus, take the recent battle of Arras as an example. The Germans are in the Salient LENS - ARRAS - QUEANT - MARCOING. A strong frontal attack supported by 300 Tanks is made Eastwards of Arras which draws in the German Reserves. Meanwhile 700 Tanks and ~~an appropriate number of~~ 500 armoured infantry and artillery ~~tractors~~ Transporters are scattered about on the line AMIENS - DOULLENS - ST.POL east of which reserves of infantry and field guns are billetted. Then, when once the frontal attack has succeeded in drawing in a large number of Genman reserves, the decisive attack would be launched, not from an elaborately prepared position under 23 cover of a prolonged bombardment, but as a surprise attack carried out in a period of about 48 hours, the approach of which commences from points from 20 to 30 (or more) miles distant from the point to be struck.

The ~~following~~ attached diagram No 3 illustrates the above.

A exhausts the enemy on the front B C and having formed the salient F draws the enemy's reserves along the circumference B E C, placing his flanks at B & C in tactically unsound positions.

G rapidly moves forward and under ~~the~~ cover of such local artillery preparation as can be offered on our side of C D strikes C D and passes through towards I J & K.

H moving forward at the same time as G forms a reserve to G, G being the more mobile. When G's troops or some of them are placed along the line O P Q R, the Tank Transporters ~~armoured tractors~~ which conveyed them might be used to bring forward L M & N, as well as the necessary supplies.

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(7)

Tank Minor Tactics.

I do not propose to discuss here the detail of Tank Minor Tactics, the principles of which are now known. One point I wish, however, to accentuate is: the importance of broad fronts to individual units in place of narrow fronts and great depth. Thus, if A-B is the frontof attack and C. D. E. the main objectives-

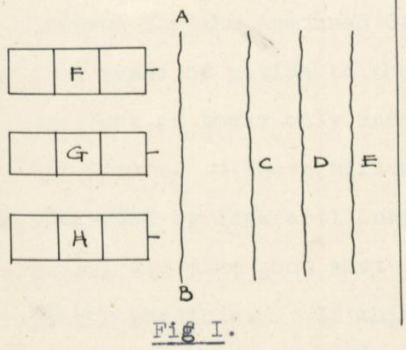

Fig I.

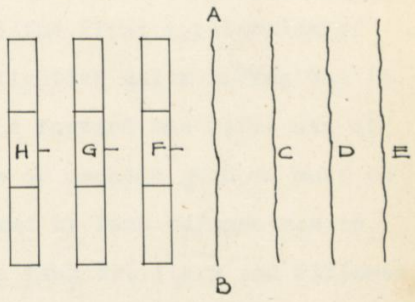

Fig.II.

- I should prefer to see 3 units (F.G.& H.) detailed to carry out the attack, distributed according to Fig.II rather than as in Fig.I, because a higher continuity of action is thereby maintained.

(a) Each unit has one main objective consequently its commander has but one thing to think about.

(b) Each unit can be withdrawn to refit after the one in front has attained its objective,

(c) Each unit forms a firm base for the next.

(d) Disorganization is localized.

(e) Supply is facilitated.

(f) Human endurance is economized especially the endurance of Commanders and their Staff.

(g) Flanks of fighting units are reduced.

(h) Multiplicity of leaders is reduced.

(i) If the initial attack fails one unit is shattered not three, consequently Moral suffers less loss

A formation which does not allow of its columns deploying rapidly in action is fundamentally wrong - Xenophon noted this over 2,000 years ago.

/ (8)

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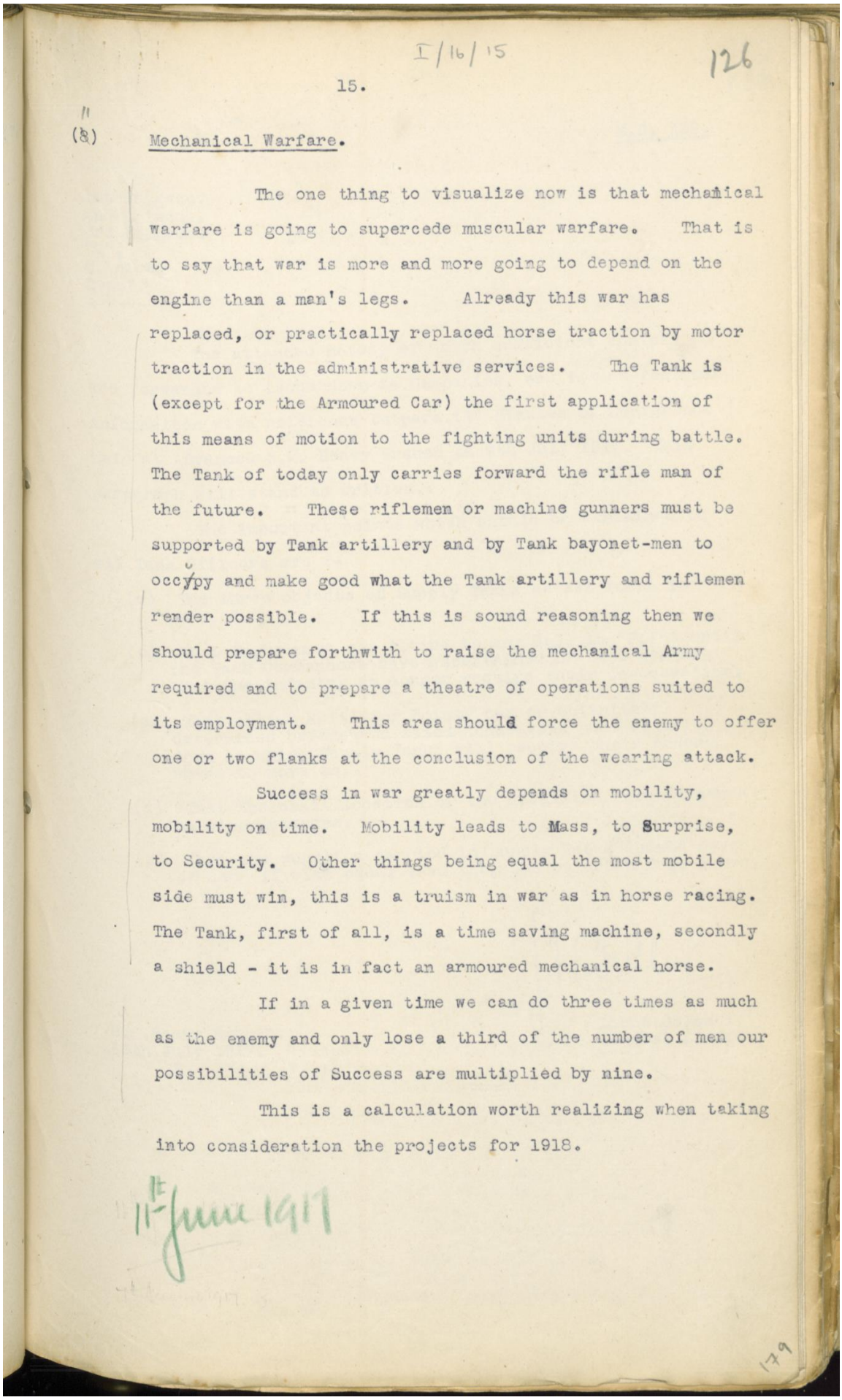

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15.

(8) Mechanical Warfare.

The one thing to visualize now is that mechanical warfare is going to supercede muscular warfare. That is to say that war is more and more going to depend on the engine than a man's legs. Already this war has replaced, or practically replaced horse traction by motor traction in the administrative services. The Tank is (except for the Armoured Car) the first application of this means of motion to the fighting units during battle. The Tank of today only carries forward the rifle man of the future. These riflemen or machine gunners must be supported by Tank artillery and by Tank bayonet-men to occupy and make good what the Tank artillery and riflemen render possible. If this is sound reasoning then we should prepare forthwith to raise the mechanical Army required and to prepare a theatre of operations suited to its employment. This area should force the enemy to offer one or two flanks at the conclusion of the wearing attack.

