

The
**WIRELESS
WORLD**

**BRITISH ARMY
WIRELESS
IN RUSSIA**

**WIRELESS
TELEPHONY**



**"ANTI-SULPHURIC" ENAMEL
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“W/T. R.E.”

An Account of the Work and Development of Field Wireless Sets with the Armies in France.

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THE great war has seen many marvellous adaptations of man's ingenuity and science as aids to victory. Scarcely a field of knowledge but has had its quietly-won results turned into martial channels, their development hastened by the pressing needs of the time. Science, with all its brain power, all its facilities for research, has had to turn from peaceful paths and to produce new tools for warfare, on sea and land and in the air. With such an adaptation of science and engineering this series of articles has to deal. The story of the work of field wireless sets in France is the story of an entirely new development of the wireless art. A new development, because though our armies were well equipped with field wireless sets before the war, these sets were not of the kind used in France, largely used that is. They were used with our forces in Egypt, Palestine, Salonika, Mesopotamia, East and South-West Africa, when as sole means of communication between units fight-

ing in desert or jungle, advancing rapidly, moving constantly, they did invaluable work. In France the problem was an entirely different one, and prior to the war, the British Army possessed no sets capable of solving it. Though indeed the problem, that of communication in battle in trench warfare, could hardly have been foreseen. How wireless telegraphy solved it, and so successfully that the number of trench wireless sets can now be reckoned in thousands, the following pages will show. I hope, too, that the story of the W/T sections R.E. working as part of the ordinary and extraordinary communication of the huge army in France, as part of the Signal Service, will show that, thanks to the heroism and enthusiasm of the operators, they contributed in no small measure to the final victory.

The wireless sets brought over to France by the original Expeditionary Force in August, 1914, numbered about a dozen. They were $1\frac{1}{2}$ kilowatt sets mounted in lorries or in limbered wagons, the latter for use with

the cavalry. During the rapid movements of the first few months these stations did a certain amount of good work, but conditions were against their employment to any great extent, as moves were too rapid during the retreat and subsequent advance from the Marne. Once the opposing armies had "dug themselves in" on the fronts that changed so little for four years, these sets were not used and they remained inactive during the year 1915.

The advent of trench warfare, however, and the ever-increasing weight of enemy artillery brought to bear on our trenches, made the problem of maintaining communication with our forward troops very difficult. The great concentration of infantry and guns on a front of attack complicated the scheme of communications. Telephone and telegraph "buzzer" lines had to be laid everywhere. But once an enemy barrage came down, telephone cables were sure to be cut. True, they could be laid along the sides of communication trenches, or buried in special trenches at night, but even the latter expedient was not a sure means of maintaining communication. Though the regulation depth was increased from a foot to six, and even eight feet, a direct hit from a Boche "5.9" would cut the line.

During the latter part of the year 1915 those responsible for organising the work of the Signal Service began to look round for some auxiliary method of communication, to carry back the "S.O.S." of the fighting infantry. Visual signalling by flag or lamp, they had, and the finest visual signallers in the world. But cover from enemy observation was not easy to find in that shell-shattered land. The dust and smoke of a barrage, too, was enough to obscure any flagwagging or lamp-signalling, while many a good visual "circuit" was useless owing to the morning

mist, at a time when information was all-important.

Many ideas were tried, some at a later date than that which I am considering. Carrier-pigeons, which did good work while trench-warfare lasted, though subject to many drawbacks, message-carrying rockets, which were never very successful, even messenger-dogs! The infantry "runner" always used in the last extremity, was a brave man, but often it cost him his life which could ill be spared.

And then, about the end of 1915, it was decided to try wireless sets. Possibly some success obtained by our Allies the French led to this decision. Certainly the enemy, from whom we were never unwilling to adopt an idea, as he from us, was not using anything but a few powerful stations for his very long rear communications. Before describing the sets that were tried, I will briefly indicate what was required of them from a military and technical point of view.

Wireless was required as a means of communication between the headquarters of battalions, brigades and divisions, to supplement the telephone and telegraph in case of the failure of the last two through lines being broken by shell-fire or difficult to lay. Later, as we shall see, wireless was required to supplement and even replace all "wire" communications in the army, both in the actual front line and in the area behind the trenches. These wireless sets were to transmit and receive orders and reports during battle and to move forward with our advancing troops. Clearly the range required of them was not great, varying from a thousand yards to ten or twenty miles. The aerials used had, however, to be as low and as inconspicuous as possible, sometimes merely ground aerials, and the sets were to be under conditions of working and screen-

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ing which did not make for efficiency. Moreover, as they had to be quickly dismantled and carried forward, everything about the sets, masts, instruments, accumulators, etc., had to be simple and as small and light as possible. The design and development of these short range trench wireless sets with their special needs and peculiarities, can well claim place as a new branch of wireless engineering.

