

CROSS REFERENCE

GENERAL REPORT ON

WIRELESS TELEGRAPH COMMUNICATION
CANADIAN CORPS

FEB. 1915 - DEC. 1918

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**P.T.O.
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**GENERAL REPORT
ON
WIRELESS TELEGRAPH COMMUNICATION,
IN
THE CANADIAN CORPS FROM FEBRUARY 1915 TO DECEMBER 1918.**

In order to make a concise but intelligible story of the work of the Canadian Corps Wireless Section during the war, it has been found necessary to subdivide the time into the following periods:-

- (1) November 1915 to July 1918, the period of development and progress during trench warfare.
- (2) The operations at Amiens 1918, the first period of open warfare.
- (3) The operations at Arras, 1918.
- (4) Quenest to Bonn, 1918.

The first subdivision *Part I* is not written in sufficient detail to show all the attempts made to utilise Wireless, but an attempt has been made to show the gradual development from a mere toy to an efficient and useful system of communication.

I. This section has been again divided into three parts as follows :-

- (a) Spark Wireless and Interception of Enemy Wireless Traffic.
 - (b) IT and Policing work. Power Buzzers and Amplifiers.
 - (c) C.W. Wireless.
- (a) SPARK WIRELESS AND INTERCEPTION OF ENEMY WIRELESS TRAFFIC.

The first instance of the use of Wireless by any Canadian Unit in France, was during May, June and July, 1915, when Sappers Garter and Max of the Headquarters Section, 1st Canadian Divisional Signal Company built and operated a press set at Divisional Headquarters. Newspapers were a great luxury in France at this time, so the Wireless Press soon became very popular. Press was taken from Poldhu and Eiffel Tower, also propaganda from Austrian, Russian and German stations.

During 1914 and for 10 months of 1915 all Wireless in France had been controlled and operated by the Army Wireless Companies but on November 5th 1915, a start was made towards the organisation of Corps Sections, when schools were started at all Army Headquarters. Twenty three men from the 1st and 2nd Canadian Divisions were sent to Cassel to the first course held in the Second Army. Later on, these men formed the nucleus of the Canadian Corps W/T Section. A proportion of senior N.C.O's had been sent on this course and of these, Staff Sergeant Mansan was selected to take charge of the work and was sent to England for his commission. In January 1916, 18 men returned to the Corps in charge of Sergeant Sharpe and the following stations were erected in the Ploegsteert area.

2.

- (1) A Corps Reception and Control Station at Corps Headquarters Bailleul, consisting of a Wilson Transmitter and Mk III Short Wave receiver.
- (2) A Sterling Transmitter and Mk II Receiver at Westhoff Farm, Report Centre for the 1st Canadian Division.
- (3) A similar set to (2) at 2nd Division Headquarters, Westoutre.

Towards the end of January, the first two B.F. sets were introduced in the Corps and placed one at 3rd Brigade Headquarters, Red Lodge, Hill 63, and the other at 4th Brigade Headquarters, La Clyte.

The Control set for the Army was a Marconi Lorry erected at Renninghelst.

During the first few months, the big difficulty experienced was the supply and recharging of batteries. Only two accumulators were supplied per station, one to be on charge and one on the set. The 1st Division had their charging done at the M.T. Company at Bailleul and the 2nd Division at the Second Army, Cassel. These distances were great and transport so limited that stations were often out of business due to a shortage of accumulators.

Work of 1st Canadian Division Station.

There was no real work done by any of the stations during the early months, exchanging of signals and messages re positions and supplies were all that passed. This station was located in an Armstrong Hut on the cross-roads, North East of Westhoff Farm and a few days after it opened up, the enemy dropped some H.V. shells very close to the station. This gave rise at once, to the idea that the Hun was locating Headquarters by Wireless and the set was moved to an open field near Neuve Eglise and operated for several hours to see if the enemy would follow it up. The experiment was not successful. Another adventure in the history of this station was when the operators were ordered to take their rifles and a B.F. set and go out searching for a spy set supposed to be operating in the area. This also failed.

Work of the 2nd Canadian Division Station.

The first real Wireless work in the Corps was handled by this station in March during the re-taking of International Trench. The set was moved up to Battle Headquarters, Sherpenberg Hill and erected in General Turner's room. Considerable business was handled to the 4th Brigade during the night.

On March 27th, the Corps moved to the Salient and about the same time, the personnel of the 3rd Canadian Division, who had been sent to the Second Army school for a course, returned and were sent with the Division into the line. During the first week of April, Lieut. Broadbelt took charge of the Section, Lieut. Mansan having been injured in a motorcycle accident. At this period, the Wireless came under the control of the Corps for the first time.

The following stations were established and operated on this front, the sets being attached to Divisions and Brigades as shown :-

- (1) A Wilson Transmitter and Mk III receiver at Renninghelst replacing the Army Central lorry.
- (2) A BAR Receiver and Sterling Transmitter at Dug-Outs behind Belgian Chateau, report centre for CYC.
- (3) Wilson and Mk.II receiver at Wall Garden, Dickebusch. This set was not attached to anyone in particular.
- (4) A B.F. sets at the Bund, Zillebeke Lake, for 9th Cdn. Inf. Bde.
- (5) B.F. set at Bedford House for 1st Cdn. Inf. Bde.
- (6) B.F. set at Spoil Bank, Battalion Headquarters.
- (7) B.F. set at Sanctuary Wood for the sacrifice guns of the 7th. Battery.
- (8) B.F. set at Voermesele for 6th Brigade.