Success in war greatly depends on mobility, mobility on time. Mobility leads to Mass, to Surprise, to Security. Other things being equal the most mobile side must win, this is a truism in war as in horse racing. The Tank, first of all, is a time saving machine, secondly a shield - it is in fact an armoured mechanical horse.

If in a given time we can do three times as much as the enemy and only lose a third of the number of men our possibilities of Success are multiplied by nine.

This is a calculation worth realizing when taking into consideration the projects for 1918.

11th June 1917

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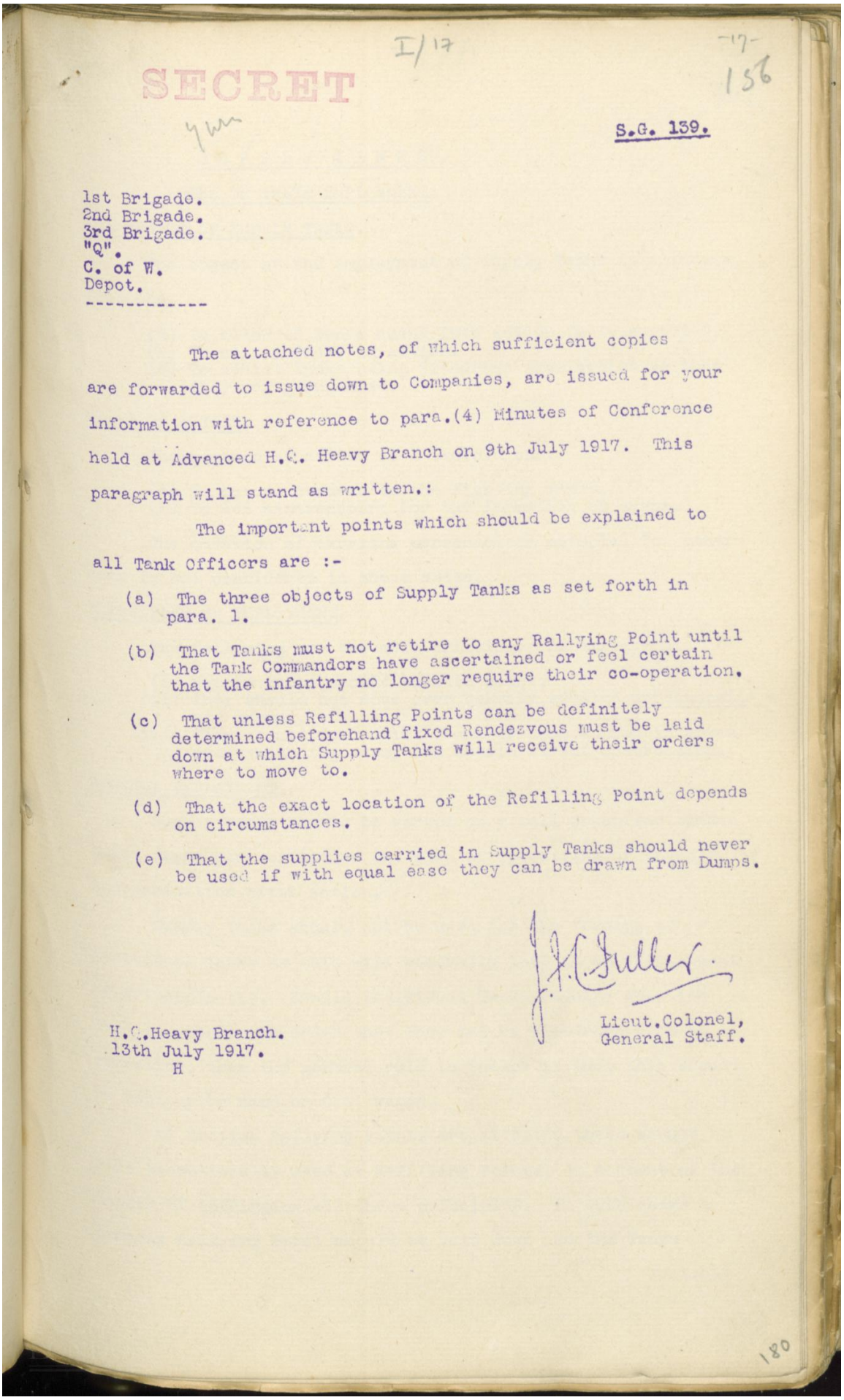

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SECRET

S.G. 139.

1st Brigade.
2nd Brigade.
3rd Brigade.
"Q".
C. of W.
Depot.

The attached notes, of which sufficient copies are forwarded to issue down to Companies, are issued for your information with reference to para.(4) Minutes of Conference held at Advanced H.Q. Heavy Branch on 9th July 1917. This paragraph will stand as written.:

The important points which should be explained to all Tank Officers are :-

(a) The three objects of Supply Tanks as set forth in para. 1.

(b) That Tanks must not retire to any Rallying Point until the Tank Commanders have ascertained or feel certain that the infantry no longer require their co-operation.

(c) That unless Refilling Points can be definitely determined beforehand fixed Rendezvous must be laid down at which Supply Tanks will receive their orders where to move to.

(d) That the exact location of the Refilling Point depends on circumstances.

(e) That the supplies carried in Supply Tanks should never be used if with equal ease they can be drawn from Dumps.

J.F.C. Fuller.

Lieut.Colonel,
General Staff.

H.Q.Heavy Branch.
13th July 1917.
H

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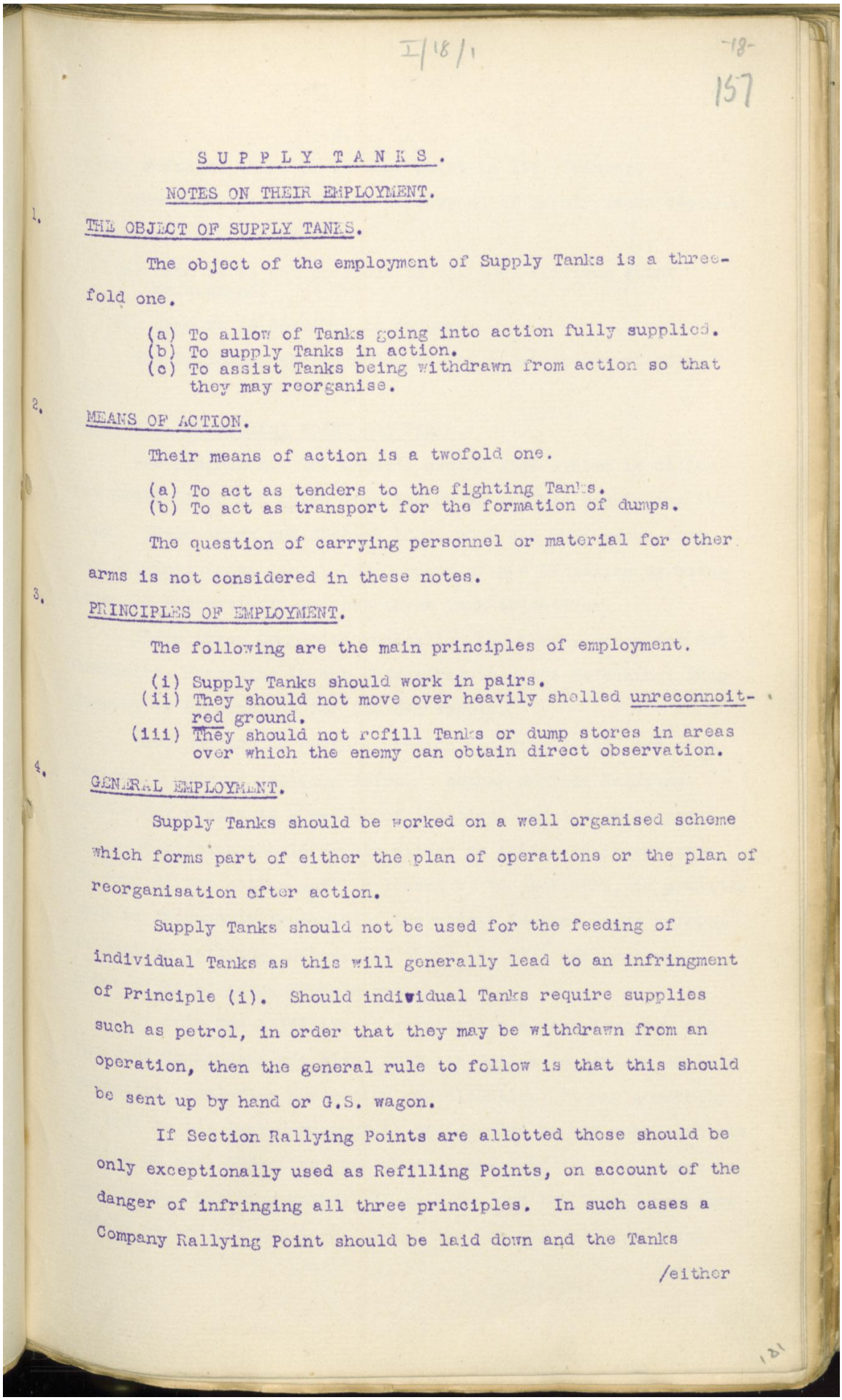

