

The Adam Park Project

Metal Detector Survey Report No.17



**17 Adam Park
22nd-26th April 2013**



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Introduction

The Adam Park Project (TAPP) officially finished in February 2012 with an exhibition of artefacts entitled 'Four Days in February' staged at the National Library, Singapore. The display introduced the Singaporean public to the wartime heritage of the estate and in particular its defence in 1942 by the 1st Battalion, Cambridgeshire Regiment.

However there were a number of important areas of the estate's wartime story still to be investigated and presented. This ongoing work has been collectively packaged under the colloquial title 'TAPP 2'. In January 2013 the 'Big Dig 2' was carried out on site which included excavations, aerial surveys and metal detecting. However a series of further metal detecting surveys continue to take place across the estate.

This report is best read in conjunction with Reports 3, 7 and 10 which detailed the findings of the three previous surveys at No.17 Adam Park. These findings suggested that there were a number of British defensive positions set along the front of the house with a concentration of dumped and burnt equipment along the south fence line of the property adjoining No.8 Adam Park dumped sometime after the battle. Permission was sort from the tenant to survey the extremities of the back garden to see if the concentration of finds extends into the rear of the property.

No.17 plays a particularly important role in the defence of the estate as it was the location of Regimental Aid Post (RAP). After the ceasefire the house was set alight by the destruction of ambulances parked along the front of the building. One orderly was killed in the initial firefight but the rest managed to evacuate the patients out of the back of the property and onto the lawn. It was hoped this evacuation would be evident in the collection of artefacts which would potentially include medical equipment.

During the period the estate was used as POW camp No. 17 was one of those buildings that was too badly damaged to house the prisoners and it was left deserted. It was sold to a local Chinese trader by some enterprising British POWs who stripped it of all salvageable items. The house appears not to have been rebuilt during the rest of the Japanese occupation of the estate.



Fig 1 – No 17 Adam is a Class 3 House built into the lower slopes of the hill. It was the site of the Cambridgeshire’s RAP and was destroyed by fire during the fighting.



Fig 2 – The garden at the back of the house was used as a muster point for the evacuation of the property when it was set alight on the evening of the 15th February 1942. This older photograph taken in 2010 shows considerable disturbance of the lawn, possibly after the removal of a swimming pool which may account for the lack of finds in this area.

The Survey Criteria and Area of Interest

Initially six transects each 2m wide of lengths between were set out in Area 1 of the back garden. A ‘prospecting’ survey was carried out on the north end of house in the small area of garden between the house and the perimeter fence. A number of WW2 items were found in this area and the decision was made to abandon the back garden in Area 1 and concentrate resources in Area 2. 5 Transects were laid out in Area 2; each 2m wide and approximately 16m in length.



Fig 3 – The Google Earth image of the site showing the location of the two new areas in the garden of 17 Adam Park that were surveyed by the metal detectorists as part of this survey. Area 1 covered the top end of the back garden. Area 2 covered the land immediately to the north of the house.



Fig 4 – Area 2 was established in the garden to the north of the house. A concentration of WW2 items was found to the left of the yellow marker flag. The yellow marker indicates where the Cambridgeshire cap badge was discovered.

Typically for this urban environment an initial metal detector sweep of the transects was carried out using the ‘all ferrous’ setting on the metal detector and a multitude of returns were registered. A full survey of all ferrous returns was deemed to be inappropriate given the time constraints and available manpower. It was assumed that

the artefacts indicating the POW occupation and combat would primarily be made of non-ferrous metals.

The initial survey of Area 1 proved to be discouraging. No WW2 items were identified and the area was cross-crossed with utility lines. The subterranean utility pipes left a significant magnetic signal on the surface which masked readings up to 50cms either side. These pipelines were marked with yellow flags and avoided. The heart of the garden seemed devoid of pertinent hits and it was decided by the end of the first morning that little would be gained from continuing with the search. A prospecting survey was carried out around the outbuildings and at the north side of the house in an attempt to find hotspots of relevant artefacts.

Prospecting Surveys entailed field walking the site with the metal detector excavating only clear and notable hits. This allowed the team to get a feel for the typology of finds around the rest of the site and to sample them. It was hoped that this would reveal any overlooked concentrations of finds as discovered in earlier surveys at No.17 and 8 Adam Park. The drawback of this methodology is that the location of the artefacts recovered is not accurately recorded and only the approximate coordinates are taken. However the discovery of a plethora of cartridges to the north of the main building during the prospecting led to the start of a full survey in that area.

Two White's Prizm Mk 6T metal detectors were used as the preferred machines. Both machines were set to maximum sensitivity but the discrimination function was set to exclude ferrous materials (the first two settings muted). The operators had difficulty discerning between non-ferrous and ferrous hits in close proximity as the artefacts were often masked by the presence of larger ferrous material. Tonal ID was not used as the constant pitch changes across a small area confused and annoyed the operators. Depth indicator was checked against the first isolated finds but as most artefacts were found in the unstable topsoil and interference by abundant ferrous material meant that the depth readings became inaccurate. Large ferrous items lying deeper in the earth tended to return a cluster of 'non ferrous' readings or masked the returns from smaller non ferrous material on the surface. This meant that a number of sweeps of the areas were undertaken, initially along the transect, in both directions and then across the transects to ensure as many of the relevant artefacts as possible were recovered. A further sweep was carried out after the item had been removed to check for other material masked by the first.

Good use was made of two hand held Garrett Pro-pointer pinpointers. As many of the artefacts were found to be on or very near the surface excavators found it easier to follow the signals given on the hand held pinpointer rather than using the larger and bulkier Prizm 6T. This however did mean that a number of ferrous items were recovered as the pinpointer does not discern between metals. Having two pinpointers drastically speeded up the recovery of items. However having two detectors was somewhat limited by having only one skilled operator.