Units had not yet become accustomed to the use of Wireless and as a result practically nothing was ever sent that way except practice messages or requests for rations and accumulators. Also since the personnel available was very limited only two men were sent to forward stations and the sets were manned for the 10 minutes in the hour only, except for Corps and CYC who kept continuous service. This left the operators considerable spare time and as a result, press sets of all types and descriptions began to make their appearance. The supply of suitable material was very limited and considerable ingenuity was displayed in the design and construction; everything being used from magnet wire and G.P. twin and hairpin wire. A short description of two especially successful sets is given below:-

One at CYC, constructed by Pte Carleton, was wound on a frame constructed from barrel heads and laths, with a secondary wound on a cheese drum. For adjustments coils of fine hairpin wire were wound on S.R.D. jars were connected in primary and secondary and shifted about on the table to give different degrees of coupling and to alter the wavelength. Signals received were remarkably good and tuning very sharp.

The set at Zillebeke Lake, built by Pte Adams, was wound of G.P. twin on a rum jar case, 4' long, with the corners rounded off to prevent sharp kinks in the wire. The secondary was composed of two layers of hairpin wire wound on a whole cheese case. The Inductance switch was built up from parts of electric lamp sockets salvaged in Ypres and the condenser of two accumulator plates suspended over one another and adjusted by means of a string running over a pulley. The detector was two Perikon crystals stuck in a match box filled with wax. But it worked. Later on the crane shifted to pancake coils made up from wire salvaged from a research laboratory in Ypres. Every operator carried a press set in his pocket then.

About the middle of May, shoots were carried out by Wireless for a 9.2" Battery near CYCR, with good success. A telephone line was run out from the Zillebeke station to the F.O.O. at China Wall and another line from the guns to CYCR. The distance was about 6000 yards and B.F. sets used at either end. Four successful shoots were carried out, the last one resulting in a miracle, - for the W/T operator. After the second shot, the F.O.O. signalled "drop 10" but "fortunately or unfortunately" the operator in using the code made it "10 right". The mistake was discovered too late, needless to say, the W/T personnel were greatly relieved when the F.O.O. signalled "An O.K. CR".

Use of Wireless During June Fighting 1916.

On the second of June, although the attack began about 7.00 a.m. and practically all lines were down, no work was given to the Bund Station until 8.00 p.m. when a message of 250 words was handed in and sent. From then on, numerous messages to Corps and Division were handled. Although all stations tried to raise the set at the Sacrifice Guns, it was never heard. At 2.00 a.m. the next day, Sapper Hood arrived at the Bund station, wounded and reported that the shrapnel barrage kept cutting the aerials, finally both operators went on the guns until the last minute. Sapper Chambers, the second operator, was killed getting out. Although enemy patrols came within 80 yards of the Bund station it was not evacuated.

For the retaking of the ground, a week or so later, a special set was erected at 1st Canadian Inf. Bde. headquarters at Railway Dugouts as an auxiliary to the Bund station. Little work resulted however.

The first charging set for the Section was secured about this time. A lighting set at Transport Farm, which had been abandoned by the Brigade, being taken over. Previous to this, all charging had been handled by Army and the 1st Division M.T. company at Hoograaf.

During the last week of June, an attempt was made by the 3rd Division M.G. Company to use Wireless for communication forward to their O.P's. Four BAF receiving sets were installed in their O.P's and the transmission was from the Bund Station using a special code. The system was tested out thoroughly and worked, but the Army stopped its use on account of the special code employed.

Three new pieces of apparatus appeared about this time, the first being a form of Valve Detector for the Mk III tuner. It utilised a French Valve and was coupled to the receiver by means of two small pancake coils. It was tried out at the Corps station and was found to be very sensitive. The second was the present short - circuiting device for B.F. sets and the third a two-valve French Amplifier.

A Ballet set for charging accumulators was received from Army about July 15th and was installed at Renninghelst, the set at Transport Farm having gone out of commission. The reserve stock of accumulators for the Corps, 7 all told, were held there.

Wireless in the Somme Fighting.

On August 2nd, the W/T Section of the 2nd Anzac Corps relieved the Canadian Corps Section and the next day the Section of 25 men and all equipment was shipped off in a 5-ton lorry for the Somme. On August the 3rd the Corps Control Station relieved the Pack Set of the Reserve Army at Tara Hill and took over the Control work. Three days later the entire section moved to Tara Hill and the following dispositions of stations was made; divisional working being dropped for the time being :-

- (1) Control Set at Tara Hill.
- (2) B.F. Set at Gibraltar in Pozieres.
- (3) B.F. Set in dug-outs across main Albert Road from (2). This set was moved later to I 15 central, the Brigade Headquarters and again to the Sugar Refinery for the taking of Courcellette.
- (4) B.F. set at H test point near Owillkers. This set was never operated from this location.

The Charging for all stations was handled by the Corps lighting lorry at Contay, batteries being delivered by ration lorry to Tara Hill station.

On August 10th, a 70' mast was received from Army and erected at Usna Hill, the D.S. being moved to this point about the same time. There was very little message work still, although lines were bad, so the station copied all English, French and German Press, interpreters being attached to translate the French and German.

For the attack on Moquet Farm, the Gibraltar set was moved to Battalion Headquarters near some 18 pounder guns in I 2 b sheet 57 D.S.E. When the barrage opened, the first shot carried the one mast about 50 yards down the field. It was repaired later and handled several S.O.S. calls during the day.

On September 15th, when the Canadians captured the Sugar refinery, the second Pozieres set was moved to Battalion Headquarters just left of the Refinery. This was a useful station and handled ~~xxxxxx~~ about a dozen important messages to Brigade and Division. In the afternoon, when the attack was continued against Courcellette the station moved up with Battalion headquarters and remained there until the 23rd. Considerable traffic was handled from the new location. It was impossible to maintain telephone communication from Battalion Headquarters to the front line and an attempt was made to cover the gap by Wireless. A trench 30 yards long and tapering from 10' at one end to 5ft at the other, was dug 200 yards behind the front line and a B.F. set was erected there. The idea of the trench was to allow the aerials to be repaired without exposing the men. Nothing was ever received from the station as the

masts were too conspicuous. It might have worked if the aerial had been kept within a few feet of the ground.

