

Extract of:

THE WAR STORY OF OLIVER HOLMES WOODWARD
CAPTAIN
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AUSTRALIAN IMPERIAL FORCE

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CHAPTER XI

THE HILL 60 MINING SYSTEM.

An idea of the size of the Hill 60 Mining System can be obtained by reference to the accompanying Plan. The legend on this plan will enable correlation of the respective sections of the Mining System. The cutting of the Yprès-Menin Railway line divided the Hill 60 area into two more or less distinct sections. In the construction of this cutting the spoil was dumped in two areas of strategical importance in War. Both dumps were on the right-hand side of the cutting, one in the German and the other in the British lines. By reason of its winding shape the spoil dump in the German lines were referred to as the "Caterpillar", that in the British lines being simply referred to as "The Dump".

On reference to the Plan it will be seen that the 60 metre contour enclosing the area of highest elevation in the vicinity lay in the German lines and in No Man's Land.

In the early days of the War bitter fighting took place to determine which of the rival forces would hold Hill 60. The possession of Hill 60 changed hands frequently but it was finally held by the enemy. In an attempt to dislodge him recourse was taken to Mining and numerous Mines were fired under the direction of Sir Norton Griffiths. This attempt at Mining was, I believe, responsible for the formation of Tunnelling Companies.

Unfortunately I am unable to give any historical details in regard to the early activities in the Hill 60 Mining System, and so must confine my story to the period of our own association with operations.

The Mine system can conveniently be divided into four more or less distinct sections:--

- (1) The Front Line Saps or Defensive Mining Section.
- (2) The Intermediate of "D" Gallery Section in which the greater portion of our counter mining was carried out,
- (3) The Berlin Sap Proper in which section were the two large offensive Mines,
- (4) The Deep Level Section constructed by our Company but not completed at the date of the attack on the Messines Ridge.

The Defensive System was in principle similar to that at Le Bizet, but was much more extensive. On the Hill 60 side of the Railway cutting the Front line trenches were protected over a length of 850 feet. This Defensive System was served by 5 shafts all of which were sunk from the Front Line Trench.

The main lateral Gallery was located at a point about 25 yards ahead of the Trench System. In this Gallery there were 26 Listening Posts.

On the other side of the Railway cutting there was an isolated Defensive System protecting about 100 yards of the Front Line Trench. This system was served by two Shafts. Being located at the junction of Squares H & I of the Hill 60 Map the System was known as the Hooks and Eyes. The Defensive System had head cover of about 15 feet.

The Berlin Sap was the important section of the Mining System as it contained the large Mines, one under Hill 60, and the other under the Caterpillar.

The entrance to the Berlin Sap was located in Bensham Road, the Main Support trench. At a point about 520 ft. from the entrance the Sap was driven on a steep incline until it reached a depth of approximately 90 ft. below the surface. At this point a Gallery was driven to the left for a length of approximately 300 ft., and at the end of this was laid the Mine under Hill 60. This Mine contained 53,500 lbs of High Explosive. A second Gallery was driven from the foot of the Berlin Sap for a distance of about 500 ft. until its end was under the Strong point known as the Caterpillar. Here a Mine containing 70,000 lbs of High Explosive was placed.

At a point about midway down the main incline of the Berlin Sap, a gallery was driven to the left and at a point about 150ft. from the Berlin Sap it branched to the left and the right. This gallery was known as the intermediate or "D" System and the trench galleries were respectively known as "D" Left and "D" Right. This system was from 45 to 50 ft. below the surface. It was to this System we confined our Counter Mining of the enemy and consequently it was the scene of much excitement.

Reference to the Plan will show a section of German Gallery which was captured by the Canadians. The "D" left gallery encountered the enemy's gallery, the Canadians fired a charge, quickly recovered the damage gallery, and finally occupied it to a point towards the German lines where a communicating shaft had been destroyed by the enemy on retreating.

The object in confining counter-mining activities to the Intermediate Gallery was to lead the enemy to believe that this was the deepest level of our Mine System. This was the extent of the Hill 60 Mining System when control was taken over by our Company. Shortly after our arrival on Hill 60 the authorities decided to place additional mines under the German strong points, one near the Caterpillar and the other under a strong point known as the Snout, situated to the left of Hill 60 Proper.

It was further decided that these Mines would form portion of a New and Deeper System.

At the head of the Berlin incline a shaft chamber having about 15 ft. of head cover was constructed and from this chamber a vertical shaft was sunk. As such shaft would encounter a bed of sand saturated with water, the first 50 ft. of the shaft was lined with steel caissons 6 ft. in diameter. The caisson was made in three segments of 5/8" Mild Steel two feet deep. A cutting ring was placed on the first ring which was then forced through the clay by pressure exerted by 4 Seven Jacks, which could each exert a force of 5 tons. As the ring was driven through the clay, that inside was removed. When the bed of running sand was encountered the caisson was continually forced down until it formed a high water-tight seal in the clay beneath the sand. All sand within the caisson was then removed and the caisson was then carried down a further 10 ft. in order to ensure a perfect water-tight joint. The remainder of the shaft was completed and supported by ordinary shaft timber sets. At the foot of the Shaft a chamber was constructed which formed the working area necessary at the foot of a shaft, while the chamber opposite was converted into a Pump chamber. This chamber was equipped with an electrically operated pump and was made as sound-proof as was possible.

Work was then commenced in the driving of a gallery to a point immediately below the bottom of the Berlin Sap. When this point was reached a bore-hole connection was made between the two workings. By this means the drainage of the Berlin Sap flowed to the Sydney Shaft and was then handled by the electrical pump.

Following the completion of this work we were able to liberate for other duties 60 men who previously operated the Military hand pumps in the Berlin System. This effort on the part of the Company to conserve man power was regarded by the authorities as quite a novelty.

The gallery connecting the Vertical Shaft with the Berlin Sap was known as Sydney Gallery.

Other galleries shown on the plan were driven from Sydney Gallery, the one nearest the shaft and turning off to the left had as its objective a point under the German strong point known as "The Snout".

This gallery was known as Brisbane Gallery and from it there turned off to the right a gallery known as Newcastle. The object of this gallery was to give a deep protective gallery to the Intermediate Section of the Berlin Sap.

From Sydney Gallery a gallery known as Adelaide turned off to the right at an angle of about 60 degrees. It aimed at a strong point to the right of the Caterpillar.

Unfortunately, in some respects, this deep level system was not completed before the attack of the Messines Ridge was launched. This was a great disappointment to us as a further five weeks would have witnessed the completion of the work.

The driving of the galleries in this extensive Deep Level System was carried out by a method which was as novel as it was effective. The method followed was that known as Clay Kicking. Briefly the operation of Clay Kicking can be described as a method whereby the whole of the power given to the spade is supplied by the legs, the operator being seated on an adjustable seat.