Fig 5 – Area 1 of the back garden was criss-crossed with utility lines and large pieces of ferrous. It was decided to move to the side of the house in order to make the best use of resources.

The survey areas were in an urban garden with a covering of ‘tropical broad leaved grass’ which was easy to uproot. In some places the grass had been washed away by the rain runoff especially under the hedgerows. The turf covered a layer of black / dark brown topsoil up to 15cms deep in parts. There was some ingress of roots from neighbouring plants and trees. The topsoil was laid on top of an orange clay layer. Notably the vast majority of the finds were in the topsoil although not stratified within this layer. Area 2 was inundated with building material including ‘Marseille’ tiles from the roof and masonry.

Recovery of subsurface artefacts was done by trowel and as there was a need to restore the garden to its original condition, care was taken to remove the sod of turf on the surface and return it after the artefact had been removed. However some of the area was devoid of turf. This made restoring the ground problematical. Location of the finds was recorded to within 5cms by measuring tape.

The weather was fairly hot for most of the time on site with the chance of afternoon rain showers. The team worked from 9.30am until 4.00pm on weekdays only to ensure minimal disturbance for the tenants.

The Location of Transects

A sketch map of the site is at Appendix 2

Area 1 was chosen to find artefacts relating to the evacuation of wounded from the RAP on the 15th February 1942. However the initial scan of the site suggested there were few pertinent items to be found and so a prospecting survey was undertaken around the north side of the property. Area 2 to the side of the house proved to be more productive with a collection of relevant artefacts being unearthed.

Area 2 covered approximately 80m² over gently sloping close cropped lawn to the north of the house. The area was bordered by a modern chain link fence and a collection of large domestic ferrous items were found along this fence line.



Fig 6 – T1 and T2 showing the state of the lawn at this point. Many of these hits proved to be large ferrous items such as bolts, nails and house fittings abandoned along the modern fence line.



Fig 7 – Transects 2 and 3 showing the concentration of finds in the centre of the lawn. The majority of these items related to the fighting

The slope fell away the east of the site and then descended a steep bank down towards the driveway. It was assumed that the banking would have acted like a rifle range butt stopping bullets fired into the garden. However there were no bullets found in the banking. This was a similar result to the search of the banking in the front of the garden which revealed very few bullets caught in the bank despite there being many projectiles found across the flatter lawns. (See Survey Report No.3)

Summary of Artefact Catalogue

TAPP Finds Log for the survey is shown at Appendix 1

A fair proportion of the relevant finds was either bullets, cartridges, shell fragments or webbing accoutrements. Other items which may have seemed unrelated when excavated have proven to be dateable to the 1940's. There follows a summary of the items revealed and a full **Finds Log** can be found at Appendix 1.

152 artefacts were recovered across the site of which 41 could be immediately associated with the war years (27%). This included 12 bullets, 2 full rounds, 4 pieces of shell fragment, 19 cartridges and a collection of webbing accoutrements.

The Cartridges

There were twenty one cartridges found during the survey of which all were in some way deformed or broken.

Transit	Item No	Description	Location	Rim Dia	Dia	Headstamp	Fired / Unfired	Maker
1	18	Cartridge	4.10m x 1.10m	13.4mm	11.6mm	DC 32 ?? VII	Fired	Dominion
2	8	Cartridge	7.05m x 1.57m	13.6mm	12.0mm	K40 VII	Fired	Kynoch & Co
2	9	Full Round	7.50m x 1.74m	13.7mm	11.6mm	1941 VII	Unfired	Unknown
2	13	Cartridge	7.80m x 1.56m	Too Badly Deformed	Too Badly Deformed	MF 39	Fired	Factory No. 1 Footscray
2	15	Cartridge	8.50m x 1.75m	13.8mm	11.7mm	K33	Fired	Kynoch & Co
2	19	Cartridge	9.12m x 0.96m	13.6mm	11.7mm	R↑L 31 VII	Fired	Woolwich Arsenal
3	6	Cartridge	5.30m x 0.67m	13.2mm	11.6mm	↑L 34	Fired	Woolwich Arsenal
3	7	Cartridge	5.72m x 0.87m	13.3mm	11.5mm	R↑L 27 VII	Fired	Woolwich Arsenal
3	9	Cartridge	6.35m x 0.85m	13.6mm	12.0mm	DC 40 VII 303	Unfired	Dominion
3	14	Cartridge	7.87m x 0.12m	13.4mm	11.6mm	K 18 2 VII	Fired	Kynoch & Co
3	18	Cartridge	8.10m x 0.81m	13.4mm	11.6mm	R↑L 35 VII	Fired	Woolwich Arsenal
3	19a	Cartridge	8.10m x 0.42m	13.6mm	11.7mm	K41 39 VII	Fired	Kynoch & Co

3	19b	Cartridge	8.10m x 0.42m	13.8mm	11.9mm	VII 40	Fired	Unknown
3	20	Cartridge	8.64m x 0.20m	13.5mm	11.6mm	VII	Fired	Unknown
3	21	Cartridge	8.67m x 0.43m	13.5mm	11.7mm	K40 VII	Fired	Kynoch & Co
3	26	Cartridge	9.05m x 0.33m	13.3mm	11.5mm	B↑E 1941 VII	Fired	Blackpole
3	27	Cartridge	9.28m x 0.20	13.8mm	11.8mm	B↑E 1941 VII	Fired	Blackpole
4	15	Cartridge	7.04m x 0.27m	13.6mm	11.8mm	R↑L 39	Fired	Woolwich Arsenal
4	16	Cartridge	7.04m x 1.98m	13.4mm	11.7mm	K VII	Fired	Kynoch & Co
5	4	Cartridge	3.76m x 0.33m	13.5mm	11.6mm	R↑L 33 VII	Fired	Woolwich Arsenal
8	1	Full round	None taken	13.5mm	12.0mm	R↑L 38 VII	Unfired	Woolwich Arsenal

