The Excavation of WWII RAF Bomber, Halifax LV881-ZA-V

PHIL MARTER[a], RONALD VISSER[b], PIM ALDERS[c], CHRISTOPH RÖDER[d], MICHAEL GOTTWALD[e], MIRKO MANK[f], STEVEN HUBBARD[g], UDO RECKER[h]

[a]Department of Archaeology, University of Winchester, UK; [b]Department of Archaeology, Saxion University of Applied Sciences, Deventer, The Netherlands; [c]hessenARCHÄOLOGIE , Wiesbaden, Germany; [d]Independent Aviation Archaeologist, Flugzeugwrackmuseum, Ebsdorfergrund, Germany; [e]Director of Archaeology of the Federal State of Hesse, Wiesbaden, Germany.

ABSTRACT.

This article outlines the preliminary results of archaeological fieldwork at the crash site of RAF Halifax bomber LV881-ZA-V and explores some of the challenges presented by the excavation of this military wartime crash site. The aircraft and her crew were shot down by a German night fighter in the early hours of March 31st 1944 during the infamous Nuremberg Raid. Four of her crew were killed and the remaining three were taken prisoner and later took part in the 'Long March'. All three survived the war. An international team comprised of staff and students from Germany, the Netherlands, Finland and the UK explored what remained of the crash site, located on a hill outside the village of Steinheim, north east of Frankfurt in the German Federal State of Hesse.

KEY WORDS: World War II, RAF, Bomber Command, Crash site, Aviation Archaeology, Halifax bomber.

Introduction

The village of Steinheim lies among the gently rolling hills of the Wetterau region, some 50 km north east of Frankfurt in the district of Gießen (see Figure 1a and 1b). The rural district of Gießen forms part of the German Federal State of Hesse, and was an area frequently over-flown by Allied bombers during World War II. Bomber streams would pass through what was known as the 'Cologne Gap' (a 20 mile wide area between southern Ruhr Flak battery and a defended zone around Coblenz) and fly on over the Westerwald towards Fulda and targets deeper with Germany. The area is littered with

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

the wreckage of aircraft shot down during operations to bomb German cities and industrial complexes in the central and eastern parts of Germany. Few of these crash sites have ever been systematically explored by archaeologists, but in 2014 circumstances were to provide a rare opportunity to do so.