The Corps was relieved by the 4th Corps on September 23rd, and the next day the section left for Ranchicourt; the Corps having taken over the Vimy Ridge Sector. The Corps received its first box car, a Napier, just a few days before leaving the Somme area.

On taking over the Vimy sector, the W/T layout was as follows :-

- (1) D.S. consisting of Wilson set and Mk III Tuner erected over Blacksmith shop, Ranchicourt, call ZFA.
- (2) B.F. set at Advanced Bde. Headquarters, Caberet Rouge, known as ZB station.
- (3) B.F. set at Right Battalion Headquarters on Vimy Ridge about 50 yards north of Tottenham Court Rd. This was ZA.
- (4) A trench set at left Battalion Headquarters, just north of 150th Alley and on the Ridge. This station was known as ZC and only stayed out for about 4 weeks.

Two weeks later, three additional sets were erected -

- (5) B.F. set in Headquarters Trench in front of Lorette Ridge, call ZD.
- (6) ZG, a B.F. set in Calonne.
- (7) ZF in Sains-en-Ghelle at CYB headquarters.

Very little real message work was handled, as units were still unaccustomed to the use of Wireless. Lieut. Mansan returned to the section about the first of November and two weeks later he moved the D.S. to Camblain l'Abbe; Ranchicourt being too far behind the line for the power of the set. About the same time, two more stations were sent out for the 3rd Division, - one ZH to Neuville St Vaast to a Battalion Headquarters and the other ZI to their Report Centre on the Mont St. Eloy - Arras road. ZB station was destroyed on January 12th by a direct hit from a Minnenwerfer, Spr. Laurie who was on the station being dug out the following morning.

Wireless During the Vimy Fighting.

For the operations on April 9th, the following dispositions of Wireless sets was made:-

The Corps D.S. and advanced dump was moved to Aurits Corner on the night of April 8th and erected at the Adv. 2nd Divn. HQ.

For the 1st Division a Trench set was erected at Maison Blanche at Advanced Division Headquarters.

and two other B.F. sets, one at Ben Tata Tunnel for 3rd Bde. and the other at Labyrinth for 2nd Bde.

Divn.

On the Second ~~army~~ front, two trench sets were erected one at Machine Gun Fort and another at Zivy Cave working back to the Corps D.S. at Au Ritz Cave.

The Third Division moved their set from the R.C. near Mont St. Eloy to Brigade Headquarters in Territorial Trench just east of the Arras - Souchez road. A second B.F. set was placed at Machine Gun Fort but did little work. An attempt was made to establish a D.S. for the 3rd Division at Fort George but it was not successful.

The station at Right Battalion Headquarters near Tottenham Tunnel was left for the 4th Division and in addition a set was erected near Souchez on the left front. This latter station was not operated.

There was little attention paid to Wireless and few attempts were made to utilize it, chiefly because units were not acquainted with its uses and limitations, and also because there was no proper organization or establishments provided. During the first few days all stations moved several times following up the Brigades and Divisions but little work was handled, except by the second Division stations. About two weeks after the original attack, the advanced station located with battalion headquarters at the Beehive handled an S.O.S. call in clear calling for artillery support against a Hun counter-attack. Assistance was secured six minutes after the message had been sent. From that time on, there was a small amount of business for this station.

After the first attack, lateral communication between divisions became extremely difficult and the divisional sets did some inter-divisional traffic.

About May 15th, Lieut Mansan left the section for England where he went on some special work for the Navy, Lieut Jones taking his place as Corps W/T Officer. Lieut. Skinner, who was acting as W/T Officer for the 3rd and 4th Divisions was wounded about this time.

The next important step in connection with Wireless in the Corps was the sub-division of the Corps Section and the formation of the Divisional sub-sections. This occurred during the first week of July 1917 and from this date on, real progress was made in Wireless in the Corps. Each Division was given an M.C.O. and 9 operators and for equipment 2 B.F. sets, 3 power buzzers and 2 amplifiers, also accumulators at the rate of 2 per station. All charging was handled by the charging lorry at Corps and delivered as required to the Divisions. The system of communication was to have the B.F. sets out with the Brigades and all messages handled through the Corps D.S., which was located at Hill 151 near the Arras Souchez Road. This station was in telegraphic and telephonic communication with Corps.

With the establishment of the Divisional Sections, the Divisional Signal Companies began to take an interest in Wireless and Power Sumner work. Men were detailed to Brigades to operate the sets and as far as possible, to move with the Brigade. This gave the Brigade Sections an extra interest in the work.

At this time, the writer was Signal Officer with the 12th Canadian Infantry Brigade, and the use made of Wireless in that Brigade is given as an example of what was happening in most of the Brigades in the Corps. The operators were taken in as a part of the section for clothing and rations and accommodation secured for the set and personnel whenever the Brigade moved. The station was always in telephonic communication with the signal office and was usually provided with a Fullerphone whenever it was too far away for an orderly to handle the messages. A number of docket and S&S messages were handled daily and steps were taken to interest the staff in the work and in the use of the Field Cipher Code. During periods of rest the personnel were used as instructors in Power - Amplifier work with the battalion signal sections. Especially good men from these courses being given an opportunity to get some experience on the W/T set when the Brigade went into the line again. In this way some good W/T operators were secured in the Division.

The third Division very successfully employed one of their B.F. sets at Divisional Headquarters - working direct to the other set located at one of the brigades in the line. This division was the first to appoint a Divisional Wireless Officer.