This number included 2 full rounds that were also found on site. The cartridges were cleaned and the heads of each round were examined to ascertain details of the head stamp. The head stamps were in part only partially decipherable but it would appear that the .303 cartridges came from 5 separate arsenals¹:

Dominion Cartridge Company, The headstamp for the military production was a simple D with a C and a broad arrow for the Brownsburg plant which later became the Dominion Ammunition Division of Canadian Industries Ltd. They operated factories in Brownsburg, Quebec and Montreal. The DOMINION headstamp was used on commercial ammunition from 1911 until 1955. They also produced .303 cartridges in Ball, Cordite Mk 2, 4, 6 and 7

The Woolwich Arsenal in Kent

Woolwich Arsenal, of which the Royal Laboratory was only a part, is situated in South East London on the River Thames. The Arsenal dates from 1670 and has manufactured many different items of warlike stores for the armed forces. Ammunition was made at Woolwich long before the adoption of the .303 cartridge in 1889. Ammunition production ceased completely at Woolwich in 1957, the last known production of .303 Ammunition being the Mk 7 Ball variant.

Kynoch & Co, Witton, Birmingham, UK. This firm was first formed by George Kynoch at Witton in 1862 as a manufacturer of percussion caps. It was changed to a limited company in 1884 as G. Kynoch & Co Ltd and by then was manufacturing metallic ammunition. A further reorganisation and expansion followed in 1889 when George Kynoch was ousted from the management and this then culminated in a further change of title to Kynoch Ltd in 1897. During the period ending with the

¹ All information on the arsenals has been taken from <http://www.dave-cushman.net/shot/303headstamps.html>

1914-18 war Kynoch, which by then was the largest of the British commercial ammunition manufacturers, owned rolling mills at Witton, Lodge Road, Birmingham and at Eyre Street, Birmingham. At various times it had propellant factories at Arklow, County Durham, making cordite, at Warsboro Dale, Yorkshire, making black powder and at Kynochtown, Stanford Le Hope, Essex, making smokeless powder. In addition to these plants the original cap production was maintained at Witton. Later, effective tracer and incendiary composition operations were also carried out at Witton. After the war in 1918 Kynoch Ltd, in common with most other British small arms ammunition manufacturers, was merged into Explosives Trades Ltd, later to become Nobel Industries. In 1926 when Nobel Industries became part of the new Imperial Chemical Industries, the old Kynoch factory at Witton was retained as the ammunition centre as part of the Metal Group within ICI. The propellant interests being concentrated mainly at Ardeer within the Nobel Division of ICI. In 1962 the Metals Division of ICI was reorganised as a separate company known as Imperial Metal Industries (Kynoch) Ltd. During WW1 Kynoch produced in excess of 2,373 million .303 cartridges.

Small Arms Ammunition Factory No 1, Footscray, Melbourne, Australia.
manufactured .303 cartridges

Royal Ordnance Factory, Blackpole, Worcester, UK. This factory was part of the 1939 - 1945 war emergency expansion plan and was situated at Blackpole on the site of the earlier Government Cartridge Factory No 3 of 1916. Initially ICI Ltd were to have operated this plant but they were advised in 1940 of the change in plans and the factory was run as a Royal Ordnance Factory by the Ministry of Supply. This factory made and marked cases but filling was carried out at the Royal Ordnance Factory Swynnerton, Staffs.

The Typology of Cartridges

The collection of cartridges was notable for what was not found. The vast majority of rounds had been fired (85%) and there were only 3 unfired cartridges². All were British .303 rounds; there were no Japanese cartridges, .45ACP or pistol rounds in the collection as found around the estate in other concentrations of ammunition. Similarly no SMLE charger units found. The rounds were centrally located in the middle of the area which would be an ideal location for a slit trench or some kind of fieldwork.

This patterning of cartridges inferred that a soldier armed with a SMLE or Bren gun had been firing from this position. As the Bren light machine gun does not take charger units it could be inferred that this was the most likely weapon used at this point. There also appears to have been no systematic dumping of unused rounds found in other areas of the garden (See Survey Report 7 & 10). As there were no Japanese cartridges found in the area it can be assumed the Japanese never overran the position.



Fig 8 a and b – Fired rounds can be identified by the fact the priming cap on the bottom of the cartridge is no longer present as seen in the right hand round in Fig A. Likewise the cartridge will have no traces of the explosive left inside In this case the dropped round at the top in Fig B has its cordite charge in place. Bullets from unfired rounds sometimes have the brass collar still attached. Galvanic corrosion around the boundary between the lead bullet and the brass cartridge leads to the two elements breaking apart leaving the bullet with it brass collar still attached as seen in the top example in Fig B.

Bullets

12 bullets were found on the site and only one still had traces of the brass collar of the cartridge still in position inferring the round was attached to the cartridge when it was dropped.

Transect	Item No	Description	Location	Notes	Weight	Length	diameter	type
2	12	bullet	7.80m x 1.56m		10.8g	32.8mm	7.9mm	
2	15a	bullet	8.50m x 1.75m	nail	9.6g	33.4mm	7.95mm	
3	8a	bullet	6.27m x 0.64m		10.6g	32.6mm	7.8mm	
3	14b	bullet	7.87m x 0.12m		10.5g	32.9mm	7.9mm	
3	15	bullet	7.98m x 0.47m		10.8g	33mm	7.8mm	
3	19c	bullet	8.10m x 0.42m		10.8g	33.0mm	7.9mm	
3	19d	bullet	8.10m x 0.42m		10.7g	32.9mm	7.9mm	

3	22	bullet	8.70m x 1.10m		10.6g	33.0mm	7.8mm	
4	22	bullet	7.80m x 1.02m		10.1g	32.4mm	7.7mm	
7	3	bullet	None taken	found beside kitchen	10.5g	31.2mm	7.7mm	
7	4	bullet	found on surface	found beside kitchen	12.0g	35.0mm	7.7mm	Type 92
8	2	bullet	None taken	found in tree line at the front of No.17	10.6g	32.4mm	8.6mm	with collar

Once again we face the dilemma of identifying the bullets. The fact that more cartridges were found than bullets suggests that these projectiles had not been dropped as part of a full round but fired into the location. However at first glance of the weights and measurements it would appear all these bullets are .303 rounds. The table below details the dimensions of the common rounds fired during the fighting at Adam Park.