The spade used in Clay Kicking had an edge 6" wide which was kept sharp. The top of the blade was fitted with a foot rest 1 inch wide with a lug at either end to prevent the feet slipping off. The operator first adjusts the seat to his liking and with both feet straddling the spade under-cuts the face of the height of about 2 feet. The position of the seat is altered until when cutting into the face of the top of the gallery the operator is almost lying on his back. Men working on either side of the Clay Kicker filled the clay into sandbags, which are then conveyed on rubber tyred trucks to the foot of the shaft. Normal progress made in a standard Mine Gallery 4 ft. 3 in. x 2 ft. 3 in. in the clear is about 1 foot per hour, including the erection of the timber required to support the excavation.

In addition to the normal Mine work a number of Sappers were constantly engaged in the construction of deep dugouts and before the attack on Messines Ridge was launched we had constructed ample accommodation for the whole of the Infantry Garrison on Hill 60.

In view of the attack on the Messines Ridge, it was decided to construct a sub-way connecting the Hill 60 Dugout System with that of Larchwood, where the Advanced Dressing Station was located. This gallery was to be 6ft. 3 in. high by 3 ft. 6 in. wide in the clear. Work was commenced on the 22nd May, the labour employed on each shift of 6 hours comprising:--

- 2 Facemen
- 3 Shovellers
- 7 Infantry fatigues

Each party worked two shifts each of 6 hours per day.

The following record of daily progress is rather amazing:--

		<u>Feet</u>	<u>Inches</u>
May 22nd	.....	20	-
23rd	.....	20	4
24th	.....	33	2
25th	.....	36	2
26th	.....	40	-
27th	.....	20	4
28th	.....	<u>42</u>	<u>-</u>
Total		<u>212</u> feet	<u>-</u>

The relatively low footage driven on 22nd, 23rd and 27th was due to long interruptions while 'standing to' on those days. The Tunnelling Company formed portion of the Hill 60 Garrison and when conditions were in any way abnormal we 'stood to' the Infantry.

CHAPTER XII

LIFE AT HILL 60.

On the afternoon 3rd November, 1916, No. 2 Section rejoined the Company and once again we were a united family. We found that the organisation of the Company for work at Hill 60 was on the basis of the Half-company. The tour of duty was as before, 4 days in the line and 4 days in Camp. With my Section I was attached to the Half-company commanded by Captain Avery. That night at 8 p.m. we left for Hill 60 and my curiosity to see the Yprès Salient and the historic Hill 60 appeared about to be satisfied. We proceeded by motor lorries to Kruisstrast and then went overland to Shrapnel Corner and thence by the Fosse Way communication Trench. As we were proceeding over the open duck-board track the enemy commenced to bombard Larchwood and our dash to safety while perhaps undignified was successful. We reached Hill 60 at 10.30 p.m. I was detailed for duty with the shift going on to work at 1 a.m. next morning. My first tour of duty was in the Front line Saps under the direction of one of the Canadian Officers. The first matter in which I received instruction was that of donning a Tunnelling Officer's rigout. I put on rubber thigh boots and then encased my feet in sandbags. My Sam Brown belt was replaced with a web belt on which hung my revolver, and with gas mask at the alert position and my head encased in another sandbag rolled to give the appearance of a forage cap, I was ready for parade. Even when clothed in the regulation Officers' Uniform I was never sufficiently vain to imagine I might be mistaken for a guardsman, but attired in this rigout I began to develop an inferiority complex. Such was not the case with all officers as the following story will show. ---

One of our officers clad in such a rigout was passing through the Infantry dugouts and called "Make way for an Officer". The Tommies looked up and saw this weirdly clad person and decided on this occasion they would not submit to having their legs pulled. Eventually, it was brought to their notice that this was an officer and their apology was immediately offered. Instead of freely accepting the apology the officer reprimanded them and said they had no reasonable excuse. They should have recognised the "Voice of authority".

At 1 a.m. I set out on my first tour of duty at Hill 60. With my Canadian friend we made a thorough inspection of the Front Line Saps on the Hill 60 side of the cutting, and visited in all about 26 Listening Posts. Since my only knowledge of the art of Listening was that gained at the Listening School. I was anxious to test my ability under actual Service conditions. To my dismay I discovered I had much to learn. At the School we listened for a single sound, here it was a case of distinguishing between earth vibrations caused by mining operations and those caused by shells exploding. On my first effort as a listener I had overlooked the latter factor and was firmly convinced that the enemy was mining beneath me, on top of me and all round me, and my report, had I been a listener, would have caused consternation.

A six hour shift as a listener is very strenuous, especially if the enemy is at all active in the locality. The standard Mine Gallery is only 4 ft 3 in. high and 2 ft 3 in. wide. It is not exactly pleasant to realise that if the sides are squeezed in only a few inches one is successfully entombed. In addition to this the galleries, especially in the clay areas, are saturated with water. The anxious time for a listener is when silence follows a period of previous activity on the part of the enemy.

This condition generally means that a charge has been laid ready to be fired at an opportune time. Such a condition can arise as follows. Sounds of the enemy mining in a fresh locality may be picked up and soon these are definitely confirmed, when this happens the direction readings by the use of two Geophones. These would be taken from several positions the location of which is accurately recorded on the Mine Plan. The direction may also be arrived at by the use of the electrical microphone. The intersection of these direction lines will locate the point from which the sound arises. Some days later another set of direction tests are made and distance between this second point and the first point gives the direction in which the enemy is driving and also his rate of progress. It can almost be taken as a definite rule that in Military Mining, galleries are driven as straight as possible toward their objective. After a few sets of direction tests have been made it is possible to determine at which point the enemy gallery will approach closest to our gallery. At this point a Mine charge is laid and eventually fired at the opportune moment.

It is rather thrilling when one is stalking but decidedly nerve-racking when one is being stalked. And so the Listener carried on: performing a duty which was unappreciated by the majority of other branches of the Service, but which was held in highest honour by those who knew of the dangers and trials associated with Listening.

In order to insure that sounds of Mining picked up by our Listeners did not originate from our own workings, it was the custom at a pre-arranged time and period to cease all work so that sounds picked up during this period could be definitely credited to the enemy.

Similarly in order to check whether the various sections of our own work were being conducted in silence work in all sections but one would cease for a period and intensive listening would be carried out. It will be realised by this that Military Mining was not just a task of digging clay from a face and putting it into the universal Sandbag. I finished my first shift on duty at 7 a.m. on 4th November, thoroughly tired out from crouching in a small Mine Gallery.

That morning I satisfied my curiosity by strolling through the Front Line Trench System and inspecting the Dugouts, so that I obtained a good idea of the general lay-out of Hill 60. I was very interested to make the acquaintance of a special Royal Engineer Listening Unit, the members of which were attached to the Company in control of Hill 60 Mining System. They operated a special Listening Instrument equipped with valves which in appearance were similar to those used in modern Wireless Set. A copper plate had been placed in the Hill 60 Mine to serve as an earth. Induced currents of electricity emanating from the enemy's telephone system were picked up and amplified. On each shift there was a Listener who spoke German fluently and a technical assistant. All conversations were recorded together with the hour and minute and his log book was then correlated with that of similar adjacent Listening Units. From this Unit we obtained at noon each day the News broadcasted in Morse Code from the Eiffel Tower.