So in the spring of 1916 there came out to France a number of small "boy-scout" wireless sets, christened at G.H.Q. Wireless Headquarters, the "B.F." sets. History does not relate the origin of this name, and though the succeeding years saw sets which better fulfilled the conditions given above, the "B.F." set is used to this day. Suitable operators, most of them old Marconi men, were obtained from the infantry and other sources, and after a period of training, the B.F. sets had their baptism of fire. They went into "action" in the 1st Battle of the Somme, July 1st, 1916. The map (Fig. 1) shows the distribution of stations during one phase of the battle. Time and again these sets got "through" important messages when all other means of communication failed. Some idea of the conditions under which they worked may be got from the station at Waterlot Farm, on a rise in full view of the enemy, and only about nine hundred yards away from him. To keep two fifteen-foot masts standing was almost impossible, and this station had to use ground aerials (insulated cables laid along the ground for a hundred yards). Some very important messages were yet despatched in this way, and enemy counter-attacks broken as a result.

Lack of facilities for transport and for charging of accumulators and many minor difficulties which occurred were natural with a new organisation, as yet

not fully equipped. Opposition and criticism, too, were not absent, but these were to die away later. It was during this Somme offensive that the poor Corps wireless officer, struggling to keep his sets going, with bad carborundum crystals and accumulators which he could not get charged, was daily asked the facetious question: "Hullo, Sparks, got any messages through?" A remark not calculated to help poor "Sparks," who, nevertheless, thanks to the keenness of himself and his men, eventually turned the tables on his interlocutor and—but I am anticipating. However funny it was to some people to see "Sparks" and his men wandering about the trenches with their "gadgets," their portable boxes of wireless magic, to the Huns at any rate they did not seem in the least bit funny. In the captured report on the Somme operations by General von Arnim, the report in which he contrasted our excellent fighting equipment with that of his own troops, he particularly asked that small portable trench wireless stations, such as we had used, should be quickly provided for him. That this was done was evident to us a few months later, when the now familiar Telefunken trench-sets began "U-M"ing all along the line. Imitation is the sincerest form of flattery, and after the *début* of "W/T.R.E.," it was still the British who kept the mastery of the Aether, both in novelty of idea and in general efficiency of service.

The success first obtained on the Somme was maintained in succeeding operations and gradually prejudice and opposition alike were won over. More men and better equipment were provided, with correspondingly better results from wireless communication. Schools were started during the winter of 1916-1917 for Signal Service officers, to give them some knowledge of the