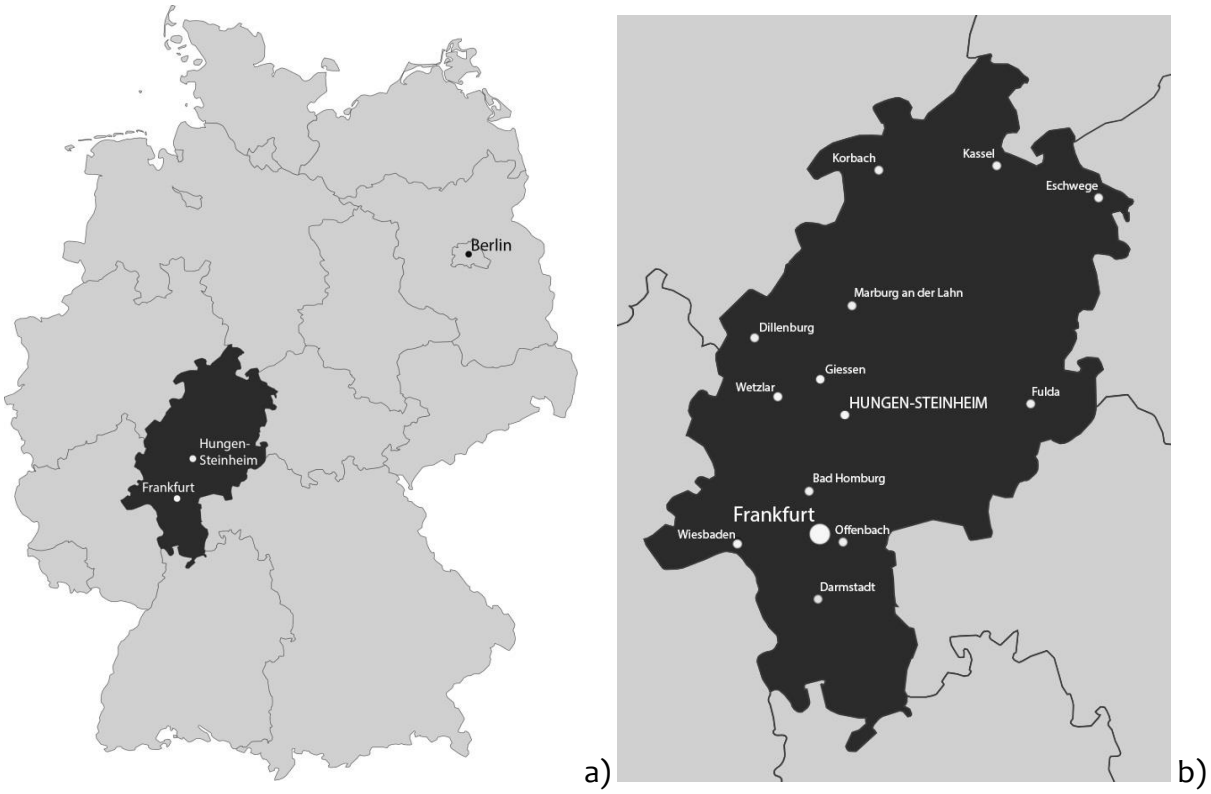

Figure 1 *Location map showing the Federal State of Hesse (a) and the location of the village of Hungen-Steinhem (b).*

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

Figure 2 *Fieldwork area outside the village of Steinheim. Subsequent diagrams refer to the area delineated here (Source topography: © OpenStreetMap contributors).*

This research project was initiated when local people observed illegal activity by metal detectorists in the vicinity of what was already known to be a WWII crash site near the village of Steinheim near Hungen (See Figure 2). The local authority was contacted and the Archaeological Department of Hesse (hessenARCHÄOLOGIE) decided to investigate the situation and assess what, if any, mitigating strategies could be put in place to protect any remains present on the site. An initial assessment of the crash site using rapid geomagnetic prospection revealed significant scatters of material across a wide area. This fine debris had, due to its generally small size, been left on site following the German wartime clear-up operation in 1944. There was however, little way to gauge the

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

rate of loss of objects from the site or to determine exactly what damage was being done to it. The decision was therefore made to take positive steps to recover information before any further data was lost. As a result, the site became the focus of a research project by hessenARCHÄOLOGIE, facilitated through systematic investigated during their 2nd and 3rd International Summer Academies. The first season of fieldwork took place in September 2014 under the direction of the Monument Protection Authority and was carried out by 30 students of the Saxion University of Applied Sciences, Deventer (Netherlands), the Turun Yliopisto (University Turku, Finland), and the University of Winchester (Great Britain) as well as the Justus-Liebig University of Gießen and the Phillips University of Marburg. It was the first time that a Second World War crash site had been archaeologically and systematically investigated in Hesse (Alders et. al. 2015; Becker et al. 2015). This historically and culturally relevant site from the regions recent history served as an invaluable opportunity to put methodical and technical approaches to the test, whilst gaining important new information about the history of the aircraft and its crew.

Historical context

Archaeological fieldwork was supported by the examination of a range of documentary evidence. RAF operational records were consulted and Luftwaffe archives checked for information about the loss of LV881. Whilst the few remaining German documents concerning the circumstances of the crash did not deliver any significant information, they did at least corroborate existing evidence that identified the crash site outside Steinheim as that of Halifax LV881-ZA-V. At the outset of the project there were few known eye witnesses who could remember the incident although others were to emerge during the research. Crucially, two sources of information that were to provide most of the detailed contemporary accounts were quickly identified. The first was Flight Engineer Alan Lawes' diary and the other, archive material relating to Australian Mid Upper Gunner Hugh Birch held by The Australian War Memorial. This second source of information also revealed that our project team were not the first to visit the crash site. Just after the war, Squadron Leader J. H. Sanderson, of Section no 14 of No 3 Missing