My first tour of duty at Hill 60 ended on 7th November, and by that time I had begun to get my bearings in the Front Line Saps. On referring to my Diary I find that my records of the events each day refer to the fact the "we heavily bombarded the Hun; the Hun heavily bombarded us; Snipers were busy at such and such a point; Dugouts were crumped; enemy was active at such and such Listening Posts"; in all of which information could be condensed by making the statement that we were experiencing the ups and downs of Trench Warfare.

It would be dreary reiteration if I attempted to record the daily experience, so I propose to tell of my life on Hill 60 in a more or less general manner.

On November 9th 1916, our Company officially took over from the 3rd Canadian Tunnelling Company and from then on the care of the Hill 60 Mining System rested on our shoulders.

At 4.30 p.m. on the 10th, word was received that the enemy had crumped one of our dugouts, killing two men and badly gassing three officers. With Lieut. Justice I was ordered to report to the Hill and after a quiet trip up we arrived there at 10 p.m. On this tour of duty I was detailed for service in the Intermediate or "D" Galleries. In this Section Listening was infinitely more exciting than in the Front Line Saps. According to the Canadians, and later confirmed by ourselves, the enemy's Gallery was within 6 ft to 10 ft. from Listening Posts "A", "B" and "C", in "D" Right Gallery. Getting into these Posts was in itself a task as the utmost caution was necessary and one in it was a case of sitting immovable. In this respect we outdid the Royal Horse Guards at Whitehall. With them tradition demanded that they should not move, with us it was more a case of fear preventing any movement. I have Listened in "D" Right Gallery as immovable as a piece of statuary and have been equally as cold, from fear.

Throughout the 12th, 13th and 14th the enemy heavily shelled Hill 60 and we lost three splendid N.C.O.'s; Sergeant Ruddick and Corporal Mudie were killed, and Sergeant Thomson had his right hand blown off. He was a fire-eating type of Scotsman and when later discharged from hospital and ordered to a base Camp, he deserted and worked his way back to France. The Military Police arrested him on arrival at Poperinghe, but our C.O. succeeded in obtaining permission for him to rejoin the Company. Despite his disability he took his full share in Front Line work and finished the War as 1st Lieut. A.S. Thomson, M.C., D.C.M. a record with calls for admiration.

My tour of duty which commenced on 24th November was for me eventful, as on this occasion I was officer in command on the Hill. On 25th I received word that I had been promoted to the rank of Captain as from 23rd October.

I later found that my promotion was to temporary rank only; the old question of alphabetical seniority on my appointment in Australia as 2nd Lieutenant having proved a stumbling block. It was not until the 22nd May 1917 that I was finally appointed as Captain with substantive rank with seniority dating back to 23rd October, 1916. Temporary rank was very uncommon in the A.I.F. On the 26th we set out to investigate the presence of a strong current of air which was reported at Listening Post No. 25 in the Front Line Saps. For some time it was difficult to ascertain whether the current of air was caused by natural draft or by induced draft - the outcome of the effect of the situation upon the party. We gingerly removed two sets of timber from the gallery and as a result of seeing a black hole ahead of us a Tornado arose! We eventually discovered that presence of a shaft fitted with a ladderway, both in a fair state of repair. The upper section of the shaft was badly crumpled. This shaft was not shown on the Plan so it was assumed it was a relic of earlier Mining activities.

I returned to Camp on the 27th November, a full blown Captain with as I thought a reasonably firm grip on the proverbial Field Marshall's Baton.

Early in December the Listeners in "B" Left Gallery of the Berlin Sap began to report sounds of enemy work. Careful observations of directions were carried out and it was practically certain that the enemy was sinking a vertical shaft. This caused great concern as the site of this new effort on the part of the enemy was so close to the Hill 60 Mine as to restrict our Counter mining. To confirm our views arrangements were made to have an aerial photograph taken. Accordingly, early one morning, one of our planes hovered around the back areas of Hill 60 and then swooped down over the crown. The photograph indicated a spoil dump and helped to confirm our views. A point was selected, in the gallery leading to the Caterpillar Mine, which was considered as being that closest to the enemy's workings. From here a gallery was driven at right angles to the main one (this is seen on accompanying plan of Mining System). Since the gallery was driven for purpose of counter attack only we employed the minimum amount of timber necessary for its support. Each day the sounds of the enemy mining became more clear and we had to proceed carefully in order that our presence would not be discovered. Eventually a point was reached which was considered to be immediately below the enemy. Here a chamber was excavated of sufficient size to carry two tons of High Explosive. The chamber was completed on the 14th December and at that date the explosive had been brought up to the Hill. I arrived on the Hill on the morning of the 15th. In view of the fact that there was the element of danger that this counter mine might set off the Main Hill 60 Mine, all arrangements had been made by the Army to storm Hill 60 and consolidate the crater should this eventuate. Naturally it was hoped that this position would not eventuate, as it would have a marked influence on the attack on the Messines Ridge at a later date. Consequently it was decided to withhold the firing of the counter mine as long as possible. From the 15th onward the sound of the enemy's work could be heard with the unaided ear, and the position was so critical that orders were given to charge the Mine. At 4 a.m. on the 18th with Lieutenant Clinton I took up a position in the chamber and then commenced an endless chain of tins of high explosive which we placed in position. We placed two sets of independent electric Leads to the Mine and in each set there were 4 detonators in series. While the work of charging the mine was in progress the position became most exciting. The vibrations arising from the enemy's work caused small flakes of clay to fall from the roof of the lightly timbered chamber and we were forced to place sandbags on top of the tins containing the explosive. It seemed that at any moment we could expect the bottom of the enemy's shaft to fall away and precipitate earth and enemy on top of us. At 6 p.m. the mine was charged and we then placed an electrical microphone in the chamber and began to tamp the gallery, that is to fill it with sandbags. This task was completed at midnight, I then returned to the Dugout and carefully listened on the microphone to the sounds of the enemy working which appeared quite normal. At 1.30 a.m. all men were removed from the Mine System and took up their position for the attack. Zero was fixed for 2 a.m. and as it was approached I made a final test of the leads and coupled up the exploder. At 1.55 a.m. the C.O. gave the order to stand by, then reeled off the minutes, half minutes and seconds, then yelled FIRE. Down went the handle of the exploder there was a dull boom a mild shock of an earthquake and to our joy the Hill 60 Mine withstood the shock.

Observers of the surface reported that a huge tongue of flame leapt skyward from the enemy's line, and then all was deadly quiet.