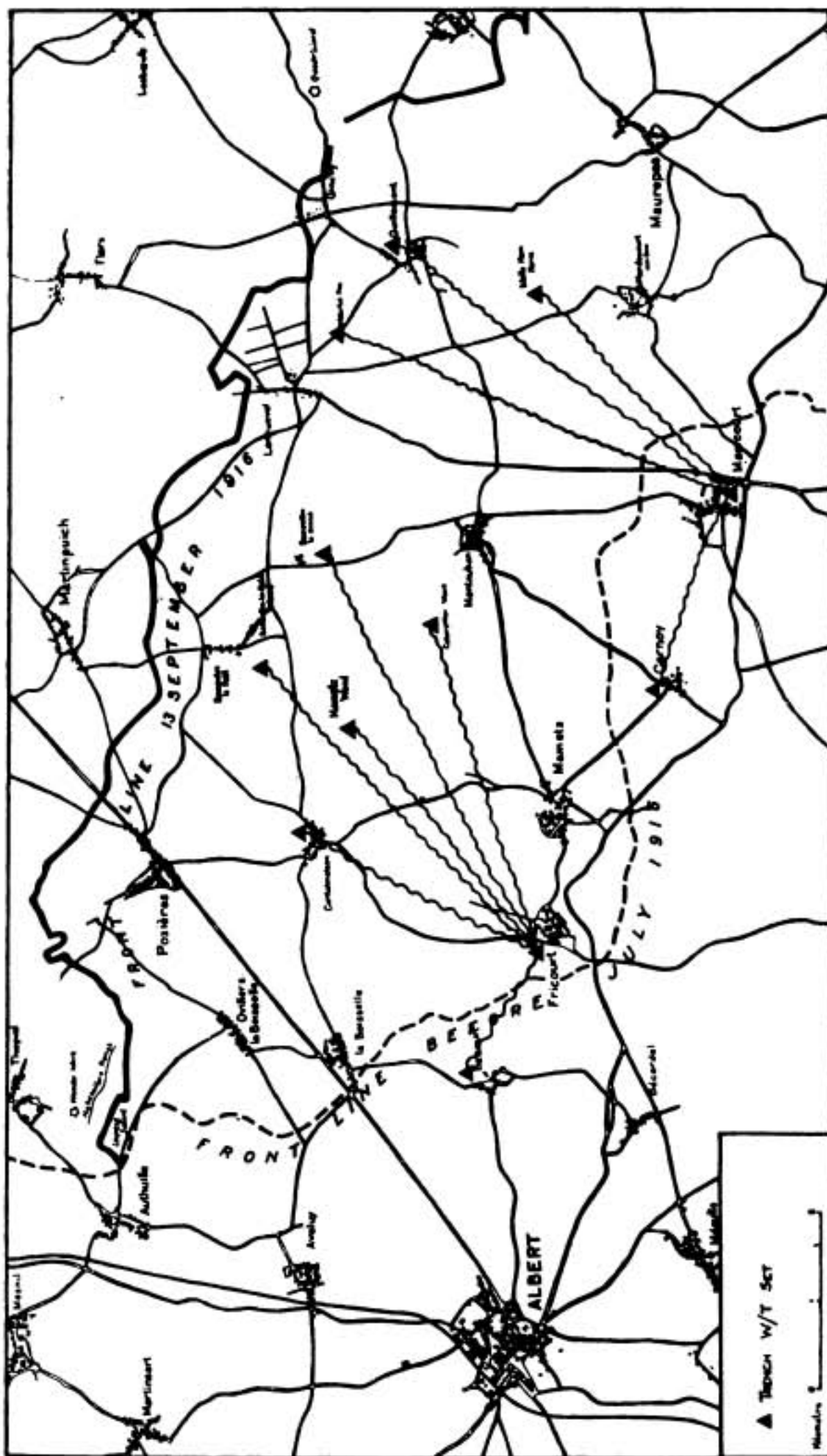


Fig. 1.
Trench Wireless first used in battle. First Battle of the Somme, September, 1916.

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working conditions, possibilities and needs of the sets. The number of sets was increased by production in special factories in England, and operators were trained at depots in England and France. The need being recognised, a staff of wireless experts at Woolwich was busy investigating the trench wireless problem, and applying to it all that modern wireless practice could suggest. In particular that revolutionising instrument, the three-electrode valve, was called in to help.

The battles of 1917; the German retirement to the Hindenburg line, Vimy Ridge and Arras, and the battle of Ypres which culminated in the capture of the Paschaendale ridge, all these added to the laurels of the "W/T.R.E."

Amongst hundreds of cases of heroism of the operators and invaluable service to the fighting infantry, I can only mention a few instances. In the first battle of Arras, for example, prior to the commencement of operations, the second corps wireless section had stations erected near the front line in communication with the 73rd Brigade Advanced H.Qrs. At 7 a.m. on April 15th one "B.F." set was moved forward to advanced Battalion H.Qrs. Only visual signalling of doubtful reliability existed until the trench set was established. During the battle visual signalling became impossible and wireless was relied upon to maintain communication. A large number of messages of the utmost tactical importance were sent at critical periods of operations, over an average distance of 8,000 yards. Continuous communication was maintained in spite of heavy shellfire.

During this battle of Arras one of the most important objectives was a peculiar hill crowned by the village of Monchy-le-Preux. This hill commands the country for miles around. The possession of it was invaluable to

our artillery observers and a great loss to the enemy. The hill and village on top were captured in a rush, the Boche retiring in disorder to the valley beyond. Owing, however, to the speed of their advance our troops were out of touch with the higher command, and the guns behind them. Out of touch, did I say? What is this queer mast affair some sappers are rigging up in the garden of what was once a pretty cottage? Up go the small steel masts in spite of the shells streaming into the village, which seem determined to wipe out this and every other cottage before many minutes are over. The aerial up, it is not long before they have installed their tiny set in the cellar and are "through," R9 signals each way. Just in time, too, for the Boche at the foot of the hill show signs of a counter-attack. "Get at the guns, Sparks, get at the guns!" And "Sparks" bends to his key, like operator on sinking ship. "S.O.S. Barrage, S.O.S. Barrage, S.O.S. Barrage" goes out on 350 metres for every battery of artillery behind to pick up. They do pick it up. Within a minute the answer comes as the shells whistle overhead. The German counter-attack withers away under our shelling, and Monchy is saved. For several hours afterwards the little set keeps the garrison in touch with the general and the guns behind until a telephone line can be laid.

The third instance is concerned with a continuous wave set. These sets were introduced about the middle of 1917 and proved very successful, later designs giving admirable results. The very low and short aerials on which they would work made it possible to instal them in positions under enemy observation and in very forward positions. They were therefore utilised for directing artillery fire from forward O.P.'s (Observation Posts). (*To be continued.*)