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SUPPLY TANKS.

NOTES ON THEIR EMPLOYMENT.

1. THE OBJECT OF SUPPLY TANKS.

The object of the employment of Supply Tanks is a three-fold one.

(a) To allow of Tanks going into action fully supplied.
(b) To supply Tanks in action.
(c) To assist Tanks being withdrawn from action so that they may reorganise.

2. MEANS OF ACTION.

Their means of action is a twofold one.

(a) To act as tenders to the fighting Tanks.
(b) To act as transport for the formation of dumps.

The question of carrying personnel or material for other arms is not considered in these notes.

3. PRINCIPLES OF EMPLOYMENT.

The following are the main principles of employment.

(i) Supply Tanks should work in pairs.
(ii) They should not move over heavily shelled unreconnoitred ground.
(iii) They should not refill Tanks or dump stores in areas over which the enemy can obtain direct observation.

4. GENERAL EMPLOYMENT.

Supply Tanks should be worked on a well organised scheme which forms part of either the plan of operations or the plan of reorganisation after action.

Supply Tanks should not be used for the feeding of individual Tanks as this will generally lead to an infringment of Principle (i). Should individual Tanks require supplies such as petrol, in order that they may be withdrawn from an operation, then the general rule to follow is that this should be sent up by hand or G.S. wagon.

If Section Rallying Points are allotted those should be only exceptionally used as Refilling Points, on account of the danger of infringing all three principles. In such cases a Company Rallying Point should be laid down and the Tanks

/either

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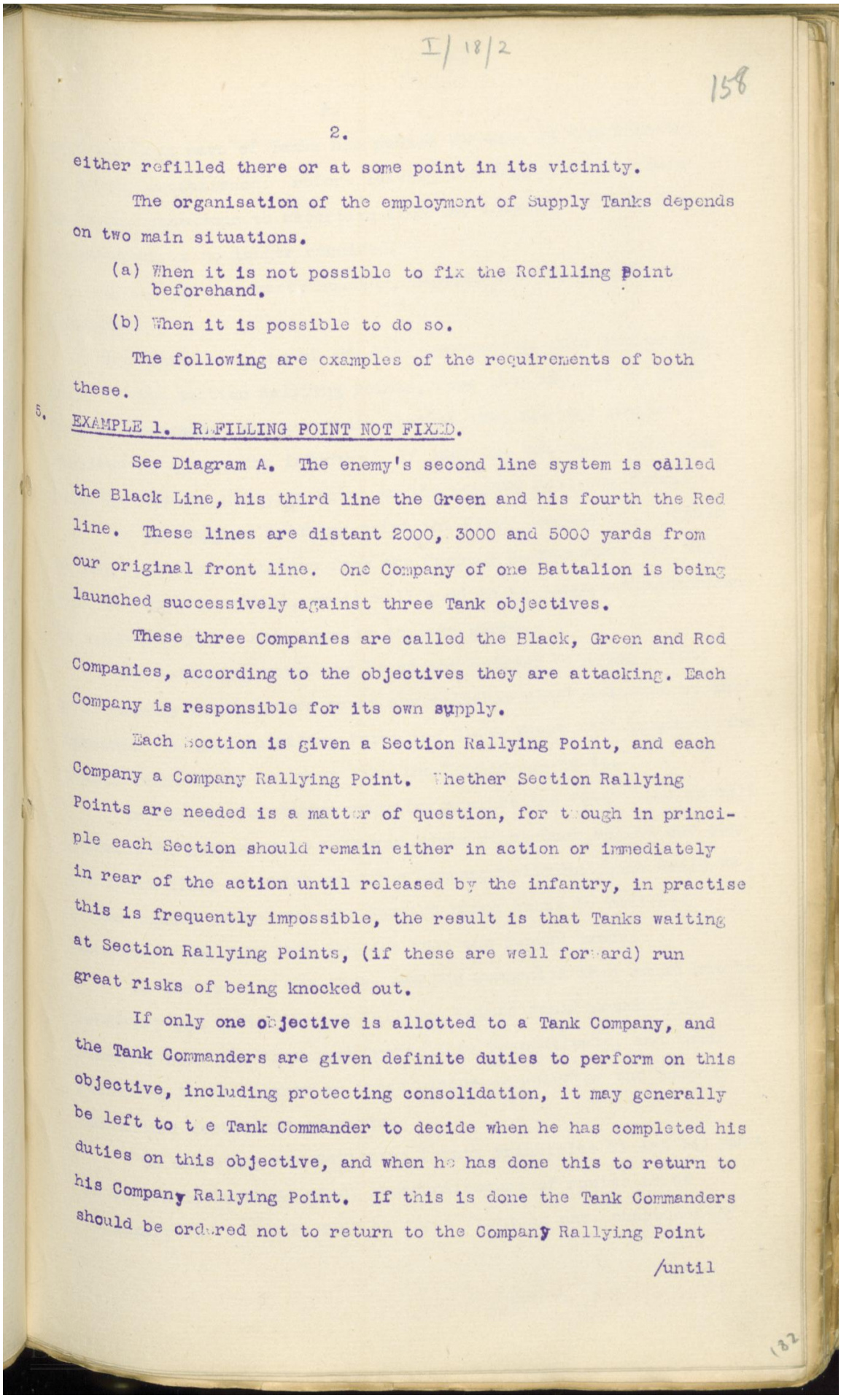

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either refilled there or at some point in its vicinity.

The organisation of the employment of Supply Tanks depends on two main situations.

(a) When it is not possible to fix the Refilling Point beforehand.

(b) When it is possible to do so.

The following are examples of the requirements of both these.

5. EXAMPLE 1. REFILLING POINT NOT FIXED.

See Diagram A. The enemy's second line system is called the Black Line, his third line the Green and his fourth the Red line. These lines are distant 2000, 3000 and 5000 yards from our original front line. One Company of one Battalion is being launched successively against three Tank objectives.

These three Companies are called the Black, Green and Red Companies, according to the objectives they are attacking. Each Company is responsible for its own supply.