The official History of Australia in the War states that the firing of this mine caused consternation among the enemy and that the German Higher Command sought to explain the disaster by attributing the wrecking of their deep level mining system to an explosion in their magazine. While at the time we did not know this was the position, we were certain that we had struck at a vital point as for almost 3 months no sound of enemy activity could be heard at depth.

Immediately after firing the mine I checked the leads of the Hill 60 Mine, so we straight way commenced to untamp the gallery to effect repairs. At the same time we examined the gallery leading to the Caterpillar Mine and found it practically intact, this showing that the force of the explosion had found a good get away through the enemy's workings.

Before this work was undertaken the system was examined to make sure it was free from noxious gas and the working parties had with them white mice carried in an open cage. White mice or canaries, by reason of their fast heart beat, give a reliable indication of the state of the air in a gallery since, if noxious gas is present, they succumb to its effects before the danger point to human life is reached. In this regard there is an amusing story to tell against two of our own men. The men were called upon to re-open a gallery which had been partly destroyed by the firing of a mine, it was therefore necessary to take all precaution against the presence of noxious gas in the shattered ground. Instructed by the officer as to what to do they were then handed a white mouse and told to retire immediately the mouse began to get drowsy. Revisiting the face a short time later, the officer was horrified to find that the men had hung the mouse in front of the fresh air supply. He severely lectured the men as to the risk they were taking when one of them remarked, "Why, all the air that B----- mouse will eat won't hurt us".

I completed this tour of duty on the 22nd December and so was fortunate in being in Camp for Christmas, which was spent as happily as circumstances permitted. The weather was typical of what one expects in the Northern Hemisphere at this season of the year. The ground was covered with a thick layer of snow, the temperature was below zero, but with bright sunny days hard frost conditions were preferable to the usual mud and slush. I think it was Sir Phillip Gibbs who went into ecstasy over the beauty of this 1916-1917 winter. He placed the work of War Correspondent in the back-ground and concentrated on extolling the beautiful white tracery of frost and ice on the vegetation, etc., etc. From his outburst I gather he was not forced to sleep in a hut made of Malthoid.

During a tour of duty which commenced on the 15th January, we had a lovely time on Hill 60. Our guns ranged throughout that day preparatory to a big artillery demonstration next morning. The Hun did not take this calmly and exchanged the compliment. At 7.45 a.m. on the 16th all guns on the Army Front commenced a 48 hours' bombardment. They started off with half hours rapid fire then eased down to a regular and methodical bombardment interspersed with short periods of rapid fire. This went on for 48 hours and we were simply astounded at the display. Unfortunately we did not escape trouble and lost 3 killed and 8 wounded. In the middle of our show the Hun blew a mine in "D" Right Gallery of the Intermediate Section, but it was fortunately short and apart from putting the 'wind up' us all did no damage.

On the 24th I was engaged in carrying out some surveying work in Swift Street and drew the attention of a Sniper. I had started off with the legs of the tripod fully extended but soon had them closed to the minimum and completed the survey on my haunches. Modern Surveying practice was not always adopted as the following story will show. When constructing the Infantry Dugout System one of the galleries encountered timber high up in one corner. This was obviously the floor of one of the Front Line Dugouts, but the question which faced the officer in charge was, "which Dugout". He instantly decided upon the procedure to follow in order to clear up the point. Grabbing a bayonet he pushed it firmly up through the crack in the floor and this action was immediately followed by a terrific roar. The officer called out, "Don't move that bayonet, I want to find out where it is". The reply came back in true soldierly language, the polite interpretation of which was, "I can tell you where the bayonet is, it is in my buttock". We had by this simple means located Company Headquarters Dugout of the Infantry. I feel that one officer of the Infantry will have cause to remember the Surveying methods followed by the Tunnellers and will recount how while asleep he was bayoneted from below.

On the 2nd February in company with Lieut. Anderson I tried myself out in the role of Forward Observation Officer for Major Brown, Commander of "D" Battery 103 Howitzers Royal Artillery. Major Brown was an Australian and so frequented our Advanced Billets at Lille Gate. He was never happy unless strafing the Hun and told us of one of his stunts which brought him a reprimand. He was annoyed at the atmosphere of peace and quietness which surrounded the Belgian Front, where the Belgians were separated from the Germans by a sea of water. It was a bright sunny morning, the Germans had their washing out to dry and as usual the Belgians were making souvenirs.

He could not resist the temptation and sent a few rounds rapid into the German Lines. To say the least they were annoyed and called for retaliation. Soon from out the blue there fell on the unsuspecting Belgians a hail of shells and then matters moved. By this thoughtless action Major Brown almost caused a state of war on the banks of the Canal de Yser.

The Major was greatly interested to learn that each night the enemy brought up a supply train well into the Railway cutting and although Hill 60 was out of his area he suggested he would dust up the Hun if we observed for him. At 10 p.m. that night we lay on the parapet and telephoned all ready. A few minutes later a dull droning sound struck our ears, followed by a crash and a roar, the shells landed in No Man's Land. "Lengthen 100 yards", we 'phoned back and this time we had the satisfaction of seeing the shells burst about where we wanted them. The message "Correct" was followed by a few rounds rapid and we closed down for the night. This stunt had little effect on the course of the War but we looked upon it as a bright interlude.

Early in February we were asked to co-operate with the Infantry in connection with a raid which was planned to leave our trenches from the Ravine. The plan was to stage a Dummy Raid on Hill 60 and to make it more realistic we were to fire two mines on which happening the Artillery would open out on Hill 60. While the attention of the enemy was held at Hill 60 the raiding party would go over from the Ravine. It suited our plans to fire a counter mine at No. 8 Listening Post and to fire a dummy mine from opposite Listening Post No. 25. For this latter purpose it was necessary to drive a shallow gallery to a point as near as possible to the enemy's Front line trench. We were within striking distance of our objective when we had to discontinue the gallery as absolute mud was encountered. This was the position when on the 18th February I arrived on the Hill. Next day we charged the respective Mines placing 1000lbs. High Explosive in each. At 3.30 p.m. on the 20th the stage was set and the performance opened with our Artillery bombarding the enemy's wire. This advertised the fact that a raid could be expected. Zero hour for the actual raid was fixed for 5 p.m. At 4.55 p.m. I fired the mine at No. 8 Listening Post and the barrage dropped on the area and remained there for five minutes. At the end of this period I fired the other mine and the Artillery placed a Box Barrage around Hill 60. The Hun artilleries had been withdrawn, little damage was done. Before the enemy woke up to the fact that he had been duped the Raiding Party was well on the way home with one officer and 119 other ranks as prisoners, 5 Machine Guns and 4 bags of Mail as trophies of the chase. At the time this was classed as the most successful daylight raid carried out on the British Front. The total casualties of the Divisional Front were - 10 killed and 60 wounded.

The Mine fired opposite Listening Post No. 25 was most spectacular. Seated as it was in a bed of mud about 12 ft. below the surface the mine on exploding threw mud in all directions and practically painted our trench system as far back as Battalion Headquarters with a layer of mud.