	Japanese 6.5x50mm SR Arisaka	.303 British (7.7x56mm Rimmed)	Japanese Type 99 7.7 mm rimless
Case type	Semi-rimmed, bottlenecked	Rimmed, bottleneck	Rimless, bottleneck
Bullet diameter	6.705 mm (0.2640 in)	0.311 in (7.9 mm)	7.87 mm (0.31 in)
Neck diameter	7.34 mm (0.289 in)	0.338 in (8.6 mm)	8.6 mm (0.34 in)
Shoulder diameter	10.59 mm (0.417 in)	0.401 in (10.2 mm)	10.9 mm (0.43 in)
Base diameter	11.35 mm (0.447 in)	0.460 in (11.7 mm)	11.9 mm (0.47 in)
Rim diameter	11.84 mm (0.466 in)	0.540 in (13.7 mm)	11.9 mm (0.47 in)
Rim thickness	1.143 mm (0.0450 in)	.064 in (1.6 mm)	1.0 mm (0.039 in)
Case length	50.39 mm (1.984 in)	2.222 in (56.4 mm)	57 mm (2.2 in)
Overall length	75.69 mm (2.980 in)	3.075 in (78.1 mm)	75 mm (3.0 in)

The 41st Infantry Regiment of the IJA who attacked the estate are known to have been armed with the old Type 36 Arisaka rifle firing the 6.5x50mm SR round. The projectile is notably smaller than the British 0.303 round.

However during the inter war years the British sold the patent for the .303 round to the Japanese who in turn started to manufacture the larger Type 99 bullet. It is fairly easy to distinguish between the cartridges as the .303 round is semi-rimmed and the Type 99 is rimless. However the bullets are of the same weight, dimensions and both have the distinctive ‘tail heavy’ composite inner.

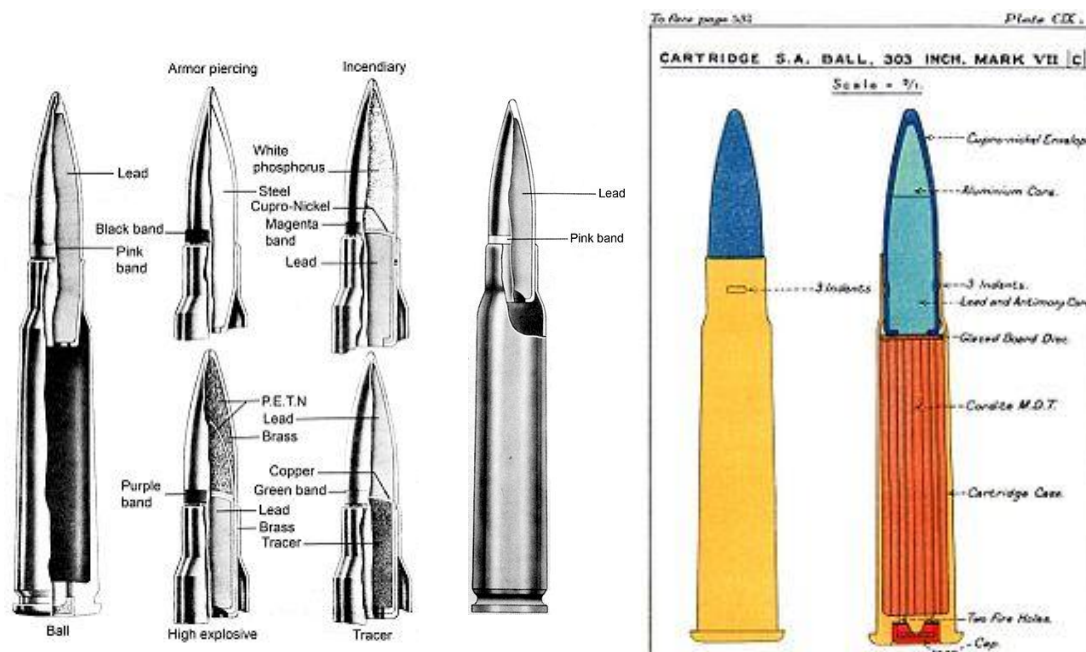


Fig 9 – Japanese Type 92 (left) and the Type 99 rounds (centre) can be compared to the cutaway of the 0.303. The rimless cartridge cases of the Japanese rounds are notable difference in the typology when compared with semi rimmed .303. However the Type 99 and .303 projectiles are almost identical; the only difference being the Japanese ball rounds have a pink band around the waist of the bullet, something which has been lost after 70years in the ground. The Type 92 bullet (left) is notably tapered towards the base and weighs in heavier at 13g

Item 17/07/004 was a bullet found at the back of kitchens is notably heavier (12.0g) and longer (35mm) than its counter parts and has a distinctive tapering towards its base. This may be a Japanese Type 92 bullet the weight of which is usually around 13g.

Therefore it is possible that the rounds found around the cartridges in Area 2 are in fact Japanese incoming rounds. This corresponds also with the findings in Survey 3 that suggested the garden was subjected to incoming Type 99 machine gun fire; a weapon that used the new Type 99 bullets and of which the 41st Regiment's machine gun company was equipped.