During the Passchendaele fighting, there was little chance for Spark Wireless. The Corps D.S. was located on the Canal Bank just north of the Menin Gate. This station was wrecked by a direct hit just before the first attack but was re-erected using an 80' mast. It was too far back to be of real use and an advanced D.S. was sent to CYAR at Kansas Cross. The rear station was used chiefly for C.W., both sets using the same masts for their aerials. In fact the Spark operators, Sappers Davidson, ~~Reimer~~ Beisel and Patmore did most of the receiving for the C.W. set, as they had all been trained on ~~Wealth~~ sets and were fast operators.

It was impossible for the Brigade B.F. sets to work, as dug-out and pill-box accommodation was too lighted and it was impossible to keep up aerials in the forward areas.

A Corps Directing Station was erected at first near Levi Cottages, just north of Zonnebeke Village. This set was destroyed by a direct hit and it was very evident that the enemy was ranging the station by means of a compass set. Whenever the station began sending the enemy started to shell. He was evidently under the impression that it was a large headquarters. None of the personnel were injured, but the station was not re-erected.

On return to the Vimy front in December much the same arrangements were made as existed just previous to the trip to Ypre. During the next two months, all Divisions appointed Wireless Officers from the Signal Companies. The writer taking over this work for the 4th Canadian Division. During February 1918 additional Wilson Sets were secured and each Division took over its own control and message work.

The equipment of each Division now consisted of a Wilson and Mk III Tuner for Divisional Headquarters and 3 B.F. sets one to each Brigade. With Wireless Officers at each Division it was easy to work up interest in Wireless Communication and classes for Officers were held in Field Cipher and Codes.

All messages were in code, except Docket messages or unimportant messages of four or five words which were sent in clear. This was on account of the danger of giving away the cipher used. A large amount of traffic was handled during the first four months of 1918, there being quite a rivalry between the divisions as to who should have the greatest daily average. About this time orders came out from Corps that all units to which Wireless stations were attached should arrange to send at least 6 messages per day. These messages were to be coded by the staff. The messages were sent, but in most cases the coding was done by the operators on the set.

All the divisions and most of the Brigades operated special Press sets, the news being typed off and distributed to the various offices and messes. The Corps station copied and translated all press, French, German, Italian, etc. This was typed and distributed throughout the Corps by the early morning D.R. run. The Press was especially welcome during the March, April and May fighting.

About the 1st of March all Divisions were equipped with a S.K.W. Lister P.E.L. set for charging and lighting and from that time on handled all their own work. The new establishments for Corps and Divisional W/T Sections - in both personnel and equipment - came out during this period and the strength was increased to 18 operators. Loop Sets and the new combined Power Buzzer Amplifiers were introduced early in 1918 but only in sufficient numbers to be used for demonstrations and for instructional purposes.

Authority was granted about the first of February for the formation of Brigade Power Buzzer and Loop Set Pools. These were composed of 6 men from each Battalion pooled under the Brigade Signal Officer. Classes were begun at once by the Divisions for the training of these men.

The Corps was withdrawn from the line on the 9th of May, and during the period of rest, extensive training was carried on, special attention being paid to schemes and the employment of Wireless in Open Warfare. Also combined Power Buzzer and Amplifier sets and Loop Sets were secured in sufficient quantities to equip all Divisions and the Corps practically to establishment.

On the 15th of June, the writer took over the work of Corps Wireless Officer, when Lieut. Jones went to the C.C.H.A. At this time preparations were made for the establishment of a Corps Wireless School to be run in connection with the Canadian Corps Signal School at Aubin St Vaast. Lieut. H.W. Dawson was secured from the 1st Division to take charge of the work. He had been W/T Officer for C.Y.A. for some time previous and acted as W/T Officer for C.C.H.A. at Amiens and for part of the Arras fighting, before proceeding to the school.

Instructors were provided from the Corps and Divisional Sections and two courses were run concurrently, one in C.W., and the other in Power Buzzer Amplifier and Loop Set work. Two complete courses were handled in each subject before the Armistice.

Wireless Interception in the Corps.

The first attempt made in the Corps to intercept and decode enemy Wireless messages was about the middle of August 1917, when the station consisting of a MK III Tuner and 3 valve Amplifier was erected in the Bois de Riamont. It was tried with the idea of discovering whether the Hun short range, Company to Battalion, set could be picked up. It proved to be a very successful experiment. There was little jamming, even from aeroplanes, and an average of 120 messages per day were taken. These were sent twice a day to the Brigade in Lievin to be forwarded by D.R. Any special important messages, such as messages in clear, were forwarded to Corps at once by Fuller Phones. One very important message in clear was handled by this station.

About the 1st Of September, a powerful station was erected at Berthonval Farm to send out time signals to all artillery and Infantry sets in the Corps, but on September 18th both these stations were moved to Bouvigny Hill near C.C.M.A. headquarters. An 80' and a 70' mast were erected and a Wilden set installed for time signals. Time was sent out at 6 a.m. and 6 p.m. using the French system. On return from Ypres in December, this station was again operated. A large squirrel cage and 8 directional aerials were erected for special work. Two large press aerials were used and all press for the Corps taken by this station.

Both telegraph and telephone communication was secured to Corps and all messages sent there direct as taken. At first the traffic only amounted to 50 messages daily but came up to about 80 during the March offensive.

During the Allied retreat in March and April practically all the W/T stations of the Third and Fourth Armies were sending in clear. As much as possible of this traffic was intercepted and forwarded direct to the Corps Staff by Wireless. For a month of this time all Canadian Corps sets were silent except for emergency working, tuning signals being sent by the Corps D.S. once daily.

The following special instance of the use of this station is given. On March 18th a priority message was copied and sent at once to Army. When deciphered it gave complete information about a Hun attack on Hill 70. This information was in the hands of the Staff, half an hour before zero hour. The attack came off but was not a success.