On the 20th March I left headquarters for Aire (See Map No.1) to attend the 1st Army Bridging School. My experiences at the School are told in another Chapter. I rejoined the unit on the 31st March and next morning proceeded to Hill 60. That night our C.O. and adjutant visited the Hill and remained over night. The novelty was too great for their respective batmen who, despite frequent warnings, continued to talk incessantly. Whether it was that I was feeling fresh after a spell at the Bridging School or that it was April Fool's Day, I cannot say, but I decided to have a bit of fun. The Batmen were still talking as the hour of 1 a.m. approached so I detailed them to work one of the pumps in the Berlin Sap, thus permitting two of the regular shift to have a spell. My action caused great amusement among the men of the shift. At about 6.30 a.m. next morning the C.O. called for his Batman, his calls became more frequent and louder and still no Batman. I then informed the C.O. of the action I had taken and from then on the joke was decidedly against me. I was forcibly informed that I had exceeded my duty in acting as I had, and I was very much in disgrace. I found a sense of humour lacking in the Army, at least among senior officers.

On the 4th April the enemy was very active at No. 5 Listening Post and anticipating that they were about to blow, Corporal Snedden withdrew the listeners. As nothing happened immediately the Corporal decided to return alone. He had just about reached the post when the enemy fired the mine wrecking the gallery. We at once set out to re-open the gallery and after several hours' work reached the body of the Corporal. Next morning in almost similar circumstances Corporal O'Dea lost his life in the Hooks & Eyes System. In the War the loss of a couple of lives here and there seemed to count for little but to the individual Company this slow but regular wastage did not pass unnoticed.

On April 7th a raid was carried out from the Ravine on a plan identical with that of the 20th March, i.e. a dummy raid on Hill 60 to attract the attention of the enemy while the raiding party carried on.

We varied the proceedings by blowing only one Mine and that at Listening Post No. 15. I fired the Mine at 7.55 p.m. the Artillery carried on as usual and the Raiding Party captured 26 prisoners. To me the amazing fact was that the enemy again rushed the bait and we caught him hook, line and sinker.

I returned to Camp on Easter Sunday afternoon. Next afternoon we played a Rugby Football match against the Northumberland Fusiliers, and after a hard fought game we won 3 to nil. Thoroughly tired out I turned into bunk early but was awakened at 10 p.m. in order to take charge of a relief party to the Hill. Word had come through that the enemy had strongly raided Hill 60 and that a tremendous amount of damage had been done to the area. We arrived at the Hill about 1.30 a.m. and when we reached Larchwood we realised that this had been no ordinary raid. Practically the whole of our trench system ahead of Larchwood had been battered almost beyond recognition. After taking over from the Section of our Company in the line, the latter marched out. I immediately got in touch with the Infantry and was alarmed to find that they were completely disorganised. On the previous night the 47th Division had been relieved by the 23rd Division and the Artillery of the latter Division had not carried out their ranging Shoots. Consequently, when the Raid opened the Infantry of the Hill could not obtain Artillery support. As a result the Germans had a much easier task than would otherwise have been the case. Undoubtedly the enemy was aware of this Divisional Change and seized the opportunity.

When daylight came we were able to survey the position and were alarmed to find that the Infantry were holding Swift Street Trench as the Front Line, thus leaving the original Front Line, in which were the Shafts of our Front line Saps, in No Man's Land. All our men, except the Listeners, were then employed in forming bombing posts in the original Front Line. I sent strong parties into the Front line Saps and established bombing posts at the head of each of our Shafts, and when these were completed they were manned by Infantry. We then set out to connect up these bombing posts by opening up the shattered Front line trench. At 8.30 a.m. that morning the enemy enlivened proceedings by blowing a Mine at Listening Post No. 26, but apart from wrecking a portion of our gallery no other damage resulted. By nightfall we had well consolidated our Front Line Trench but without cessation we worked through the night completing the work of re-opening our trench system.

Our men worked magnificently and supported by the Infantry we were able to have our Trench System in good order by day break next morning.

During the night the enemy raided Allan Crater on our left flank, but as by this time the Artillery had carried out their ranging we got good support and the attack was repulsed. When the trench work was well in hand I made a thorough survey of the position and, from a series of flags placed by the enemy at the point of their greatest advance, I found they had penetrated to behind Bensham Road on the Hill 60 side of the cutting and to a point behind the Dump on the other side. The Raiding Party had entered the Infantry Dugout System to such an extent as to indicate that the members of the Party were very brave men.

The Dugout which contained the Special R.E. Listening Apparatus was almost blown to pieces. In one of the Infantry Dugouts we found 23 killed. A toll of the killed showed 43 Germans and 33 Britishers, and in addition 9 of our men were captured. From Sergeant Dean, who had been left for dead by the enemy, we learned later that our men came up from the Front Line Saps and walked right into the arms of the enemy. In addition to the killed there were 200 other casualties among our troops.

The official History of Australia in the War states that the Raiding party comprised 600 specially selected men and that the object of the raid was to attempt to destroy our Mining System. It is interesting to record that our espionage system must have advised the Higher command of this proposed attempt. Some weeks previously we had received instructions to completely block all entrances from the Trench system. This instruction caused comment at the time, but had this work not been attended to it is fairly certain that tremendous damage would have been done to our Mine System. We were relieved on the night of 12th April, after a tour of duty in which no rest was obtained. However we had the satisfaction of knowing that we had done a good job and our effort was greatly appreciated by the Battalion in the Line.

Matters on the Hill proceeded in a normal manner until April 25th.

I had come back to Camp on the previous night and on the afternoon of the 25th we went to Proven to play a return Rugby Football match with the 177th Tunnelling Company. After a hard game we won by 3 point to nil.

Just when the match finished word came through that a disaster had occurred on the Hill, as a result of which 3 officers and 7 men were killed, and 4 officers and about a dozen men were badly gassed.

We immediately returned to Camp and I was ordered to the Hill with a relief party.

This was the second occasion within a few weeks that I had been ordered to the Hill after a Football match and I began to wonder whether there was any connection between Football and disasters on Hill 60. On arrival at the Hill I found that the disaster arose from a premature explosion when a charge was being prepared for a mine in "D" Left Gallery. The only one of our officers who escaped had returned to our Headquarters Dugout to get a measuring tape. He noticed that a 50 pound box of Guncotton was being prepared as a primer for the charge and overheard the remark, "We did not test the detonators for continuity". Evidently it was decided to test the detonators while they were in the primer, and by a thousand to one chance there must have been a supersensitive detonator which exploded when the testing current was put through the circuit. The whole of the Officers' Dugout was wrecked and it was only by the purest good fortune that the other 4 officers were not killed. It was not until the 28th April that we had recovered the bodies of our comrades, who were buried in the cemetery at Railway Dugouts. A start was then made to repair the Dugouts and this work was well advanced when we were relieved on the 28th April.