Each Section is given a Section Rallying Point, and each Company a Company Rallying Point. Whether Section Rallying Points are needed is a matter of question, for though in principle each Section should remain either in action or immediately in rear of the action until released by the infantry, in practise this is frequently impossible, the result is that Tanks waiting at Section Rallying Points, (if these are well forward) run great risks of being knocked out.

If only one objective is allotted to a Tank Company, and the Tank Commanders are given definite duties to perform on this objective, including protecting consolidation, it may generally be left to the Tank Commander to decide when he has completed his duties on this objective, and when he has done this to return to his Company Rallying Point. If this is done the Tank Commanders should be ordered not to return to the Company Rallying Point

/until

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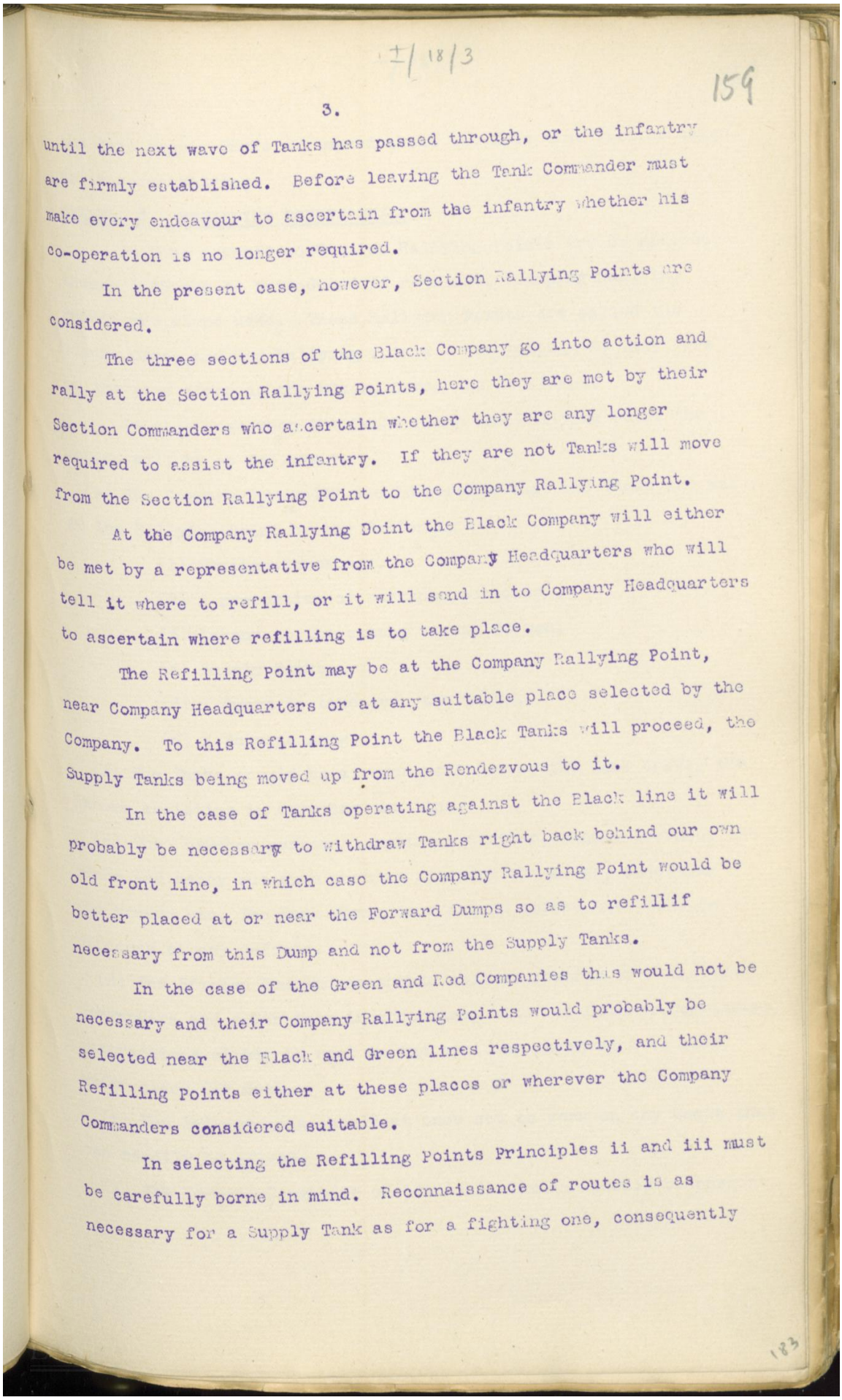

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until the next wave of Tanks has passed through, or the infantry are firmly established. Before leaving the Tank Commander must make every endeavour to ascertain from the infantry whether his co-operation is no longer required.

In the present case, however, Section Rallying Points are considered.

The three sections of the Black Company go into action and rally at the Section Rallying Points, here they are met by their Section Commanders who ascertain whether they are any longer required to assist the infantry. If they are not Tanks will move from the Section Rallying Point to the Company Rallying Point.

At the Company Rallying Doint the Black Company will either be met by a representative from the Company Headquarters who will tell it where to refill, or it will send in to Company Headquarters to ascertain where refilling is to take place.

The Refilling Point may be at the Company Rallying Point, near Company Headquarters or at any suitable place selected by the Company. To this Refilling Point the Black Tanks will proceed, the Supply Tanks being moved up from the Rendezvous to it.

In the case of Tanks operating against the Black line it will probably be necessary to withdraw Tanks right back behind our own old front line, in which case the Company Rallying Point would be better placed at or near the Forward Dumps so as to refillif necessary from this Dump and not from the Supply Tanks.

In the case of the Green and Red Companies this would not be necessary and their Company Rallying Points would probably be selected near the Black and Green lines respectively, and their Refilling Points either at these places or wherever the Company Commanders considered suitable.

In selecting the Refilling Points Principles ii and iii must be carefully borne in mind. Reconnaissance of routes is as necessary for a Supply Tank as for a fighting one, consequently

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4.

the less Supply Tanks are moved about the less time will be taken up in reconnoitring.

EXAMPLE 2. REFILLING POINTS FIXED.

In this example no Section Rallying Points are considered, though they may be introduced if required. Company Rallying Points are alone used. These Rallying Points are called the Black, Green and Red Rallying Points - see Diagram B. They are in the same place as the Black, Green and Red Dumps.

In each case when the Tanks reach the Rallying Point the action will be as follows :-

(a) The Company Commander should arrange that the Tanks are met at the Rallying Point by the following :-

(1) Section Commander.

(2) A proportion of Workshop personnel.

(3) Labour to the extent of say 30 men.

(4) Supply Tanks.

(5) A Guard to take over the Tanks.

(6) A Salvage gang.

(b) The Tanks should be at once refilled by the Tank crews, the labour assisting in carrying the tins.

(c) The Workshop personnel under an Officer, should overhaul the Tanks and carry out such work as cleaning the plugs, adjusting the brakes etc. The Tank Commanders should inform the Workshop Officers of any defects.

(d) The Section Commanders should collect reports from the Tank Commanders and order them in accordance with the Company Commanders instructions either to rest on the spot, or march back to some safer place for rest.

(e) The Salvage gang should at once set to work on any Tanks that can readily be salved.