Distribution of Ordnance

In summing up therefore we have a concentration of ordnance in the centre of Area 2 which suggests an allied weapon, possibly a Bren light machine gun was being used in the vicinity. The collection of bullets, most likely Type 99 machine gun bullets, found around the same location suggests that the Bren gun operator was the target for incoming unfriendly fire. This pattern of British cartridges and Japanese bullets is indicative of a British defensive position that was not overrun by Japanese troops and is similar to other positions found not only in the garden of No.17 but also along the British defensive line.

Shell Fragments

Four small pieces of what was labelled as shell fragment were found:

Line Number	Transit	Item Number	Description	Location
17	1	17	shell fragment	4.18m x .061m
36	1	36	shell fragment	9.80m x 0.32m
43	2	1	shell fragment	2.30m x 0.72m
56	2	14	shell fragment	8.55m x 1.00m

There were too few to be able to note any particular patterning.



Fig 10 - Item 17/01/036 was noted as shell fragment but does not truly fit the typology found on other sites. This piece of metal showed traces of molten deposits on the edges and bore no tell-tale machined grooves or screw thread found on other shell fragments.

Webbing Buckles

There were 3 webbing buckles recovered all of which identified as parts of the British Type 37 Webbing.

Line Number	Transit	Item Number	Description	Location	Notes
78	3	8	webbing buckle	6.27m x 0.64m	1 bar open
96	3	19e	webbing buckle	8.10m x 0.42m	2 bar open
101	3	24	webbing buckle	8.88m x 0.27m	1 bar closed

One item identified as a clip off the back of an ammunition pouch was recovered from Area 1 on the final day after the flags and transects had been removed. This item was subsequently left on site.

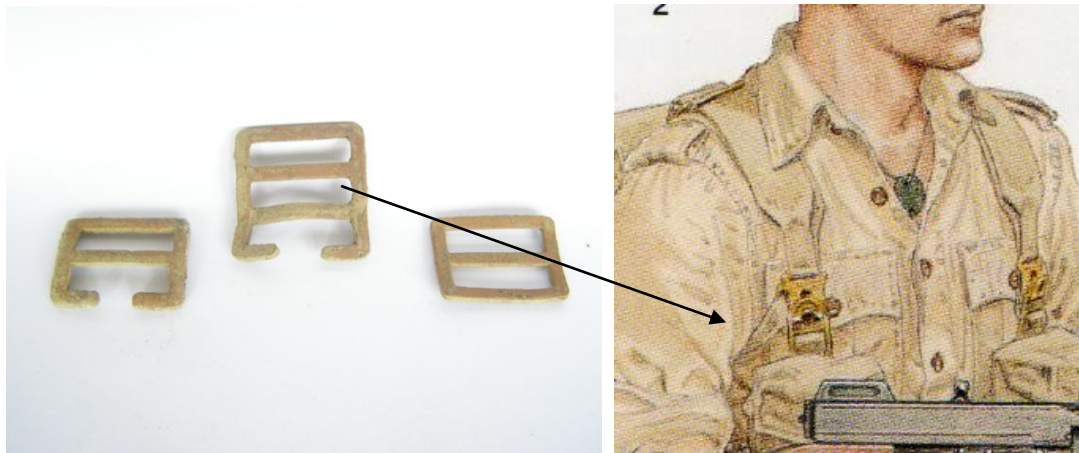


Fig 11 – Three type 37 webbing buckles found in the close proximity of the concentration of cartridges suggest that an ammunition pouch was left in the area. The two bar buckle (centre) is found on the top of the ammunition pouch and attaches the pouch to the braces.

Other Related Artifacts

The Cambridgeshire Cap Badge

Once again the volunteers on site at No17 Adam Park experienced the thrill of revealing the single most talismanic metallic item that could be wished for on this battlefield. Sitting slightly to one side of the concentration of bullets and cartridges and mere few centimetres under the surface was discovered our fourth Cambridgeshire cap badge and the seventh military badge to be found at Adam Park.



Fig 12 – Volunteer digger Kim Frost shows off the cap badge found in the garden at No.17 Adam Park. As this was one of the first items found the photograph does not show the relative position to the remaining horde of cartridges and bullets found at this site. See Plan at Appendix B for location of artefacts.

This badge was similar to the last three but is in better condition. It is of the same design as the other cap badges³, and only has sustained the slightest damage on the turrets of the ‘keep’. On cleaning the bimetallic nature of the badge was clearly discernible and the detail in the brick work was outstanding.

The finding of so many badges at Adam Park leads us to believe that there was a systematic disposal of such items. Most likely the order was given out at the end of the fighting for all personnel to ditch any items that may link them to their regiment as it is standard practice to only reveal name rank and number to your captors. Men who had carried their sidecaps in their kit bags would have then disposed of their regimental insignia before being captured. It is reasonable to believe that the man who was firing off the rounds found in the locality also disposed of the badge at the time of the ceasefire and surrender.

³ Unlike the badge found at No.7 Adam Park the word ‘CAMBRIDGESHIRE’ has been spelt correctly.



Fig 13 – The Cambridgeshire's Cap Badge found at No.17 Adam Park

The Ring

A small dress ring was recovered from Area 2. The ring was badly deformed but had a maximum diameter of 20mm. It was broader in one part 6.5mm and at its narrowest part 3 mm. The remains of winged heart motif are possibly present at the widest part.



Fig 12 – 17/003/23 The ‘Ladies Ring’ was badly damaged

The Gun Oil Brass Container Lid and ‘Pull Through’

Two items were found that could be associated with the SMLE cleaning kit. The kit could be carried in the butt of the SMLE or as part of the personnel items in the kit bag. It consisted of a brass ‘pull through’, a 75mm rod with a hole at the end of it through which a length of chord was passed, and the top of an ‘oiler’, a brass container which held gun oil. The brass screw cap of the container also acted as a spatula used to apply the oil to the working parts of the weapon.