Part of the success of this station was due to the fact that a German multiple tuner, which had been taken at Farnus Wood during the Vimy fighting, was used for interception. The tuning was very sharp and close and by its use stations could be heard that the Army could not pick up.

Every morning complete information, about the calls and wavelengths of the enemy sets on our front, was received from Intelligence B. Army.

(b) IT AND POLICING WORK - POWER BUZZERS AND AMPLIFIERS.

It is not yet known just when the German Army began to do interception work on our telephone lines, but it must have been very early in the war, almost as soon as it settled down to more or less definite French Warfare. It is known that this method of using the Valve Amplifier was known to the German Army before the war, and in all probability both instruments and trained personnel were available before August 1915.

It is certain that when the 1st Canadian Division came to France in February 1915, the Hun had information ~~attributed~~ these stations in use and much of the leakage of information, attributed to spies in our midst, was due to their use. The enemy was always aware of all our reliefs and he even knew the numbers of the battalions ~~at~~ the line and in some cases the names of the Battalion and Company Commanders. Just when or how the allies discovered that he was obtaining this information from our telephone systems, it is impossible to say, but in the fall of 1915, the French began experimenting with Amplifiers, with the object of intercepting enemy telephone messages. The British took up the work almost at once and the first station on the British Front was installed at Neuville St Vaast in April 1916. Why these stations were called IT stations it is hard to say, but they have been known by this name ever since the first set was put into operation.

The personnel of this station consisted of German interpreters, telegraph operators and linemen, picked from various English units in France. When the Canadian Corps took over this front in October 1916, this station was attached to the Corps and the question at once rose of manning it with Canadian personnel, if suitable men could be found. A canvas was made and the first Canadian IT men were sent to the W/T School, Compagne le Mesdin, on October the 20th 1916.

After a course on Amplifiers and Intelligence work, these men returned and the first Canadian IT post was established about the 1st of January 1917 at the Neuville St Vaast station, now called No. 6 Post. The apparatus in use consisted of a French 4 valve Amplifier of the type commonly known as the "Grand Piano". Although clumsy and bulky, this instrument gave better results than most of the more modern types of English and French Amplifiers. Both earths and loops were used on this station; the best results were obtained from a loop running through a mine gallery practically under the enemy front line. This station always gave good results and on several occasions information concerning intended raids was picked up in time to make artillery and Machine Gun preparation.

In February, this station was moved to Vimy Ridge, near the Pimple. Loops were put out but no earths and the results from this station were never very satisfactory. About the same time, a station, manned by English personnel, was installed in Colonne and gave excellent results, a great deal of German conversation being obtained every day. During February also, a third station was installed in Tottenham Tunnel on the Ridge.

It was about this time that the policing of our own telephone lines began. The Blue Bull tunnel station which was not getting much German, did the most of this work. It was very difficult to persuade our own people, especially officers, that there was any need for caution when using the telephone. It was only by taking pages and pages of our own telephone conversation and passing it through the Staff, that any improvement could be effected. Very drastic regulations were drawn up and special checks were made to prevent talking over the telephone, especially ahead of Brigade Headquarters. By a concentrated effort, telephone discipline in the Canadian Corps was greatly improved before April 9th, as was proved by reports from German IT Posts captured during the Vimy fighting.

The first IT Post to be established after the taking of the Ridge, was in Vimy village, about the third week of April. This station did little real interception but was valuable for the policing work which it was able to do. It was also used as a receiving station for forward Power Buzzers. During the first four months of 1917 about 12 or 15 additional Canadian personnel were trained at the GHQ School and added to the section which now totalled about twenty IT operators and Interpreters.

The next set installed was at Farbus Wood, where German conversation was again picked up. This station did some very useful work, and several letters of congratulations were received from Intelligence in connection with the work of this set.

During May and June, the amount of enemy conversation heard by these sets greatly decreased, as Germans appeared to be cutting down on telephone communication in the forward areas and replacing it by a very elaborate Power Buzzer system. From this time on, the interception was chiefly of Power Buzzer messages in clear and code.

In May 1917, the old "Grand Piano" type of amplifier was abandoned in favor of a new 3 valve French, and the C Mk I and C Mk II Woolwich Amplifiers. These later types were almost as sensitive as the old French model, but were very much lighter and more portable.

During the first week of July, a new station was erected in Lievin, near Brigade Headquarters, as a check on the traffic over our own lines. Telephone discipline was becoming slack again and about this time further regulations were put into force and any telephone exchange was required to register all conversations passing through the exchange. These registers were sent in to the Staff weekly.

Some time before the operations at Hill 70, a fourth Post was established in Cite St Pierre. This station was particularly successful, as they were in a salient in the enemy line and had succeeded in tapping an old enemy buried cable which ran diagonally across the salient.

Just before the attack on Hill 70, the Lievin station was moved up to Hill 70 and located near a battalion headquarters. A large number of German Power Buzzer messages were picked up by this station but as they were all in code, their importance can not be definitely known. Policing work was also carried out here.

During August, the second draft from the GHQ School was received, consisting of seven interpreter operators. This greatly strengthened the section and it was then possible to make more frequent reliefs on the four Posts in the Corps area.

Early in September, the St Pierre station was moved to Elen dit Leuette on the Lens - Arras road. This was one of the best stations ever established in the Corps. The earths were placed in the bed of the Souchez river and in the canal, and in addition an old German water main was utilized. 12 to 15 pages of German was obtained every day. This was of great use to the I Branch who were busy at that time, deciphering the new German code.

No IT work was attempted during the time the Corps was on the Ypres front in October and November, 1917, the men being employed on other duties.

On the November, when the Corps returned to the Lens sector two stations were established, # 5 Post in Cite du Moulin and # 6 Post in Avion Road near Beaver Trench. The first station was very successful, especially in Power Buzzer interception but the second was too far from the line and finally became more or a less a Police Set.