(f) The Company Commander or Second-in-Command should be present

/at

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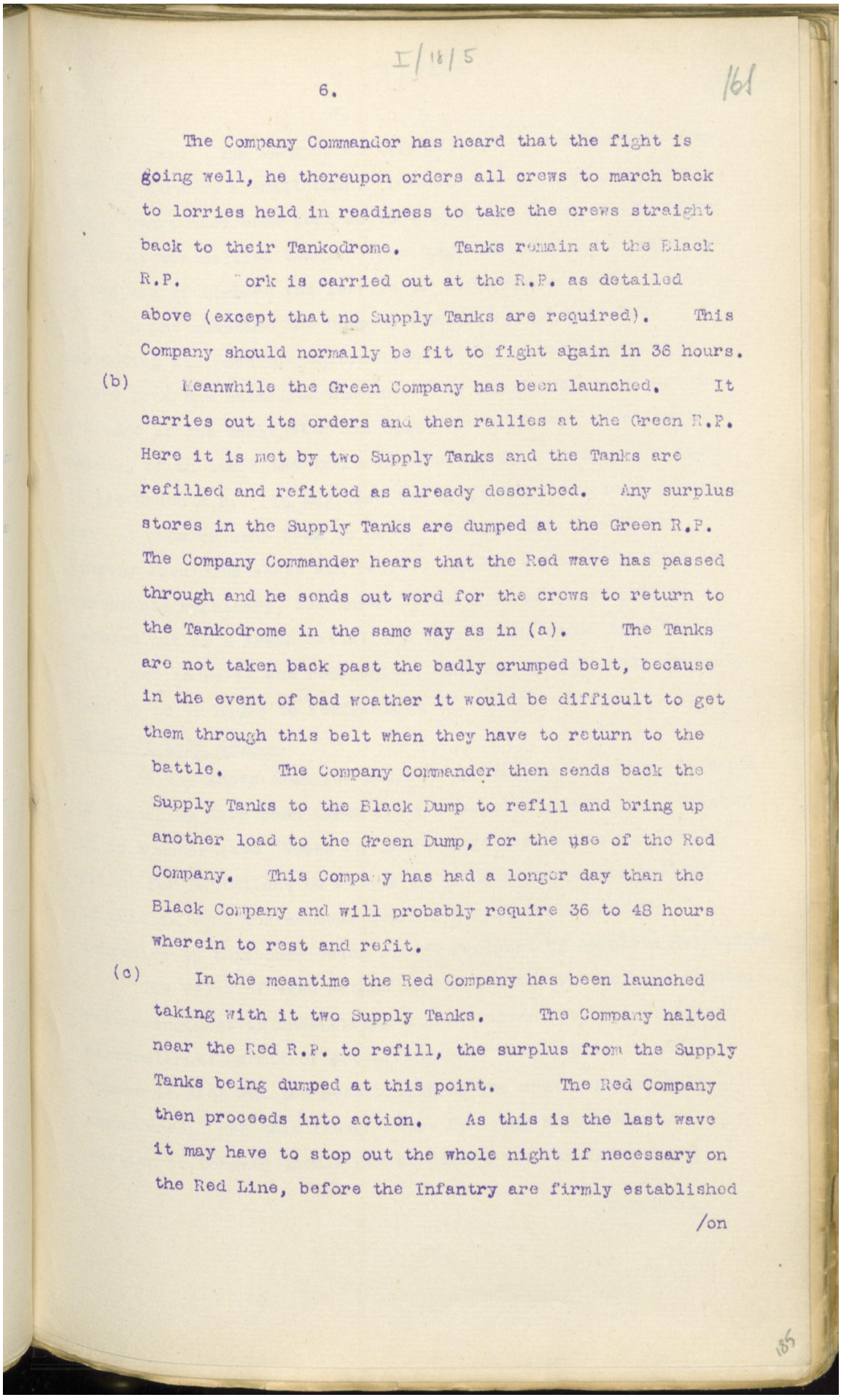

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6.

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The Company Commander has heard that the fight is going well, he thereupon orders all crews to march back to lorries held in readiness to take the crews straight back to their Tankodrome. Tanks remain at the Black R.P. Work is carried out at the R.P. as detailed above (except that no Supply Tanks are required). This Company should normally be fit to fight again in 36 hours.

(b) Meanwhile the Green Company has been launched. It carries out its orders and then rallies at the Green R.P. Here it is met by two Supply Tanks and the Tanks are refilled and refitted as already described. Any surplus stores in the Supply Tanks are dumped at the Green R.P. The Company Commander hears that the Red wave has passed through and he sends out word for the crews to return to the Tankodrome in the same way as in (a). The Tanks are not taken back past the badly crumped belt, because in the event of bad weather it would be difficult to get them through this belt when they have to return to the battle. The Company Commander then sends back the Supply Tanks to the Black Dump to refill and bring up another load to the Green Dump, for the use of the Red Company. This Company has had a longer day than the Black Company and will probably require 36 to 48 hours wherein to rest and refit.

(c) In the meantime the Red Company has been launched taking with it two Supply Tanks. The Company halted near the Red R.P. to refill, the surplus from the Supply Tanks being dumped at this point. The Red Company then proceeds into action. As this is the last wave it may have to stop out the whole night if necessary on the Red Line, before the Infantry are firmly established

/on

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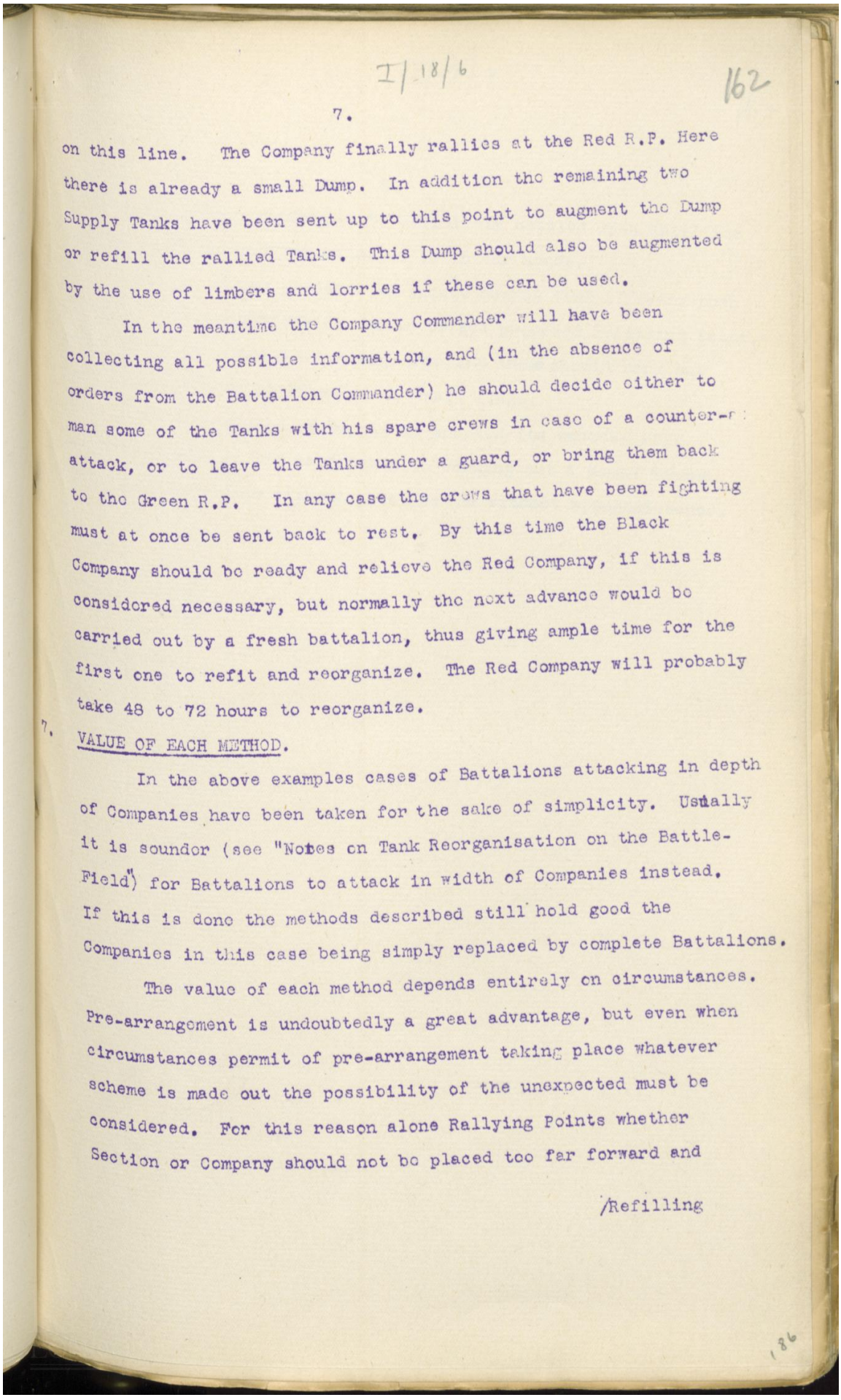

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7.

on this line. The Company finally rallies at the Red R.P. Here there is already a small Dump. In addition the remaining two Supply Tanks have been sent up to this point to augment the Dump or refill the rallied Tanks. This Dump should also be augmented by the use of limbers and lorries if these can be used.