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

Research Enquires Unit investigated the crash site in January 1947. He interviewed the Bürgermeister of Steinheim and his predecessor and talked to local people, locating and identifying the bodies of the four airmen killed who had been buried in cemeteries at Hungen and Steinheim (they were later transferred to Hanover War Cemetery in 1948). He did not at that time, realise that the aircraft was LV881 but was able to ascertain the names of the deceased crew. He hoped that this would allow the crashed aircraft to be identified back in England (Sanderson J. H. 1947, A705 166/5/484). This information had subsequently been cross-checked by other researchers (Mank 2007), ultimately resulting in Halifax LV881 being listed in Chorley's well known series *Royal Air Force Bomber Command Losses of the Second World War (1944)* as having crashed at Steinheim, some 3km SEE of Hungen (Chorley 1997, 144).

Halifax LV881-ZA-V and her crew belonged to RAF 10 Squadron, stationed at RAF Melbourne near Seaton Ross, Yorkshire in the north of England. 10 Squadron had operated as part of 4 Group which encompassed squadrons from across North Yorkshire. In March of 1944 it had recently been equipped with four engined heavy MKIII Halifax Bombers. Her crew had not long arrived on the Squadron (in December 1943) and had carried out only four previous operations before being lost during a night operation to bomb the town of Nuremberg. The raid had been ordered by the head of the Bomber Command Sir Arthur Harris, to take advantage of the dwindling winter nights that allowed deeper penetration raids into the heart of Germany. A combination of factors would combine to hamper the operation and produce one of the most costly operations of war for the RAF (MIddlebrook 2003; Nichol 2013).

The Nuremberg Raid, March 30-31st 1944

On the evening of March 30th 1944 aircraft set off from airfields across eastern England with the intention to use cloud cover over much of northern Europe to hide their approach to Nuremberg. Early weather forecasts had suggested that the area around Nuremberg would be clear enough to allow a successful attack to be made, but in the event, the cloud cover on the approach failed to materialise and it instead masked the

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

target. Despite warnings, delivered by a Mosquito reconnaissance aircraft that had reconnoitred the area earlier in the day that the conditions had changed, the raid was given the go-ahead. A force of 782 heavy bombers was eventually dispatched and although some 52 turned back for a variety of reasons (Middlebrook 2003; 119) this still represented a considerable effort.

Aircraft were required to fly in a collected formation known as a 'bomber stream' which was designed to overwhelm the German defences by sheer weight of numbers and provide a measure of mutual protection. It would also deliver the bomb loads to the target in the shortest possible time and allow the crews to exit the target area as swiftly as possible. However, in the early part of 1944 it had become increasingly clear that the German defences had adapted well to this strategy and had developed a 'running commentary' that charted the progress of the bomber stream. This was broadcast to the night fighter crews and helped guide them to intercept the bombers. Prior to the approach of the bomber stream, night fighter aircraft would be ordered to collect around radio beacons placed at various locations across the region and made to await the arrival of the enemy aircraft. Assuming the route the bomber stream was taking could be identified, this system meant that large numbers of night fighters could be collected in a suitable position to intercept the enemy in an organised and efficient fashion. Indeed, on the night of the 30th of March 1944, German listening stations had already estimated the size of the bomber stream by monitoring the H2S transmissions[1] of aircraft leaving their stations in England and were well prepared for their arrival over Germany (Middlebrook 2003; 132).

To begin with the bombers formed at an assembly point over the North Sea and then proceeded to the Belgian coast and on to the first turning point of the route at Charleroi in Belgium. The bomber stream, which was by this time some 68 miles long, proceeded to embark on the 'Long Leg' of their route that would see them follow a constant course for 265 miles through the 'Cologne Gap' before turning south to the target (Middlebrook

[1] H2S was an early ground mapping radar system to be used in combat. It aided night time navigation and bombing.