I have previously mentioned the fact that one set of leads to the Hill 60 Mine was broken as a result of the mine which we fired on the 19th December. After repairing the break it was decided to leave the gallery open and establish a Listening Post at its end. At about the beginning of May our Listeners began to pick up sounds of the enemy working at a spot which was far too close to the Hill 60 to be pleasant. We definitely established that they were sinking a Shaft and were able for a time to gauge their progress by the creak made by their windlass at each revolution. Eventually it seemed that his shaft sinking ceased by the continued revolutions of his windlass suggested that driving galleries was then under way. As far as this new sphere of activity was concerned we felt reasonably safe with regard to his chance of locating the Hill 60 Mine. We were, however, very frightened in regard to the tactics employed by the Hun at this time. The concentration of troops and guns in the area could not fail to advise him of the projected attack on the Messines Ridge. The enemy set out on a definite scheme of blowing mines, giving the impression that he was frantically attempting to wreck our Mines. During the few weeks prior to the firing of our mines the enemy's counter mining work was intensive and we were kept on the alert. As My story will tell his efforts were not successful as regards the Mines, but he certainly kept us in a chronic state of having the 'wind up'.

CHAPTER XIII THE FIRING OF THE HILL 60 MINES

Early in May 1917, there began a concentration of Troops in and behind the Yprès Salient to an extent previously unknown in the 2nd Army area. This caused a state of suppressed excitement, as it heralded the long expected attack on the Messines Ridge. In this attack Infantry, Artillery, Air Force and Tunnellers would co-operate on a scale, the magnitude of which had in all probability never been surpassed in the annals of War. On a Front of about six miles the British had constructed 19 Mining Systems under the more important strategic positions of the enemy's defence system, and approximately 600 tons of High Explosive was in readiness to wreck these.

Toward the end of May, all roads leading to the Yprès Sector were densely packed with Divisions moving up. It seemed that over night all available areas were transformed with large camps, and like Marmion of old one could say:--

"A thousand did I ween
Thousands upon thousands there were seen,
That chequered all the heath between
The streamlet and the town.
In crossing ranks extending far forming
a camp irregular,
Oft giving way where still there stood
Some relic of the old oak wood."

The old villages of Dickebuch, Reninghelst, Ouderdom, and Busseboom, and the town area of Poperinghe were peopled by a new race of men. While the concentration of Troops was amazing, it was still more amazing to observe that of the Artillery. At last the promise made by Lloyd George seemed on the point of realisation. "We shall have guns wheel along the Front, with unlimited ammunition". There was a constant stream of Artillery moving up, and at night time travelling on the forward roads was rendered difficult by the congestion.

When day broke, the guns had mysteriously disappeared, having taken up their firing positions. There would be a break in the stream of mobile Artillery, and then plodding along the roads, drawn by tractors, would be seen the siege artillery, ponderously moving up into position. As soon as each Battery took up its firing position, ranging shoots would be carried out, and the roar of guns would daily increase in intensity. The sharp bark and concentrated flash of the mobile artillery would be punctuated by the deep boom and sheet-lightning flash as the Siege Artillery fired.

It was in the Front Line areas that the concentration was marked. Batteries of Field Guns were located at every conceivable spot; and ammunition dumps were so closely spaced that it seemed impossible for the enemy artillery to fire without hitting them. In fact, during the early days of the concentration the number of dumps which were hit seemed to indicate that the enemy was aware of the location of all our Batteries.

As a preparatory measure to the final attack, the army had judged by events, decided upon a campaign of harassing bombardment upon all sections of the enemy area. Without a moment's warning every gun in the army would open fire and continue for periods from a quarter to perhaps an hour. Just as suddenly as the bombardment started it would cease and an atmosphere of deadly calm would hang over the area, broken only by newly arrived batteries carrying out ranging shoots. This policy of harassing fire must have slowly but surely worn down the enemy's resistance. Each sudden bombardment may have been, for all they knew, the opening barrage of the expected attack, and, one could imagine the rush to 'stand to', the excitement and the strain of anticipation, and then probably just when the tension was greatest the bombardment would cease. I have stood on Hill 60 and seen the flash of guns and heard the roar of the passing shells, which sounded like so many devils let loose. So thick were the shells that it seemed possible that a collision must occur. All this in what could be called demonstration shoots - what would it be like when the real attack started?

On the surface we had created a veritable inferno, and when we realised that to all this would be added the awe-inspiring destruction caused by the firing of some 19 mines, containing about 600 tons of High Explosive, we realised that, whatever else happened, the combined effort of Infantry, Artillery and Tunnellers, would produce a spectacle in Warfare the like of which had never been seen and probably had never been imagined possible. While all lived in this atmosphere, there was no outward sign of excitement among the British Troops. Everything was accepted as a matter of course, and an hour or two of bombardment from all guns in the army would bring forth the comment, "Well we gave the Huns a good dust up last night".

It was on the 15th May that my Commanding Officer advised me that I had been detailed to take control of the Firing of the Mines. While it was natural that I should feel proud at being selected to fill this post of honour, it would be wrong to consider the position as a personal triumph. To do so would have wronged some 600 comrades of my own Company, to say nothing of the thousands of Tunnellers who had worked toward the completion of the Hill 60 Mining System. I felt that upon my shoulders had been placed a heavy responsibility. Even in civil life one would approach the task of firing such a large quantity of high explosive with a feeling of responsibility; and yet a failure could, in such a case, be assessed in terms of £. s. d. On this occasion any slip on my part would endanger the success of the attack, and increase the loss of human lives. Thus my earnest hope was that I would prove equal to the task, not to satisfy personal desires but rather that no failure on my part would render futile the work of thousands of comrades-in-arms of Tunnelling Companies. It was not a normal task, and to the actual fear which one experienced in attacks on the enemy was added this great responsibility.

My last tour of ordinary duty on Hill 60 extended from 20th to 25th May, and on 21st May Captain Worledge, of the Royal Engineers Depot at Chatham, arrived on Hill 60 to finally check the Mine leads. He made independent tests on the Mine leads, examined all details in connection with the proposed method of firing the Mines, and after an exhaustive examination approved of all plans. The arrival of Captain Worledge indicated that the long expected attack was close at hand, and the realisation of this seemed to unconsciously add to the strain.

At 8.30 p.m. on Saturday, 2nd June, the firing party comprising ---
Captain O.H. Woodward
Lieut. J. MacD. Royle
Lieut. J. Bowry
Sergeant J. Wilson
40 Sappers

left for Hill 60.

Before leaving I was confidentially advised that the attack on the Messines Ridge would be launched on 7th June. We reached Hill 60 at 10.30 p.m. and immediately commenced the work of reinforcing our Dugout and Mine System. This consisted of putting struts in all galleries, in order that these sections would more effectively withstand the force of the explosion. In War nothing could be taken for granted and this measure of protection was adopted in order to guard against a failure in the attack. Hill 60 area was a strong fortress which, despite the magnitude of our attack, might prove difficult to capture.