In the meantime the Company Commander will have been collecting all possible information, and (in the absence of orders from the Battalion Commander) he should decide either to man some of the Tanks with his spare crews in case of a counter-attack, or to leave the Tanks under a guard, or bring them back to the Green R.P. In any case the crews that have been fighting must at once be sent back to rest. By this time the Black Company should be ready and relieve the Red Company, if this is considered necessary, but normally the next advance would be carried out by a fresh battalion, thus giving ample time for the first one to refit and reorganize. The Red Company will probably take 48 to 72 hours to reorganize.

7. VALUE OF EACH METHOD.

In the above examples cases of Battalions attacking in depth of Companies have been taken for the sake of simplicity. Usually it is soundor (see "Notes on Tank Reorganisation on the Battle-Field") for Battalions to attack in width of Companies instead. If this is done the methods described still hold good the Companies in this case being simply replaced by complete Battalions.

The value of each method depends entirely on circumstances. Pre-arrangement is undoubtedly a great advantage, but even when circumstances permit of pre-arrangement taking place whatever scheme is made out the possibility of the unexpected must be considered. For this reason alone Rallying Points whether Section or Company should not be placed too far forward and

/Refilling

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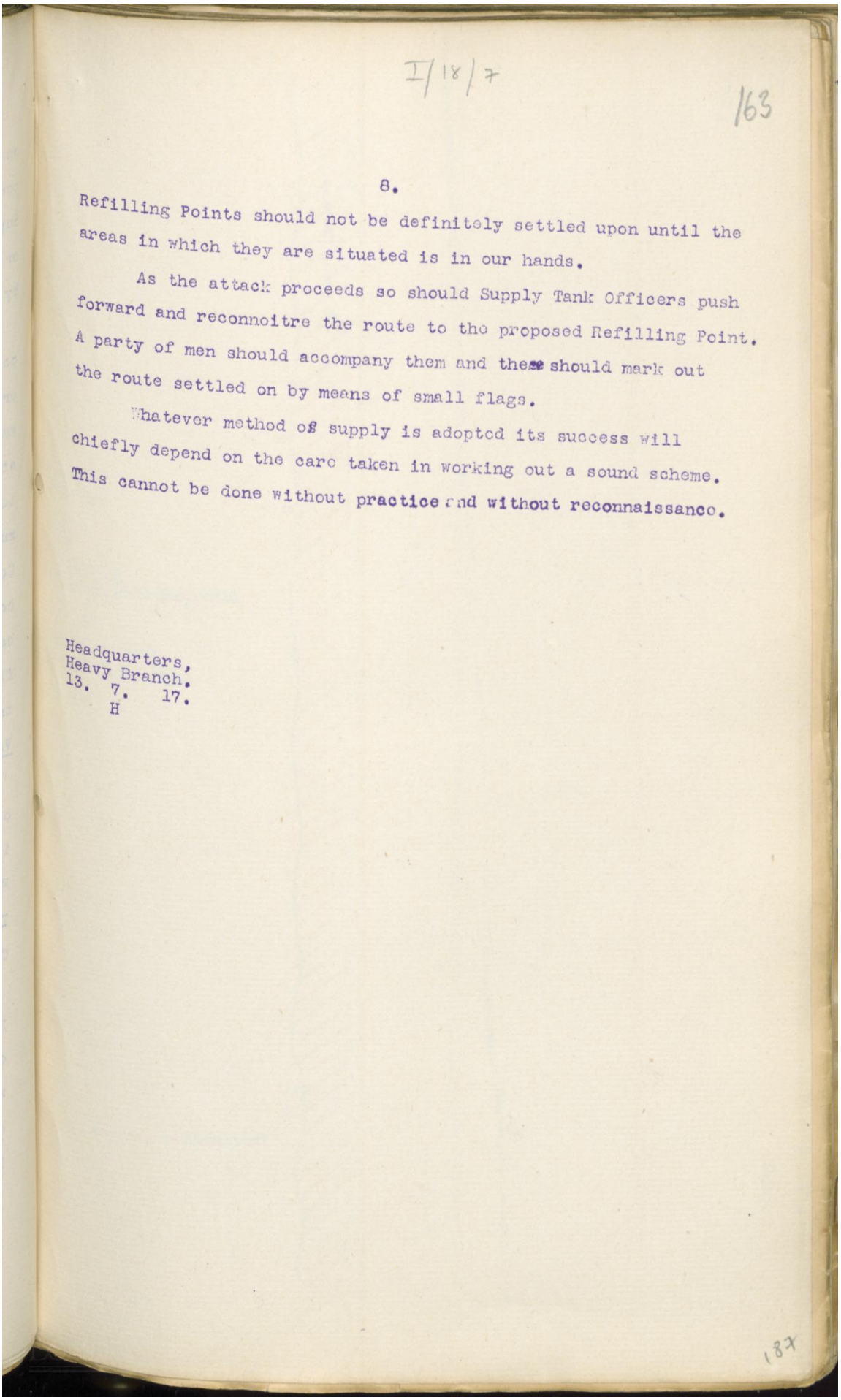

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8.

Refilling Points should not be definitely settled upon until the areas in which they are situated is in our hands.

As the attack proceeds so should Supply Tank Officers push forward and reconnoitre the route to the proposed Refilling Point. A party of men should accompany them and these should mark out the route settled on by means of small flags.

Whatever method of supply is adopted its success will chiefly depend on the care taken in working out a sound scheme. This cannot be done without practice and without reconnaissance.