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

2003; 90). Conditions could not have been worse for the operation. The absence of the promised cloud meant that the bombers were hopelessly exposed in the bright moonlight and the German defences knew exactly where they were. The German night fighter defence had already been alerted to the approach of the bomber stream and Generalmajor Walter Grabmann who had ordered all the night fighters in the region to collect on the Aachen (Ida) and Frankfurt (Otto) radio beacons, probably assumed the target would be in the Ruhr industrial area. The fighters would, as a result, be ideally placed to intercept the bombers as they passed through the 'Cologne Gap'.

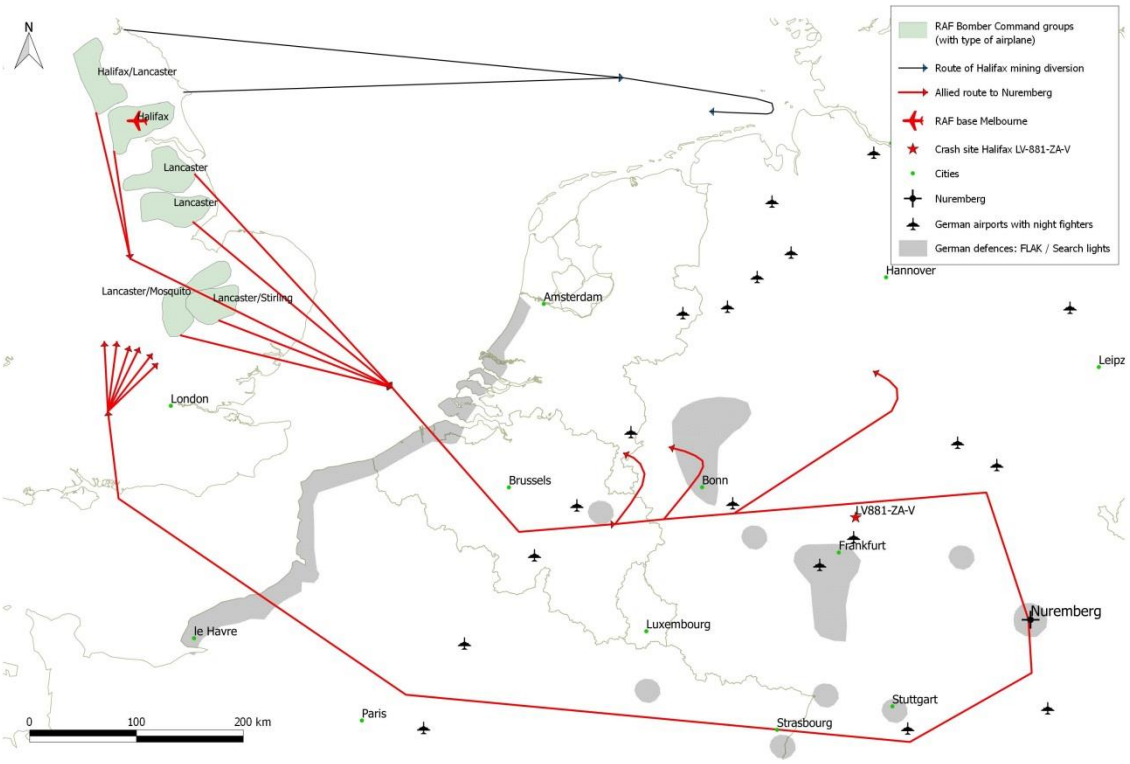

Figure 3 *The Nuremberg Raid, March 30-31st 1944. Note the diversionary raid to the north, near the Danish coast and diversionary attacks made by Mosquitos north of the main track near Bonn, designed to draw off enemy night fighters (Visser, after Middlebrook 2003).*

Around midnight as the bomber stream began to pass over the German frontier and through the Cologne Gap, some 250 night fighters were waiting for them and a desperate aerial battle ensued. Nearly 60 bombers were shot down in as many minutes and as Martin Middlebook comments "it is unlikely that a single hour, before or since, has

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

seen a greater rate of aerial destruction"(2003; 170). In the midst of this battle, LV881 also met her demise and as the bomber stream pressed on towards the target her crew fought desperately for their lives.