An interesting proof of the use of IT sets by the Germans came to light on this station and is given briefly below; it also shows the difficulty encountered in educating both officers and men in the proper use of the telephone, even after three years of Active Service.

Some 5.9's were dropping near a Heavy Trench Mortar Battery and the operator on the IT set, overheard the P.O.O. call up the Bombardier in charge and ask whether damage was being done. The Bombardier replied, "No, they are falling about 150 yards to our left, Sir". Although the Hun had been pounding away for over an hour, it only took him fifteen minutes to switch and put the Mortar out of action, incidentally killing the Bombardier and all but one of the crew. This statement is vouched for, as the battery was not more than 200 yards from the IT Post.

During February 1918, another interesting fact was brought to light through the work of # 5 Post. It was discovered that under certain circumstances, Fullerphone messages could be picked up by Amplifier sets. This fact was very fully investigated at the time and resulted in strict precautionary measures being taken. An account of this investigation and the steps taken to avoid further trouble will be found in Appendix A of this report.

During March, the third big draft of IT men was received; they were all Canadian personnel trained at the GNG School.

In April a third Post was established just north of Loos and the old station at Hlen dit Leavette was also reopened. Little German was intercepted during this period as the enemy seemed to have become very cautious.

During April a special listening set was established for Police work in the areas around Brigade and Divisional Headquarters. This was intended as a check on our own lines and it only remained for a few days in any one location. It was very successful. The Corps was out of the line from May 9th to July 15th during which period only training was carried on. On taking over the Arras Front in July, two stations were established, one near Gavrelle, and the other just north of Tilloy Crossroads on the Arras - Cambrai road. Little work was done by these stations as the Corps was only in the line for two weeks.

This ended the IT work in the Corps as no attempts were made subsequent to August 8th, to establish Posts; all the personnel being employed on P.O.W. Cage work and on C.W. and Spark Wireless Stations.

Power Buzzer-Amplifier Work.

The first Power Buzzer work done in the Corps was the establishment of an experimental Post in July 1916, near Valley Cottages, in the Salient. A Power Buzzer was installed at Maple Copse working back to a model II French 3 valve amplifier, better known as a "Grand Piano". The distance was not over 800 yards but good results were obtained. A week later, the first Power Buzzer and Valve Course was started at Second Army and was attended by four W/T men from the Corps.

The next appearance was on the Somme about a month later. The amplifier was installed at D Point in the Cemetery at Poisieres and the Power Buzzer sent to Battalion Headquarters near Moquet Farm. The only use made of the Amplifier, was just previous to the attack, the line went ~~disconnected~~ on one side from Brigade to D point and the amplifier was hitched in enabling the Brigadier to give some last special orders to the Battalion Commander.

The first Power Buzzer Course in the First Army began at Cheques on December 27th 1916 and again four W/T men were sent. This course only lasted four days. Following this course some instructional work was carried out among the Battalion signallers; demonstrations were given and the sets were moved around among the various Brigades.

During the Vimy attack, some good work was done in front of Machine Gun Fort for the 3rd Division. A Power Buzzer had been taken over by the Company signallers and worked back to Battalion Headquarters, a distance of about 600 yards, but it was a bad gap, from a lineman's point of view. 19 messages were handled during the first day, lines being scarcely ever in.

On the right of this again, a set at Spandau Tunnel did considerable work with a Company Headquarters about 800 yards in front. Sapper Corbett of the W/T Section was in charge of the forward set and had the interesting experience of walking into Spandau Hof Tunnel and finding four Germans still at breakfast. In the mud and darkness, he had gotten ahead of the infantry. Being suddenly confronted with the business end of a Colt automatic, the Huns decided that discretion was the better part of valour.

The 11th Brigade had some success in front of Tottenham Tunnel during the first two days. All these sets continued to work for nearly a week, with fair results, moving forward as the line advanced.

During the summer months, considerable work was done by the Brigade and battalion sections and results were good on the whole. The chief difficulties encountered were :-

- (1) The weight of the instruments and accumulators which had to be carried into the line.
- (2) The excessive jamming from D S circuits and telephone circuits in the immediate vicinity.
- (3) The difficulty of maintaining earth leads in the forward areas.

When it is considered that the Company signallers had to carry all the Company signalling equipment in addition to the Power Buzzer and Amplifier apparatus, it is not to be wondered that coils of earth lead and heavy accumulators often disappeared between Brigade Headquarters and the front line. For successful working a forward base of 150 to 200 yards was required. This required considerable maintenance and the usual result was that during heavy shelling, when the telephone lines were cut, the earth leads were cut also. The only way to avoid this would be to bury in the earths, but it was difficult to get working parties for this purpose and signal sections were never able to do it themselves. There were never enough Fullerphones for Battalion and Brigade requirements and as a result messages in Code were continually being sent by D S phone. Neither the buried cable or the overland lines were perfect and as a result jamming was very bad on the Amplifiers at the receiving end.

The new type Combined Power Buzzer - Amplifier was an improvement on the separate instruments being lighter and easier to handle, but accumulators were still a difficulty. The note from these sets was high pitched and easy to read. The Amplifier, the new C Mk III type, was very sensitive, in fact too sensitive as it made and also most of the sets installed were badly jammed by the Wireless transmission from Eiffel Tower.

It is not considered that Power Buzzer work was worth the time devoted to it. Before it can be successful, Special Power Buzzer Sections will have to be established, as has been done in the German Army. Also lighter instruments and accumulators will have to be constructed. It is considered that more success would have been achieved if this time and energy had been spent in the development of the Loop Set, especially in French warfare.

and excellent 17 Sept

(c) C.W. WIRELESS.