Headquarters,
Heavy Branch.
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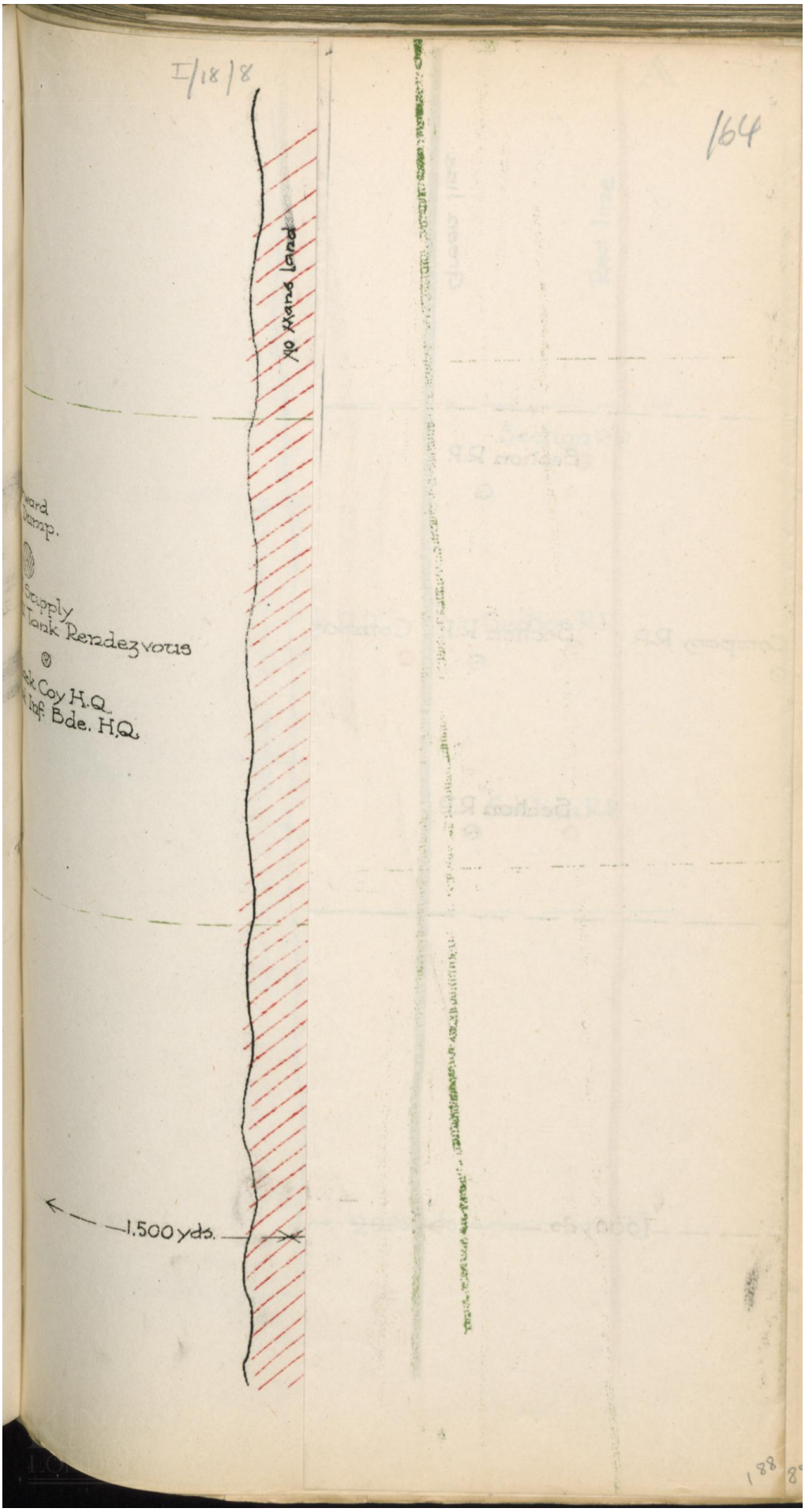
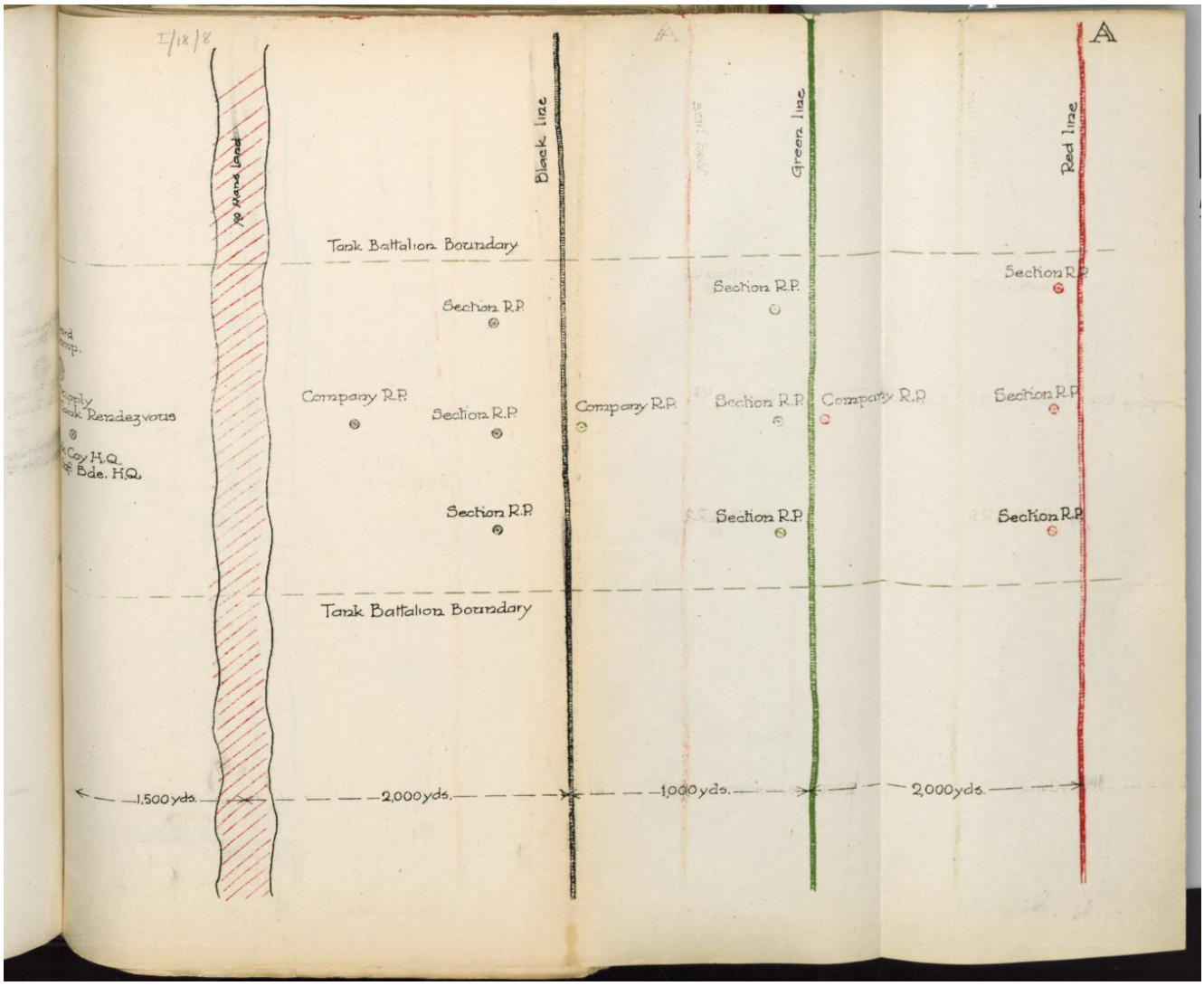
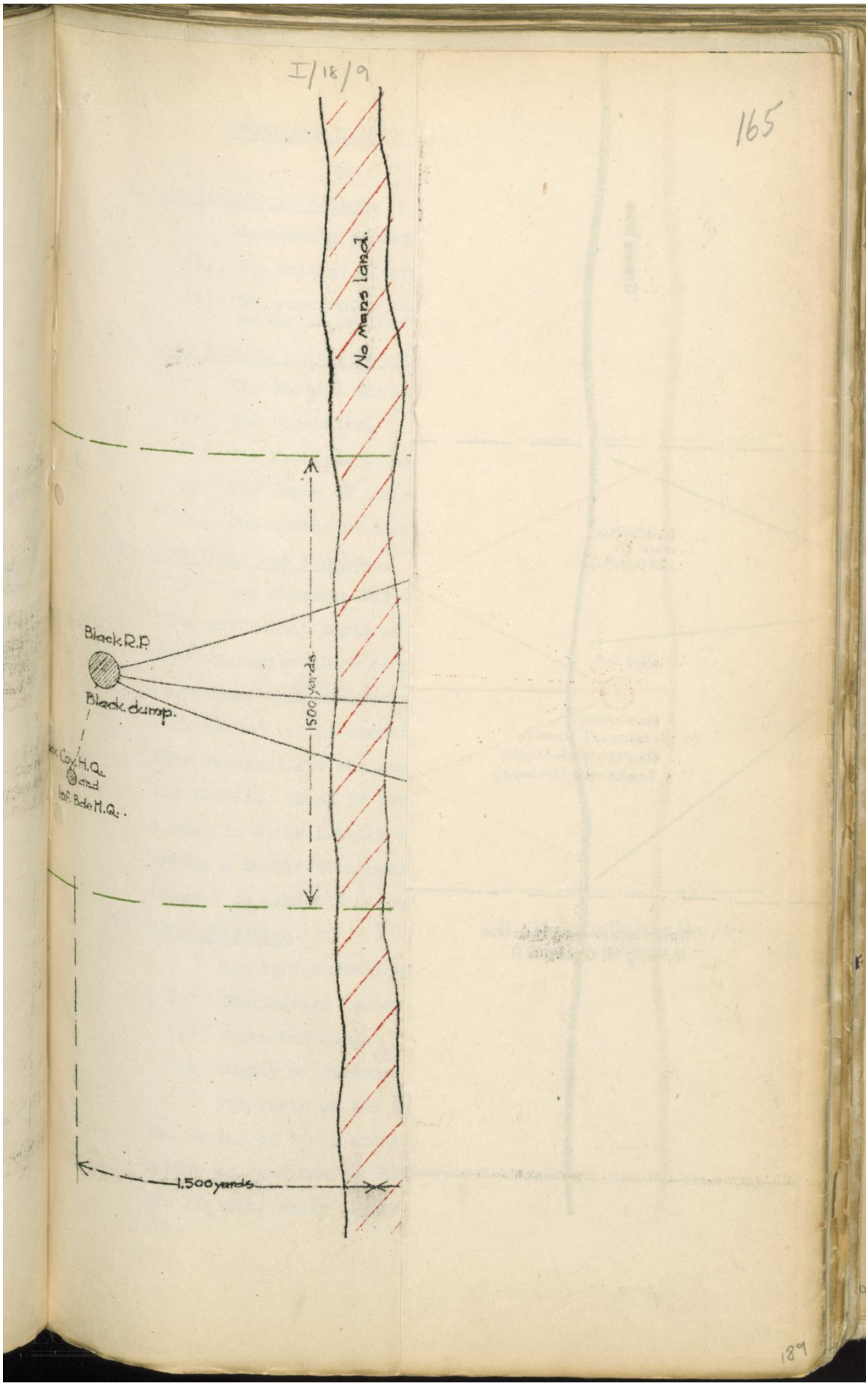