By the time the remaining bombers touched down in England later that morning, the full scale of the disaster had become apparent. Of the 795 Halifax and Lancaster aircraft that took part in the operation, 95 were lost to the German air defence, the majority shot down by night fighter aircraft[2]. Moreover, it was clear that strong winds and cloud cover over the target area had hampered navigation and many crews had failed to bomb Nuremberg, instead attacking the town of Schweinfurt and others dropping bombs in the largely rural areas outside Nuremberg itself (Middlebrook 2003; 184).

The fate of LV881 and her crew

On the morning of the 31st of March staff at RAF Melbourne began receiving the returning 10 Squadron crews. By just after 6 am, eight crews had landed safely and only one was missing. LV881s flight entry in the Squadron Operations Book had the following added to it: "Missing - *Nothing heard from aircraft following take-off*" (TNA AIR/27). Whilst this entry was never elaborated on, other documents were available to allow us to piece together what had happened. The Australian National Archives contained a range of material that proved invaluable, some of which had come from the original investigation archive. This information contained elements of accounts recorded by the crew.

It appears that sometime between 00.30 and 01.00 hrs the aircraft was hit twice, five minutes apart, by what the crew assumed was flak. The second hit caused No 3 fuel tank to burst open and catch fire. The pilot Walter Regan pushed the aircraft into a dive to put it out, but after this failed to extinguish the flames the order was given to bale out. Four crew members, Warrant Officer William Norris of the Royal Canadian Air Force

[2] These figures are derived from Middlebrook 2003 and his chapter *The Cost*; 274-281. The losses during the raid can be broken down in various ways and include aircraft damaged beyond repair or crashed during take-off or landing, but the figure of 95 in this case refers to aircraft listed as 'missing'.

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

(Navigator), Flight Sergeant Norman Wilmot (Bombardier), Sergeant Alan Lawes (Flight Engineer) and Sergeant Ronald Tindal (Rear Gunner) managed to exit the aircraft before it crashed. The three remaining crew members, Flight Sergeant Walter Regan (Pilot), Sergeant Donald Smith (Radio Operator) and Flight Sergeant Ernest (Hugh) Birch, of the Royal Australian Air Force (RAAF) (Mid Upper Gunner) were not so lucky. Their bodies were found at the crash site when the German authorities arrived on the scene (Sanderson J. H. 1947, A705 166/5/484, hessenARCHÄOLOGIE; 2014). They were later buried in the local cemetery at Steinheim and eventually transferred to the Commonwealth cemetery of Hannover-Limmer after the war. Tragically, a fourth crew member, Rear Gunner Ronald Tindal who had managed to leave the plane, was killed when his parachute failed to open. He was found dead on the morning of the 31st of March at the community border between Hungen and Bettenausen outside the nearby town of Hungen (City Archive of Hungen, without Number). Sergeant Tindal was initially buried in the cemetery of Hungen, before he was transferred to Hannover to join the other deceased crew members.

Navigator Bill Norris, Bombardier Norman Wilmot and the Flight Engineer Alan Lawes parachuted to the ground safely and surrendered to the German authorities in Steinheim and in the neighbouring village of Rodheim. After their first stopover as prisoners in the mayor's office of nearby Trais-Horloff, they were transferred to the military cells at Gießen airport. From there they were taken for interrogation at what has now become widely known as 'Dulag Luft' at Oberursel outside Frankfurt. Norman Wilmot had been injured during his exit from the aircraft or perhaps following his landing by parachute and was hospitalised for some time before being interned in Stalag Luft VII, Bankau, Upper Silesia. Bill Norris and Alan Lawes were interned in Stalag Luft VI, Hydekruge, Memelland, East Prussia (now Šilutė in Lithuania). All three men were to survive the war.