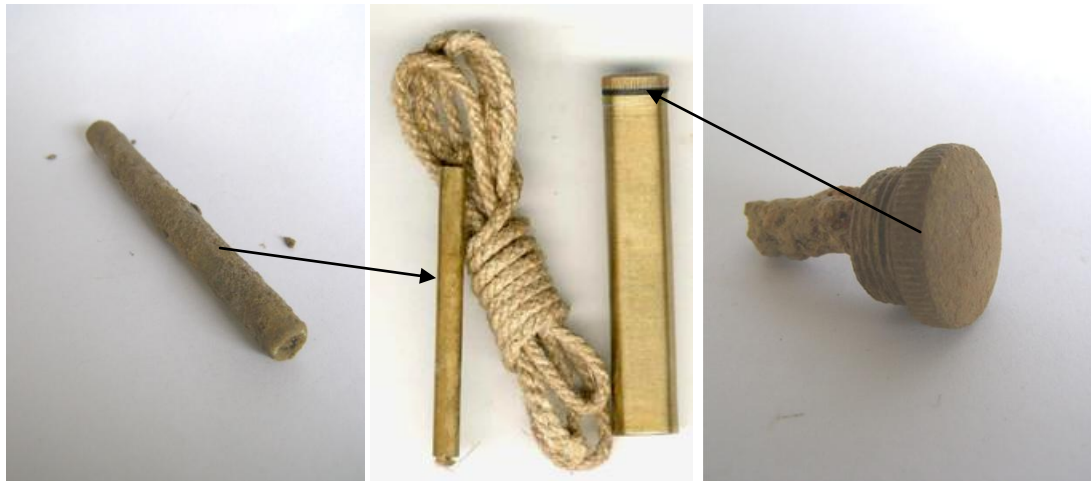


Fig 13 – Two items found at No.17 Adam Park can be associated with the SMLE cleaning kit found in the stock of the Lee Enfield Rifle.

Other Items found at No.17 Adam Park

A number of tours and visits took place during the course of the survey. This gave the team the opportunity to return to areas of the garden previously surveyed. Two items were found on the surface and were considered of particular interest.

Molten Glass

The bank to the south of the front garden at No.17 was the subject of two surveys over the past few years. These surveys revealed a substantial amount of evidence relating to the burning of the house during the ceasefire. The bank was once again visually examined and an impressive piece molten glass was recovered. It appears to be the neck and mouth of a bottle but the heat to which it was exposed has melted the shard until it has collapsed in on itself.

Diarists report that the Regimental Aid Post was covered in bottles. Bottled water, beer and spirits was brought across from the RASC Camp mess and used by the medics to relieve thirst and as an anaesthetic. This bottle was in the house at the time of the fire and disposed of down the banking at a later date.



Fig 14 – Molten Glass bottle found down the bank at the front of the house is fitting testimony to the destruction of the house on 15th February 1942

The Toy Tank

It was quite ironic that a Toy Tank was recovered whilst prospecting over the fence at No.18 Adam Park. In 1942 British troops were amazed to see Japanese tanks negotiate the Malayan jungles when their leaders said it was not possible. To find a toy tank on this particular battlefield is somewhat paradoxical.



Fig 15 – The toy tank found at No.18 Adam Park appears to be a British Centurion tank which was made by Corgi in the 1950's (right).

Aerial Photography

The opportunity was once again taken to take aerial photographs of the surrounding area. The Parrot A.R. V.2.0 Drone was flown from the front and back gardens at No.17 in an attempt to capture a view of the surrounding landscapes and place the survey into the context of the rest of the estate.



Fig 16 – The AR Drone Mk 2 by Parrot

The drone was controlled from an iPad 2. It was set to a maximum cruise height of 60m and photographs were taken using the forward facing camera which has a resolution of 720p. The drone also has a downward facing 60 fps vertical QVGA camera for ground speed measurement. This camera has proven unsuitable for effective downward facing photography.

Limited battery life means that the flight times are limited to no more than 10 minutes. Flight time is notably reduced to half the amount when the indoor polystyrene foam shell is retained.

The greatest difficulties in flying the drone in the conditions faced at Adam Park were negotiating the overhanging trees and maintaining a steady stationery position as the breezes and sloping ground were encountered. Rarely does the machine remain stationery constantly adjusting altitude as it measures the height off the undulating terrain below. Constant adjustments were required to maintain a position from which a 360 panoramic view could be taken.

Despite all the difficulties a portfolio of interesting images were collected at No.17 which show the surrounding terrain and previous survey areas. Photographs of the interior of the estate clearly show the disposition of houses, tennis courts, roads and drainage and provide a valuable insight into the layout of the estate.



Fig 17 – An aerial photograph showing the line of the main road into the estate at the back of No.17 Adam Park. The view shows how the road follows the contour of the hill and provides access to all the houses along the ridge line. The drainage ditches along the road provided readymade slit trenches for any troops moving along the road. On the evening of the 13th February C Coy moved along this road to the point of the bend before establishing defensive positions either side of the road.



Fig 18 – An aerial picture looking south- east from No.17 Adam Park taken at around 50m altitude, above the prevailing tree line. This shows the high ground to the east of the Adam Road where A and B Companies man trenches in what was known as the ‘Indian Camp’; an abandoned RASC depot, later to become the site of the Adam Road POW camp in 1945. Adam Road can be seen in the foreground.



Fig 19 – A construction diagram showing the component parts of the AR Drone 2.0. The machine has proven a cheap and usable platform for aerial photography. Solving the problem of a downward facing camera would increase its usefulness in the field.