While experimental work had been carried on at GHQ for some months previous, the first attempt to put C.W. wireless on a really practical basis was in January 1917, when a course was started at Campagne for Wireless Staff-Sergeants only. This course lasted three weeks and was followed almost at once by a course for operators. There were ten Canadians on this course, which lasted three weeks, but at the termination of the course proper, half the Canadians were given ten days on experimental work at GHQ.

On March 1st 1917, a C.W. Course was started by the first Army at Chocques and between forty and fifty Canadian Artillery personnel attended the course. Six of the Canadian Operators from the first GHQ course were selected as instructors, - one for each of the six Woolwich sets in use. The course lasted three weeks and was highly successful. About 15 really good men were turned out but unfortunately were allowed to return to their units and were never on W/T work in the Corps. The Stanley set was first introduced at this course but it was not a success then and was condemned by Captain Stanley himself, who sent it back to GHQ for further experimental work. Following this immediately, was a second course at Chocques, at which twenty Canadians attended, but it was run by N.C.O's from the First Army Section and from GHQ.

At the start, there was no C.W. Section in the Canadian Corps, but the Canadian personnel who were in the First Army Section were attached to the Corps for duty with the Artillery, as it had been decided that C.W. sets were to be used exclusively for field and heavy artillery. The first four stations were put out about April 1st 1917, two to the thirteenth H.A.G. and two to the 64th H.A.G. For the 13th H.A.G., the rear station in charge of Sapper Heaps was erected at Maroeuil and the forward set at O.P. LN 21 just in front and a little north of Neuville St Vaast. The rear station for the 64th H.A.G. was at Loue in charge of Sapper Beisel, with the forward set near Zivy Cave. Spr. Davidson was in charge of this station. Captain Bolithe of the First Army Wireless Section was in charge of these stations which were the only sets in use on the British front at that time. It was an experiment only. No one from GHQ forward, with the exception of the operators themselves, had any confidence in the practical utility of the sets.

On the start there was a certain amount of delay, due to accumulator trouble, but within two days all four stations were in good communication on 1000 metres wavelength. The distances front to rear were about 2000 yards and no amplifiers were used, but 29 signals were obtained at all times. High Tension batteries were used for transmission. Thirty foot aerials were used at the rear stations but only five foot on the forward sets. In fact the aerials were so low, that no jamming whatever was experienced even from aeroplanes overhead.

Considerable work was handled on April 9th, chiefly from P.O.O's who had gone over with the Infantry. The messages were brought in by runner ~~from~~ to the O.P's and sent back by C.W. Wireless. During the day, both forward sets were moved, the Zivy Cave station to Tilleuls and the other to Farbus Wood. This was the first demonstration ever made of C.W. and the artillery were very well pleased with the results.

Towards the end of April, the Canadian personnel were withdrawn from the stations and the First Army carried out some experimental work from the Ridge to Neuville St Vaast. The first Heterodyne Wavemeter was introduced here, spark meters having been used up to this time. This meter was known as the AAR type.

About the 1st of June 1917, Lieut. Fraser of the Canadian Corps Signal Company, took over the C.W. and it became part of the Canadian Corps Signal Company. Also the excellent results secured during the Vimy fighting resulted in another school being organized at Cancourt, the first course beginning on July 15th.

Shortly after Mr. Fraser took charge of the C.W. two stations were erected for the 1st Canadian Heavy Brigade. The rear set at Cabaret Rouge and the forward in an O.P. just east of Red and near Clueas trenches. There was practically no line communication this far forward and during the June fighting around the Electric Power Station and the Triangle, some very valuable work was done; numerous S.O.S. messages and messages re laterations in and observations of barrage fire were forwarded.

About the first of July these two stations were moved, the rear set going to the artillery exchange at Bully - Grenay and the forward one to King's O.P. on Vimy Ridge. From these positions the first registration by Wireless was carried out in the Corps. This work was in preparation for Hill 70. It was the only way in which that particular Brigade could be registered, as the area covered could not be observed from any other point. It required three days to register the whole Brigade, but results were highly satisfactory. All messages were sent by W/T to the exchange and from there to the Batteries by telephone.

Just before the attack on Hill 70, the C.W. layout was again changed and two additional sets erected. On the left sector one station in Loos village worked back to Bully - Grenay, and on the right there was a station at St Pierre in touch with Aix-Moulette. For the show itself, it was intended that the Loos set should move up to the top of the Ridge and the St Pierre station to Lens Hospice. The left Loos station moved forward with the P.O.O. and erected on the top of Hill 70 at what later became known as Ascot O.P. The other set was never erected as the party were scattered by the shelling and were never able to reassemble.

Little work was done from the Ascot station until about twelve hours after zero when the Hun began his counter-attack. The shell fire was very heavy and it was impossible to keep up lines back to the buried cable in Loos. The artillery had 15 linemen working continuously on this stretch but were hardly ever through. This meant that the P.O.O. was dependant on the Wireless and during the first night, five S.O.S. calls were handled in rapid succession and for about twelve days after the attack, some S.O.S. calls

were put through every day. A Garden Mk II set cavalry pattern, was tried out here but was not a success and practically all the work was done a a Woodrich Mk I set. Tonic trains were first introduced in the Corps at this time but were not employed for the attack as the personnel had not had sufficient training in their use.

The next occasion on which C.W. Wireless came to the fore, was during the Battle of Passchendaele in October and November 1917. This was the first attempt to put C.W. to a supreme test and its success was due entirely to the skill and devotion of the men manning the sets, who under the worst possible conditions and heavy shell fire maintained an aerial which was being shot down on an average twenty times a day. Great credit is also due to the men manning the rear station as the jamming there was worse even than the forward station..