Developing a Research Strategy

Traditionally a wide range of approaches to the investigation of historical aviation crash sites have been employed. The remnants of the European air war of WWII now lie

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

scattered across the continent, residing in almost every nation of the European Union. Since 1945, each country has developed a slightly different attitude to their presence, and employed 'heritage strategies' that range from complete indifference to active archaeological enquiry or even specialised military recovery. Frequently, military authorities have focussed their attention on the presence of live ordnance or human remains and Heritage groups and aviation enthusiasts on the recovery of military memorabilia. In many cases, sites are afforded little protection from damage or loss and the opportunity to excavate such sites is frequently unregulated. This has resulted in a sometimes hap-hazard attitude to their treatment and the loss of important contextual data at each site. Indeed, many excavators are never required to articulate their research aims, fieldwork rationale or outline their methodological approach to the crash they have chosen to explore.

In The German Federal State of Hesse where the crash site of LV881 resides, limited protection does exists for wartime military crash sites and curatorial bodies such as hessenARCHÄOLOGIE are working hard to encourage the development of a more rigorous approach to the investigation of aviation archaeology. Central to this are efforts to establish more meticulous crash site recording and the development of proper research aims. It is in this light that several main 'goals' were articulated for the LV881 project. They were necessarily broad in scope, but designed to stimulate dialogue during the project and provide some direction for fieldwork. In addition, a set of more 'site specific' aims were developed and refined throughout the course of the work. This was necessary because of the constantly developing nature of our understanding of what this particular crash site consisted of and it reflected our desire to explore what was possible within the context of our project. Whilst the scope of this article does not allow a full consideration of these questions it is useful to list them here to aid the on-going discussion about the importance of such ideas to the development of the discipline.

The general research goals were as follows:

1) Survey and map the nature and extent of crashed remains of Halifax LV881.

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

2) Assess the surviving remains with regard to future preservation and protection strategies on both this site and others of a similar nature.
3) Investigate the surviving remains to help illuminate the final moments of Halifax LV881 and cross-check and contrast eye-witness accounts of the crash.
4) Test excavation strategies at key locations within the crash site with a view to understanding the most appropriate approaches for the recovery of archaeological data.
5) Forge links between parties associated with this single historical event, exploring it from alternate viewpoints to consider its value as cultural heritage.

From these general goals, developed a set of more detailed archaeological questions that the project attempted to answer:

1) How did the aircraft break-up during the final moments of the flight?
2) Can we identify where the main elements of the aircraft came to rest?
3) What range of objects remained on site following the German clear-up operation?
4) Can we recover objects that add colour to the official accounts of this aircraft's final operation and the fate of her crew?
5) Can we confirm eye-witness accounts of events that took place in the immediate aftermath of the crash?

It also seems important to articulate the range of activities and evidence that we might define as 'archaeological' knowing that this too is a matter for debate. We consider the full range of artefacts and objects from the crash site, historical documentary archives, personal archives and eye-witness accounts to be within the remit of this 'archaeological' project. The order in which these various aspects of our project were tackled could not remain in a neatly ordered sequence but rather resembled an organic 'investigation' in which new clues continually added to our knowledge and helped us evolve new questions.

Summary of initial findings

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

During our research, details began to emerge of the aircraft's final moments as a result of documentary sources that became available from both the navigator Bill Norris and the family of Flight Engineer Alan Lawes. Correspondence between the family of Hugh Birch and the Air Ministry, available through the Australian War Memorial Archives provides recollection of events by Navigator Bill Norris related to Mid Upper Gunner Hugh Birch's father. A further account of events was written by Flight Engineer Alan Lawes in his personal log kept whilst he was a POW. A careful examination of both accounts gives us a clear picture of how the crew viewed what had transpired.

The aircraft had been on course at 20,000ft and heading towards the last part of the 'long leg' when they were attacked. Whilst crew members believed they had been hit by flak, the nature of the damage sustained suggested something different. They had observed two 'hits' sustained in the starboard wing some five minutes apart. The first punched a hole in the wing and the second punctured one of starboard fuel tanks so that fuel began to spill out and catch fire. Both Alan and Bill recognised that the attack had originated from below the aircraft and as a result assumed that it was flak that had struck them. The location of the damage to the fuel tank of the starboard wing and the repeat nature of the second hit in broadly the same location suggested a calculated and determined attack, more consistent with night fighter tactics. Indeed, German archives contain one night fighter claim that compares closely with the time and location of the attack on LV881. Unteroffizier Brandt of the *3rd* Staffel der Nachtjagdgruppe 10 (based out of Finsterwalde) made a 'kill claim' for a four-engined bomber within the map grid square where the crash site is located, at a height at which we know the aircraft was travelling (Abschuss Kommission des Oberkommandos der Luftwaffe 2015; Foreman, Matthews & Parry 2004, 162). It seems likely that it was he that had brought LV881's flight to an end.