Conclusion

This survey at Area 2 took three days to complete. One more day was lost fruitlessly searching for relevant finds in the back garden. Once the prospecting survey revealed a collection of bullets and cartridges at the side of the house there were effectively only three further days of work remaining. With only a couple of volunteers on site each day, disruptive weather and with a number of groups touring the estate during the week, there was limited resources and time available to carry out the work.

However even this relatively small survey area produced some very interesting and thought provoking data. The concentration of the WW2 artefacts in the middle of the lawn was exceptional. The typology of artefacts is clearly different from areas where ordnance and webbing had been dumped. Once again we have uncovered what appears to be a British defensive position on the front line of the fighting for the estate. Even if we disregard the collection of bullets that may or may not be Japanese, we have a collection of expended British ammunition suggesting the position was indeed occupied by a British soldier firing a Lee Enfield rifle or a Bren Light Machine gun. It is also suggestive that the soldier must have taken up a position in some kind of cover that was available at that location. Most likely he constructed a slit trench. The disposition of personal equipment and the cap badge suggests that the trench was back filled at the time of capture with WW2 equipment.

Although limited, the survey proved to be a great classroom for the volunteers who attended. The archaeology was notably different and a superb example of how patterning and typology can tell a story about the site. The discovery of the fourth Cambridgeshire cap badge was definitely the icing on the cake.



Fig 20 – A ‘Japanese’ view, take from the driveway top the east of the transects, of the concentration of bullets and cartridges found in the side garden at No.17 Adam Park

Appendix 1 - TAPP - Finds Log – 17 Adam Park

Line No	Transit	Item Number	Description	Location	Notes
1	1	1	Water Bottle Cap	0.15m x 1.10m	
2	1	2	brass pipework	0.32m x 0.67m	
3	1	3	rivot	0.31m x 1.80m	ring shaped metal
4	1	4	screw	0.53m x 0.22m	
5	1	5	washer lead	0.67m x 0.81m	ring shaped metal
6	1	6	large nail	0.55m x 1.48m	I shaped metal
7	1	7	nail	0.95m x 1.11m	
8	1	8	nail	1.31m x 1.42m	
9	1	9	nail	1.31m x 1.42m	
10	1	10	lead roof lining x2	1.45m x 0.14m	
11	1	11	small rectangular metal	1.72m x 0.74m	
12	1	12	part of a pipe	2.01m x 1.20m	
13	1	13	L shaped angle iron	2.79m x 0.89m	
14	1	14	Large parts of a pipework	2.00m x 0.87m	
15	1	15	washer lead	2.84m x 1.47m	
16	1	16	large length of metal bar	3.23m x 0.32m	
17	1	17	shell fragment	4.18m x .061m	
18	1	18	cartridge	4.10m x 1.10m	
19	1	19	handle possible ammo crate	4.22m x 1.65m	
20	1	20	nail	4.55m x 0.92m	
21	1	21	glue tube	4.78m x -0.31m	
22	1	22	angular iron and chipping hammer head	4.80m x 1.20m	
23	1	23	length of pipe	4.93m x 1.50m	flattened one end
24	1	24	triangular iron work	5.30m x -0.43	one of two found on site Out of transect against fenceline
25	1	25	Large lump of metal	5.30m x 0.57m	
26	1	26	thick triangular section of ferrous material	5.58m x 1.60m	
27	1	27	nail	6.90m x 1.32m	
28	1	28	nail	7.15m x -0.07m	x3 Out of transect against fenceline
29	1	29	long length of metal	6.73m x -0.13	
30	1	30	section of metal tube	7.30m x 0.30m	40mm dia
31	1	31	large metal pieces	7.30m x -0.18m	Out of transect

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Line No	Transit	Item Number	Description	Location	Notes
					against fenceline
32	1	32	nail	7.57m x 1.61m	
33	1	33	nail	8.00m x 1.00m	
34	1	34	small length of wire	8.88m x 0.45m	
35	1	35	nail	9.12m x 1.58m	
36	1	36	shell fragment	9.80m x 0.32m	Large piece
37	1	37	nail	9.96m x 1.51m	
38	1	38	angle iron	10.52m x 1.49m	
39	1	39	nail	10.70m x 0.35m	collection
40	1	40	handle possible ammo crate	11.10m x 0.20m	
41	1	41	iron bracket	11.40m x 0.05m	
42	1	42	iron hook	12.60m x 0.53m	
43	2	1	shell fragment	2.30m x 0.72m	
44	2	2	L shaped angle iron	6.0m x 1.40m	
45	2	3	wire	6.0m x 1.40m	
46	2	4	glue tube	6.65m x 0.40m	
47	2	5	metal bracket	6.65m x 0.80m	
48	2	6	L shaped angle iron	6.60m x 1.58m	
49	2	7	large tent peg / post	7.11m x 1.20m	
50	2	8	cartridge	7.05m x 1.57m	
51	2	9	Full round	7.50m x 1.74m	
52	2	10	nail	7.69m x 0.18m	
53	2	11	drain cover	7.80m x 0.60m	
54	2	12	bullet	7.80m x 1.56m	
55	2	13	cartridge	7.80m x 1.56m	
56	2	14	shell fragment	8.55m x 1.00m	
57	2	15	cartridge	8.50m x 1.75m	
58	2	15	bullet	8.50m x 1.75m	nail
59	2	16	pipe	8.12m x 0.69m	90mm length 18mm across
60	2	17	shield shaped badge	9.05m x 0.43m	
61	2	18	large length of metal bar	9.22m x 0.13m	
62	2	19	cartridge	9.12m x 0.96m	
63	2	20	tin lid	9.00m x 1.23m	
64	2	21	bottle top	9.42m x 1.15m	
65	2	22	smle pull through	9.60m x 1.43m	
66	2	23	wire	10.52m x 0.53m	
67	2	24	bottle top	10.30m x 17.60m	
68	2	25	pipe	12.20m x 0.35m	
69	2	26	bottle top	12.50m x 1.61m	
70	2	27	cap badge	9.73m x 1.27m	
71	3	1	Iron Y Crook bar	1.58m x 1.43m	