The time selected for the attempt was the attack on Passchendaele Village itself on November 6th, 1917. The system was planned to provide communication for the F.O.O.s of the C.C.M.A. and every precaution was taken to insure success. The personnel were carefully selected and specially trained and all equipment was thoroughly overhauled and dried. In addition plans covering every detail were drawn up and thoroughly explained to the personnel themselves. Four stations were erected all together as explained below -

- (1) The rear set was at C.C.M.A. headquarters, Vlamertinghe Chateau.
- (2) A combined spark and C.W. station at Division Headquarters, the Ramparts, Ypres.
- (3) An intermediate or stepping up station on Gallipoli Heights.
- (4) The forward set going over after the infantry and to be erected in Passchendaele Village near the Cross roads.

It was intended that all traffic from and to the forward station should go through Gallipoli for re-transmission, but as this station was only 5000 yards from Passchendaele. This however did not work out and all traffic was handled through the station at Ypres.

The party went by car to Capricorn Keep early in the morning of November 6th and from there ~~waded~~ waded through four and a half miles of mud and almost continuous shell - fire. Appendix B gives the list of equipment taken in by the men and when it is remembered that the party only numbered 12 men, some idea can be formed of the superhuman effort demanded.

The party arrived at the spot selected at 9.10 a.m. but could not locate the F.F.O. , so erected in a Pill Box about 500 yards north. Three aerials were erected all with separate lead-ins so that at least one aerial would always be in commission.

The Wilson set and Mk III Tuner were tried first but no results were obtained as the percussion of the exploding shells made it impossible to keep the crystal adjusted. It was finally discarded in favor of a Woolwich C.W. set and at 9.55 a.m. the station began calling. No reply was received until 2 p.m. when the Divisional Station was heard to answer, but from that time on, the stations were practically never out of touch. Signals were remarkably strong although the distance was slightly over nine miles. The traffic was heavy as it was the only communication which the artillery possessed in that forward area. The messages were chiefly for the Artillery with reference to barrage fire, enemy concentration, registrations, etc. Messages were also handled for the infantry such as, calls for extra Machine Guns, Doctors, Stretcher bearers etc., and as an instance of the speed and reliability of the communication, the following instance is related. "An M.C.O. from the battalion in the line came running into Company Headquarters, which was also the Wireless station, saying that our own barrage was dropping short in our front line. The operator without for orders called C.C.N.A. giving them the time and map location and within five minutes the barrage was lifted.

Jamming from enemy Spark Stations was very bad but the signals were so strong that it proved to be only a slight drawback.

On the morning of November 8th, the station was shifted to a cellar in Passchendaele village near the dug-out occupied by the F.O.O.

Reliefs and supplies were sent up to the forward station every 48 hours. The party consisted of a relief of four men and a four man carrying party. On every trip it was necessary to take in rations, water, batteries, aerial wire, valves and a C.W. set, as the rough handling necessitated frequent charging of the sets, no fewer than seven sets being used during the twelve days the station was in operation. Appendix B. gives a list of all the material carried in as well as the names of the men, composing the first relief.

On November 7th, Colonel McNaughton, C.B.S.O. for the Corps carried out a test between Wireless and Pigeons. The W/T message was received at C.C.N.A. within 5 minutes of the time it was handed in, in fact, before the pigeon had left the roof of the Pill Box. This use of the C.W. ^{Wireless} had quite a favourable effect on the general feeling throughout the Army, about the practicability of C.W. All the messages sent were picked up not only by our own set at Vlamertinghe Chateau, but also at Second Army Headquarters Cassel and at the First Army Wireless School at Tilqued. This last was a distance of over 35 miles.

When the Corps returned to the Lens Sector, on November 28th, the C.W. sets were again turned over to the Heavy Artillery groups but nothing special was attempted. On January 15th 1918, the four sets of the Corps were loaned to the 10th Field Survey group for flash spotting work. One set was placed at Sun Quarry O.P.

one on Lorette Ridge and the home station at Group Headquarters, Aix Boulette. The results were highly satisfactory and the work was continued for about a month. It was at this time, that the first C MK III C.W. set was tried out in the Corps. It was placed at the Sun Quarry station and was very successful.

About the end of February, when the system was adopted of placing a H.A. Group headquarters with each Infantry Headquarters, the sets were recalled to Corps and used between groups and Brigades to duplicate the existing wire communication. Two C MK III sets with Tonic Trains were tried in this work and proved to be a big improvement over H.T. Batteries, once the men learned the adjustment of the vibrator. This work was carried on until the Corps was relieved, about May 9th. Appendix C gives the proposed C.W. Establishment as laid down by GHQ at this time.

During December and January two Woolwich sets were sent out for a week at a time to the various field Artilleries for the purpose of demonstrating the use of Wireless for observation and registration. This was the first use of Wireless by the Field Artillery. At the same time, Mr. Smedley who had received his commission during the Passchendaele operation, opened a school at Camblain l'Abbe for personnel drawn from five Field Artilleries, as they intended to equip them with C.W. sets as fast as instruments became available. The Course lasted about two months and gave quite satisfactory results.

As numerous reports kept coming in, through prisoners and other sources, that the enemy was using C.W. Wireless as a means of communication, a special Woolwich set was installed, early in January 1918 at the Interception station at Bouvigny. This was kept going for some months, but no definite/were ever obtained.
results

During the period of rest, from May 15th to July 15th, extensive training of C.W. personnel was carried out, especial attention being paid to long range schemes. Additional C MK III sets were issued to the Corps during this period and all men were trained in their use. Before the Corps took over the Arras front from the 17th Corps in July, the available C.W. personnel from the Field Artilleries were divided up, an H.C.O. and 9 men, with one Mk III and 2 Woolwich sets being sent out to each of the 1st, 2nd 3rd and 4th C.D.A's. This was the start of the C.W. with the Divisions and the results may be followed by reference to Parts 2, 3 and 4 of this report.

Whitaker Steel
Capt. C. C.

16-4-19.

Corps Wireless Officer
for Chief of Canadian Corps.