In a letter written immediately after the war to the father of Australian Mid Upper Gunner Hugh Birch, navigator Bill Norris wrote of an explosion witnessed by Flight Engineer Alan Lawes, just after he exited the aircraft (A705 166/5/484). Fieldwork at the

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

crash site confirms that the aircraft appears to have then disintegrated into several parts in mid-air, which were subsequently strewn over the top of a hill outside Steinhem. The four engines, which were much heavier than the rest of the aircraft, separated from the fuselage with parts of their wings and impacted in different places. So far, three of the impact sites are known to us. Fragments of the nose and the cockpit section which had come apart from the fuselage lay about 200 meters further away and small fragments were spread over an area of several hundred meters in between.

A systematic metal detector survey of the hillside was undertaken to try to determine the nature and extent of the crash site, whilst recovering significant items from the wreckage. Each object was geo-referenced, identified and recorded. This information could then be cross-checked with eye-witness accounts that described the wreckage before it had been removed in 1944. During interviews conducted in 2014, local people suggested that the majority of larger objects had in fact been salvaged and removed by the German Army during the 31st of March 1944 (hessenARCHÄOLOGIE 2014). These parts were transported by cart to the nearby train station of Nidda–Ober-Widdersheim. At the same time, numerous incendiary bombs that made up the 5.6 tonne payload of the aircraft had also been found scattered across a large area in the woods and these were removed by the Army.

Survey work in 2014 located a further four incendiary bombs which were subsequently recovered by the bomb disposal team of the Federal State of Hesse. Additionally, British .303 inch ammunition which probably belonged to the eight 7.7 mm Browning machine guns mounted in the mid upper and the rear turrets, was found where the fuselage had lain.

The distribution of objects across the hillside enabled the project team to target their excavation efforts on particular locations within the crash site. The hessenARCHÄOLOGIE 2014 Summer Academy Excavations focused on an area where it was believed the cockpit had lain (see Figure 4). It was clear from the nature of the artefact scatters and the crew accounts of the crash that remains would more than likely exist only as a surface scatter of

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

material. As a result the excavation team decided to divide the chosen area into a series of 2m x2m grid squares that eventually encompassed an area that measured 20m x 23m (1 row of squares measured 2m x 1m). Each 2m grid square was numbered and excavated, with recovered objects being placed into corresponding labelled containers. In this way even very small items could be recovered and analysed and a distribution of the material created. Excavation usually proceeded to a depth of no more than 20cm, largely as a result of the proximity of the underlying bedrock to the surface and the lack of a single crash 'heavy impact point'. Indeed, all the material appeared to have been lying within the topsoil.

Figure 4 *Location of three trenches on the hill outside Steinheim. Trench 1 was designed to explore the cockpit location (in 2014), 3 the area of the main fuselage and 4 one of the engines (in 2015)(Source Topography © OpenStreetMap contributors).*

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

Figure 5 *Excavation at the site where the cockpit came to rest. Excavation grid-squares are divided up using 'emergency-tape' (Photo: Phil Marter).*

