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NOTES ON WHAT CAN BE DONE BY OUR BATTERIES TO AVOID DETECTION BY ENEMY SOUND RANGING.

1. Wind is the most potent factor in the problem. Owing to the fact that the wind velocity at different heights above ground level generally increases with the altitude, sound travelling with the wind is deflected towards the ground, while sound travelling against the wind is deflected upwards and becomes inaudible at ground level much sooner. Therefore any precautions that can be taken become much more important when the wind is blowing towards the enemy. **A breeze blowing from the instrument to the gun renders Sound Ranging difficult or impossible.** It follows that if our Sound Ranging Sections cannot range our batteries owing to an unfavourable wind, the conditions are good for the enemy's Sound Ranging.

2. Whenever possible, it is advisable to fire from two or more positions **simultaneously**. This would not confuse the record obtained by the British type of Sound Ranging instrument; on the contrary, it would probably mean more than one location on a single record. But in view of orders to this effect given to German batteries, it seems probable that this procedure does interfere with the German Sound Ranging system. A case which occurred recently corroborates this. One of our batteries was being shelled under conditions which made it almost certain that the fire was controlled by Sound Ranging observation. There was a long interval between rounds and the shooting was good. A neighbouring battery was asked to fire, timing its rounds so that the gun fired simultaneously with the burst of the enemy shell. This was done, and immediately the enemy's shooting became inaccurate and soon ceased.

3. In the case of howitzers no particular method of fire by a single battery is likely to defeat enemy Sound Ranging under good weather conditions. **Gun batteries, however, by firing salvos** whenever possible, may spoil the record by confusion of the shell-wave of one gun with the gun-wave of another.

4. Other circumstances being equal, the chances of detection by German Sound Ranging are lessened by any of the following conditions:—

- (a) A general noise of firing by either side on the front, or considerable artillery activity on the flanks.
- (b) Very windy weather, unless the wind is W. or S.W.
- (c) Fairly calm weather with an E. or N.E. breeze.
- (d) Deliberate simultaneous masking fire from a neighbouring battery—a **gun** battery, if possible of the same or next lower calibre. The discrepancy in calibre should not be too large. For example, one 18-pounder gun would not mask the record from a 12-inch or 15-inch. Such very heavy pieces would be best masked by a continuous noise, *e.g.*, by one or more neighbouring 18-pounder batteries firing as rapidly as possible from five seconds before till five seconds after the discharge of the heavy piece.

5. When there is ground for believing that enemy fire is being controlled by sound observation, the following precautions should be adopted, when possible:—

- (a) The battery which is being shelled should not fire if it can be avoided.
- (b) The nearest **howitzer** battery of calibre next lower* than that of the offending enemy battery should fire a round or section salvo (preferably on the offending battery), timing the instant of firing to be as nearly as possible simultaneous with the burst of the enemy shell. The efficacy of this method obviously depends on the confusion of the record by the simultaneous arrival at the German instrument of the sounds of the burst and the howitzer discharge. If the masking battery and the shelled battery are not roughly equidistant from the front line, the distance should be allowed for in timing the instant of firing. The same of course applies to the masking fire advocated in para. 4 (d).

GENERAL STAFF, G.H.Q.,
14-9-17.

* It has been found by experience that the record of the discharge of a howitzer corresponds approximately with the record of the burst of a shell of a slightly greater calibre.