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Line No	Transit	Item Number	Description	Location	Notes
72	3	2	bottle top	2.40m x 0.40m	emblazoned with the letter 'p'
73	3	3	small metal cap	2.80m x 2.00m	
74	3	4	U shaped metal bar	3.14m x 0.92m	
75	3	5	bottle top	4.38m x 0.22m	1 bar open
76	3	6	cartridge	5.30m x 0.67m	
77	3	7	cartridge	5.72m x 0.87m	
78	3	8	webbing buckle	6.27m x 0.64m	many
79	3	8a	bullet	6.27m x 0.64m	
80	3	8b	nail	6.35m x 0.44m	
81	3	9	cartridge	6.35m x 0.85m	as per other sites
82	3	10	foil	6.88m x 0.10m	
83	3	11	nail	7.42m x 0.71m	
84	3	12	Thin bent metal rod	7.42m x 1.02m	2 bar open
85	3	13	foil	7.42m x 1.56m	
86	3	14	cartridge	7.87m x 0.12m	
87	3	14b	bullet	7.87m x 0.12m	lady's
88	3	15	bullet	7.98m x 0.47m	
89	3	16	square metal washer	7.90m x 1.41m	
90	3	17	metal pin	8.05m x 0.76m	1 bar closed
91	3	18	cartridge	8.10m x 0.81m	
92	3	19a	cartridge	8.10m x 0.42m	
93	3	19b	cartridge	8.10m x 0.42m	looks like the FMJ of a bullet?
94	3	19c	Bullet	8.10m x 0.42m	
95	3	19d	Bullet	8.10m x 0.42m	
96	3	19e	webbing buckle	8.10m x 0.42m	lady's
97	3	20	cartridge	8.64m x 0.20m	
98	3	21	cartridge	8.67m x 0.43m	
99	3	22	bullet	8.70m x 1.10m	1 bar closed
100	3	23	ring	8.80m x 0.65m	
101	3	24	webbing buckle	8.88m x 0.27m	
102	3	25	foil	8.88m x 1.80m	looks like the FMJ of a bullet?
103	3	26	cartridge	9.05m x 0.33m	
104	3	27	cartridge	9.28m x 0.20	
105	3	28	spark plug	10.00m x 0.58m	lady's
106	3	29	nail	9.86m x 1.11m	
107	3	30	small metal fragment	10.57m x 0.85m	
108	3	31	pin	11.85m x 0.74m	looks like the FMJ of a bullet?
109	3	32	2.5cm long fragment of metal	5.72m x 1.86m	
110	4	1	nail	2.14m x 1.22m	
111	4	2	triangular iron work	2.50m x 0.55m	lady's
112	4	3	big metal bar	3.90m x 0.38m	
113	4	4	nail	4.45m x 1.80m	

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Line No	Transit	Item Number	Description	Location	Notes
114	4	5	nail	5.20m x 0.35m	
115	4	6	large lump of ferrous	5.10m x 1.90m	
116	4	7	foil	5.65m x 0.11m	
117	4	8	nail	5.65m x 1.41m	
118	4	9	cylinder of metal	5.65m x 1.92m	
119	4	10	small right angled piece	6.10m x 1.63m	
120	4	11	long iron nail and a U shaped length of metal	6.30m x 0.25m	
121	4	12	small piece of foil	6.30m x 0.96m	
122	4	13	coin	6.70m x 1.10m	
123	4	14	small U shaped metal bar	6.95m x 1.46m	
124	4	15	cartridge	7.04m x 0.27m	
125	4	16	cartridge	7.04m x 1.98m	
126	4	17	small clip	6.80m x 2.10m	very shiny with a tie in the middle section
127	4	18	flat oval 'terminal'	7.40m x 0.00m	
128	4	19	small piece of foil	7.40m x 0.52m	
129	4	20	aluminium plate 5cm x 2.5cm	7.45m x 0.86m	
130	4	21	foil	7.80m x 0.95m	
131	4	22	bullet	7.80m x 1.02m	
132	4	23	foil	8.05m x 0.50m	
133	4	24	nail	8.05m x 1.75m	
134	4	25	round flat topped screw	8.70m x 0.23m	
135	4	26	semi circle flat metal	10.06m x 0.00m	
136	4	27	window fitting	11.10m x 0.47m	
137	5	1	Tiny fused metal bracket	1.76m x 0.33m	
138	5	2	2cm metal tube	2.40m x 0.75m	
139	5	3	cylinder of metal	3.15m x 0.68m	
140	5	4	cartridge	3.76m x 0.33m	
141	5	5	door key	4.00m x 0.30m	
142	6	1	small brass piece of pipe	None taken	found in back garden
143	6	2	buckle	None taken	found in back garden
144	6	3	brass joint	None taken	found in back garden
145	6	4	knife blade	None taken	found in back garden
146	6	5	brass wire terminal	None taken	found in back garden

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Line No	Transit	Item Number	Description	Location	Notes
147	7	1	wire terminal from a plug	None taken	found beside kitchen
148	7	2	small piece of brass pipe	None taken	found beside kitchen
149	7	3	bullet	None taken	found beside kitchen
150	7	4	bullet	found on surface	found beside kitchen
151	8	1	Full round	None taken	found in tree line at the front of No.17
152	8	2	bullet	None taken	found in tree line at the front of No.17

Appendix 2 – Sketch Map Area 1