Hand in hand with this work, we made final preparations for firing the Mines, and the following particulars of the method adopted are of interest.

Electrical detonators were used in firing the Mines. In each mine there were three sets of electrical circuits, with five detonators in series in each set of leads. Until the 7th June, when the mines were fired, the separate leads of each mine were brought to a central switchboard, in order that continuous tests could be carried out to ascertain the condition of the leads.

Two series of tests were regularly taken, --

(1) Continuity Test: This was a simple test taken by means of a Galvanometer and Dry Cell, which when connected to each set of leads allowed an electrical current to pass through. This in turn caused a deflection of the needle of the Galvanometer, thereby indicating that the circuit was intact.

(2) Resistance Tests: The cables used in the circuit were of standard resistance per foot; therefore since the length of the cable used could be accurately determined, the total resistance offered to the flow of the current through the cable could be determined by multiplying the length of the cable by the resistance per foot run. Further, the resistance of the electrical detonators was standard, so the sum of the cable resistance and the resistance of the detonators gave the total resistance of the circuit. Immediately an electrical circuit was laid, the actual resistance of the circuit was ascertained by aid of a Wheatstone Bridge, and if this figure was in agreement with the theoretical figure the circuit was considered correct.

The resistance test was the more important, as by means of this there was a greater chance of discovering whether the leads had deteriorated, or, what was more important, whether the enemy had located the gallery and cut the leads. If a set of leads had been cut and the ends joined, the continuity test would still show correct, and a feeling of false security would follow. In this respect even the resistance test could fail, since, if the enemy had cut the leads, he need only ascertain the resistance of the section of the circuit through the mines, and then attach the Wheatstone Bridge to the section of the leads going to the testing station. Continuity and resistance tests would then show correct, and yet the leads would not be connected to the Mine.

This is not an impossible position as one of the Royal Engineer Tunnelling Company actually performed the feat, and removed the whole of the enemy's Mine. Thus, in order to prevent such a happening, it was essential in the closing stages of our work to take resistance tests almost continuously.

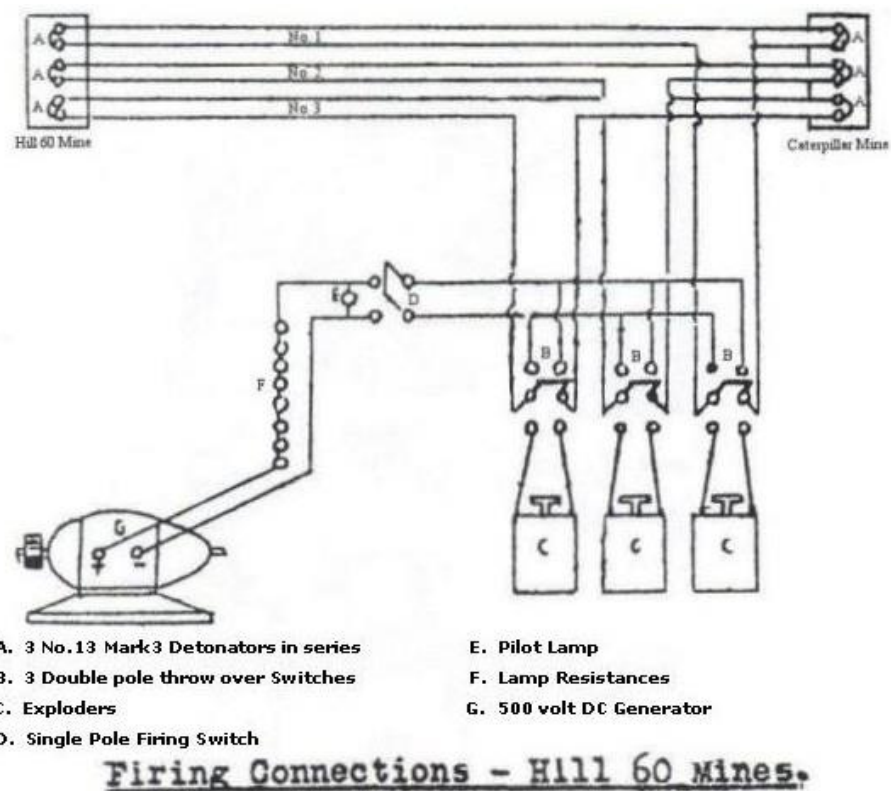
There were two methods by which the mines would be fired: --

(1) Power from the standard Service exploder, which consists of a small series wound dynamo, operated by depressing a handle.

(2) Power from a direct current 500-Volt Lighting Set.

It was not considered wise to rely solely on Power from the Lighting Set, as this was located in a Dugout having about 14 ft of head cover, and there was the risk of a chance shell damaging the set at the last moment. Consequently the firing system was designed to permit either method being used.

A diagrammatic sketch of the firing connections is given below:--



As mentioned earlier, there were three sets of leads in each mine brought to a central switchboard. Since the total resistance of a pair of leads from the Hill 60 Mine and a pair from the Caterpillar Mine was well within the range of the power produced by the Service Exploder, it was decided to fire the mines in series. A copper plate was used to connect one of the terminals from the Hill 60 Mine to one from the Caterpillar Mine, bringing the mines in series. This was done on three sets of leads, thus simplifying the work, when at the last moment the Mine leads were extended to the firing station located in Bensham Road Support Trench. On the evening of 6th June the Mine leads were extended to the firing station, and by midnight the firing arrangements were completed and the lay-out was as follows.

On a well insulated switchboard three double pole throw over switches were installed, and to the central set of terminals on each switch was attached one pair of Mine leads. One outer pair of terminals on each switch was connected to the dynamo circuit and the other pair to the exploders. In the dynamo circuit a single pole throw over switch was placed. A pilot lamp was installed in the firing station to indicate that all was correct with the dynamo; Lamp resistances were inserted in the circuit to prevent a flash over at the generator, when the firing switch was closed, and an earth was connected to the engine driving the dynamo so that the engine could be stopped.

The Mines were eventually fired from the Dynamo circuit.

On Sunday, 3rd June, we commenced to retamp the gallery leading to the Hill 60 Mine. A final listening test indicated that the enemy was still working in this area, and as the gallery was slowly filled with sandbags we felt that we were leaving the safety of the Mine to chance. However, from that moment until the Mines were fired an officer was continually on the switchboard taking continuity and resistance tests. That afternoon, from 3 p.m. to 3.30 p.m., all guns of the Army opened up with a demonstration barrage, and the roar of the shells as they flew over the Hill 60 area was beyond description.

Monday, 4th June, was noticeable for the general atmosphere of peace which surrounded the Salient. A War Correspondent visiting Hill 60 on that day could honestly have reported "All quiet in the Salient".