I/18/8
164
No Mans Land
ward
Dump.
Supply
Tank Rendezvous
Coy H.Q.
Inf. Bde. H.Q.
1.500 yds.


I/18/8
A
A
No Mans Land
Black line
Green line
Red line
Tank Battalion Boundary
Section R.P.
Section R.P.
Section R.P.
Company R.P.
Section R.P.
Company R.P.
Section R.P.
Company R.P.
Section R.P.
Section R.P.
Section R.P.
Section R.P.
Tank Battalion Boundary
1,500yds.
2,000yds.
1,000yds.
2,000yds.


I/18/9
165
No Mans land.
1500 yards
Black R.P.
Black dump.
H.Q.
and
Inf. Bde H.Q.
1,500 yards
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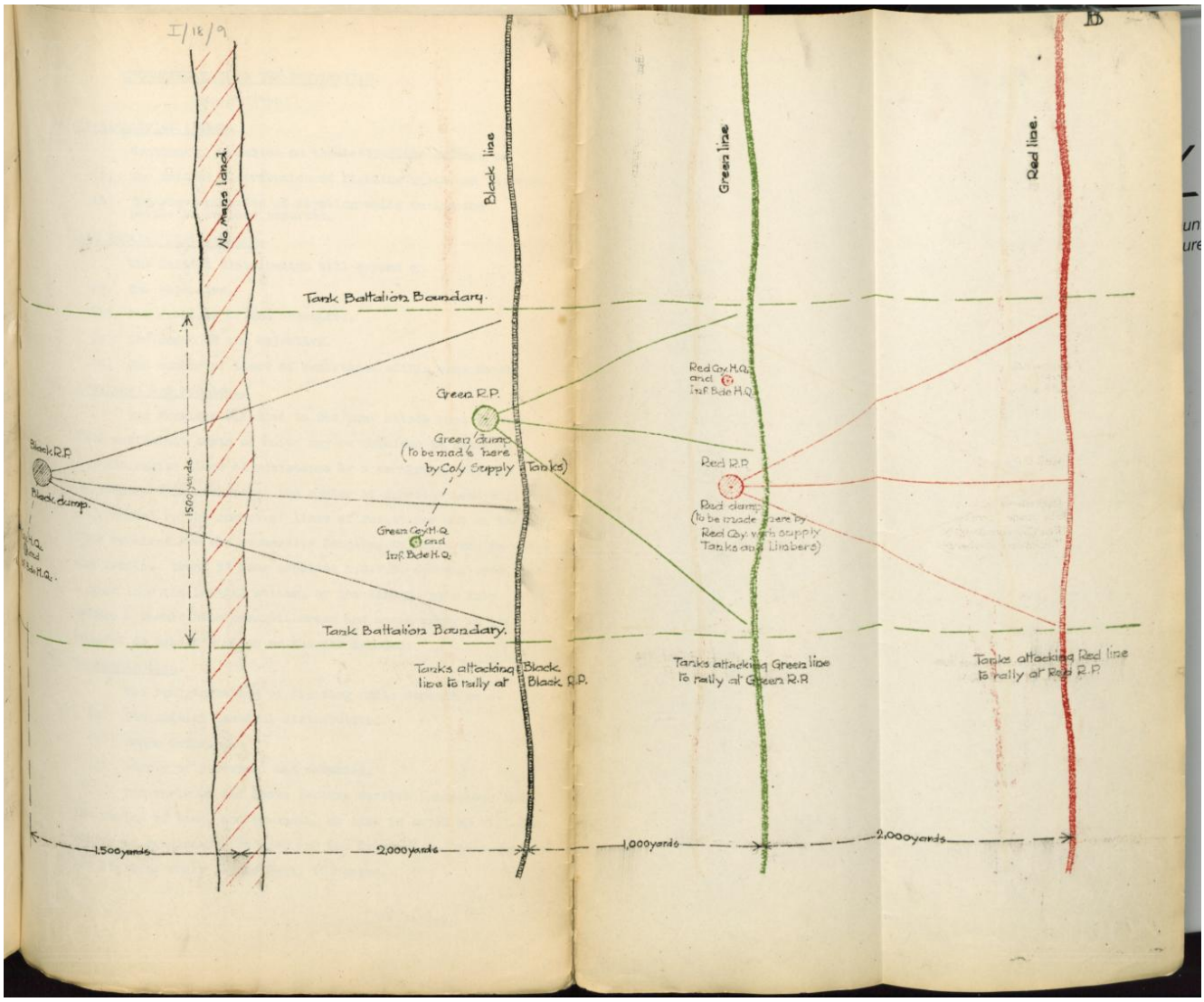
I/12/9
No Mans Land.
Black line
Green line
Red line.
Tank Battalion Boundary.
Green R.P.
Green dump
(To be made here by Co/y Supply Tanks)
Green Coy H.Q. and Inf Bde H.Q.
Red Coy H.Q. and Inf Bde H.Q.
Red R.P.
Red dump
(To be made here by Red Coy: with supply Tanks and Limbers)
Black R.P.
Black dump.
1500 yards
Tank Battalion Boundary.
Tanks attacking Black line to rally at Black R.P.
Tanks attacking Green line to rally at Green R.P.
Tanks attacking Red line to rally at Red R.P.
1,500 yards
2,000 yards
1,000 yards
2,000 yards