To give a measure of variation to the routine harassing bombardment, Tuesday 5th June, was reserved for the Heavy Artillery, and from 3 p.m. to 4 p.m. they sang their song of hate in deep bass notes. One felt that even the enemy would appreciate this change in the deadly routine bombardment.

At 6 p.m. on the 5th, the 69th Brigade of the 23rd Division commanded by Brigadier General Lambert, moved in to take charge of the attack. I reported to Brigadier General Lambert and was informed that Zero hour for the attack had been for 3.10 a.m. (summer time) on the 7th June.

Wednesday, 6th June, was a day during which one's nerves seemed to be strained to the breaking point. The chief task of the day was to extend the Mine leads to the firing dugout, which was located in Bensham Road Support Trench, distant about 375 yards from the Hill 60 Mine and 462 yards from the Caterpillar Mine. In effect the firing dugout was a structure so arranged that no beam of light would show through.

At about 12.30 a.m. on the morning of the 7th June, the extension of the leads was completed and, despite the fact that continuous resistance tests had been carried out, I approached the task of final testing with a feeling of intense excitement. With the Wheatstone Bridge on an improvised table, I set out to check the leads and as each one in turn proved correct I felt greatly relieved. At 1.15 a.m. all was correct, and as there was still about 2 hours to go before Zero it was essential to keep taking resistance tests as rapidly as possible, in order to insure that nothing happened in the closing stages of the drama about to be enacted.

At 2 a.m. all Troops were withdrawn from the Dugout and Mine Systems, and posted in their position for attack. At 2.25 a.m., I made the last resistance test, and then made the final connections for firing the Mines. This was rather a nerve-racking task as one began to feel the strain, and wonder whether the leads were correctly connected up. Just before 3 a.m. General Lambert took up his position in the firing dugout. It was his responsibility to give the order "FIRE". Watch in hand he stood there, and in a silence that could almost be felt he said, "Five minutes to go". I again finally checked up the leads, and Lieutenants Royle and Bowry stood with an exploder at their feet ready to fire should the dynamo fail. Then the General, in what seemed interminable periods, called out, "Three minutes to go", "Two to go - One to go - 45 seconds to go - 20 seconds to go - 10 seconds to go - and then 9, 8, 7, 6, 5, 4, 3, 2, 1, - FIRE!! Over went the firing switch and with a dull roar, accompanied by a heaving of the ground, the Mines exploded. We had not failed in our duty.

Just prior to the actual firing of the Mines, probably a second or two, we began to feel the earth tremors resulting from the firing of the 17 other Mines on the Army Front. In those fractions of a second, arising from the variation in the synchronisation of watches, I realised how quickly one's mind functions, as I distinctly remember the feeling of envy of those officers similarly situated as I, who had brought their task to a successful conclusion, while mine had yet to be performed. In the determination that the firing switch would be properly closed, I grabbed the handle firmly, and in throwing the switch over my hand came in contact with the terminals, so that I received a strong shock which threw me backward. For a fraction of a second I failed to realise what had happened, but there was soon joy in the knowledge that Hill 60 Mines had done their work. Located as I was in a Dugout, I can tell little of the details in regard to the scene staged when the Mines were exploded so the following description is that of a brother officer.

Daybreak on the morning of 7th June was beautiful, and at 2 a.m. everything assumed an atmosphere of peace and quietness as our guns eased down, in order to lure the enemy to keep quiet. As all the attacking Infantry were lying out on the surface, shelling by the enemy was not desired, as heavy casualties would have followed. The enemy proved obliging, and during the last hour before Zero a deathly stillness reigned, broken only by the dull sleepy drone of heavy shells going across to the back areas. Yet in all this quietness there was wave upon wave of Infantry, ready to leap into action at the moment the Mines exploded. Thousands of Artillery men stood at attention, lanyard in hand ready to pull, and send the first salvo of the barrage speeding on its course of destruction.

Just before Zero there shot up from the enemy line a few Star Shells which illuminated No Man's Land, and the German Sentry probably felt relieved that his searching gaze discovered nothing out of the ordinary. To the Infantry, gazing in the direction of the Mines in the faint grey separating darkness from the dawn, nothing could be seen, but suddenly the earth seemed to swell like a huge mound rising from the ground, and when it had reached the breaking point cracks appeared from out of which rushed hissing gas and flames.

These tongues of flame shot upwards and then seemed as if they would roll toward our lines and consume their creators. Pillars of cloud succeeded the pillars of fire and before these died away the most tremendous and probably the most perfect barrage opened the grey lines of men sprang into action and the attacking Infantry marched along as if on parade.

The attack on the Messines Ridge over the length of about 6 miles was wonderfully successful, and before nightfall the troops were well established on the final objective.

Thus, on 7th June, 1917, the dreaded Yprès Salient ceased to exist, and due to the combined effort of Infantry, Artillery, and Tunnellers the Messines Ridge was brilliantly captured.

Following the firing of the Mines a hurried inspection of the Dugout System showed that little damage had been done, and the upper section of the Mine System was intact. One officer and a number of men were left to attend to the inspection of the System, and with the balance we set out to consolidate the Craters of both Mines. Our chief objective was to establish Machine Gun emplacements, and while this was proceeding I set to and measured up the Craters, particulars of which were:--

HILL 60 MINE:

Charge:	Ammonal	45,700 lbs	
	Gun Cotton	7,800 "	
	Total:	53,500 "	
Diameter of Crater formed	.. ..	68 yards	
Depth of original ground level	.. ..	33 feet	
Radius of rupture to complete obliteration	.. ..	140 feet	

CATERPILLAR MINE:

Charge:	Ammonal	70,000 lbs	
Diameter of Crater	.. ..	90 yards	
Depth of Crater from original ground level	.. ..	51 feet	
Radius of rupture to complete obliteration	.. ..	190 feet	

A careful inspection of the area surrounding the Mines showed how thoroughly the Mines had done their work. Trenches were squeezed together so quickly and thoroughly that enemy dead were seen in a standing position. Relatively few prisoners were captured from Hill 60 proper, and those of the enemy who were alive were nervous wrecks, a great number of them actually crying with fear.

The official History of Australia in the War states that the German Records show approximately 700 men killed in the Mining System by the explosion of the mines.

One can readily excuse the enemy breaking down under the strain of this Hell on Earth, as even to our own men, who anticipated the explosions, the sight was absolutely awe inspiring.

We were relieved that afternoon and about 6 p.m. we set off for Camp, thoroughly tired out with the heavy strain of the past five days. For a change we walked down to Lille Gate along the railway line, and received a strafing from the Brigade Major of the Brigade in support of Railway Dugouts for walking on the railway line in daylight. We felt inclined to inform him that the Hun had more to attend to than a party of 40 men and 3 officers walking back from the Front line area.

It was a wonderful day and when we reached Camp we felt that in some measure we had earned a solid night's rest.

I was fated to never again set foot on Hill 60.