Quite early on during the 2014 excavation (Trench 1, Figure 3) it was possible to identify that there was a clear concentration of finds in the centre of the excavated area. In some of the central squares more than 100 fragments per square were recovered in each. In contrast some of the outer squares provided little or no finds at all. This ability to define concentrations of material without locating each single object, proved to be a useful compromise that balanced information recovery with efficient time expenditure. It was a strategy that we continued to utilise in our second season of fieldwork. The sheer number of individual objects on site required a degree of pragmatism in relation to recovery and recording work. Whilst the large parts of the wreckage had already been salvaged in 1944, a huge variety of objects still remained on site, most were no larger than a few centimetres in size. These included numerous aluminium fragments of the outer shell of the plane, broken fragments of Perspex from the windows, parts of several appliances like the display of the Air Speed Indicator, the tachometer of one of the four engines and the display of one of the fuel tanks. A lens, probably from the MK XIV bomb sight used by Norman Wilmot or perhaps the on board camera, was also recovered. These items (see

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

Figure 6) all came from the cockpit area and the forward compartment, confirming that this had once been the location of a large section of the front of the aircraft (see Figure 7 for position of main elements of the aircraft).

Figure 6 *Items from the crash site. The air-speed indicator a), forage cap badge belonging to Hugh Birch b), pocket compass c) and one of the many items displaying manufacturing serial numbers d) (Photos: hessenARCHÄOLOGIE).*

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

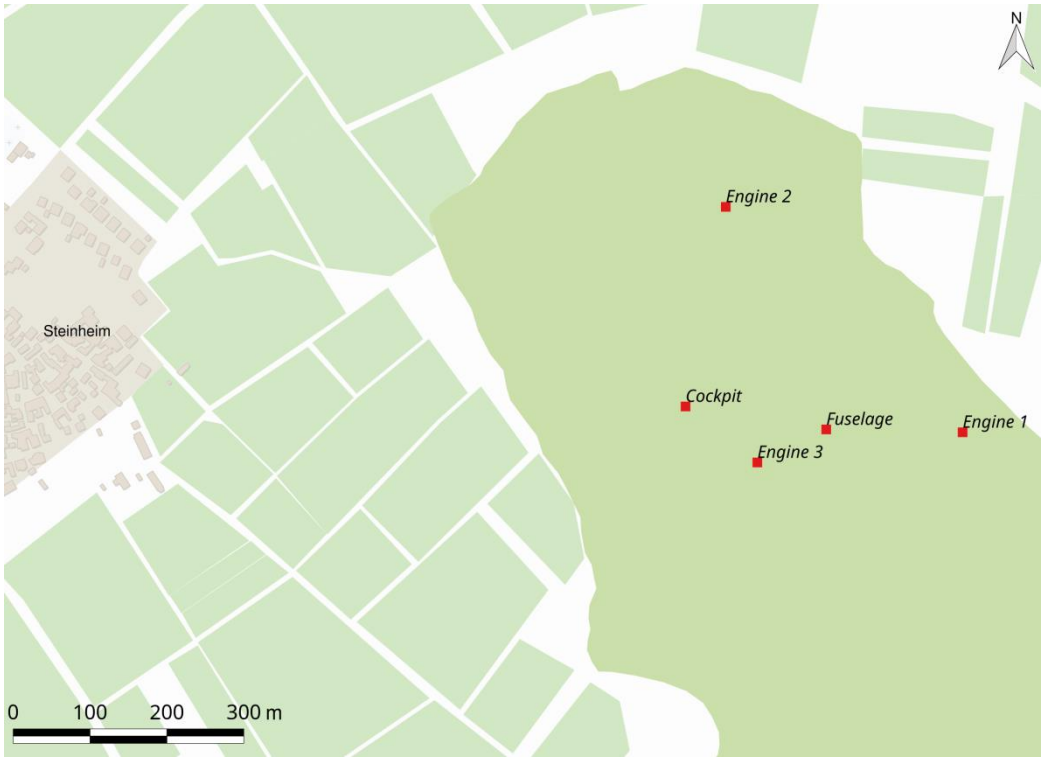

Figure 7 *Location of the main elements of the aircraft, distributed across the hillside. Direction of travel was from north west to south east. Note that the fuselage travelled further than the cockpit (Source topography: © OpenStreetMap contributors).*

Also amongst the finds were different levers, switches, lamps, cables, fuses, parts of the oxygen system and of one of the microphones. A large number of finds displayed part numbers, which helped the team identify which systems they had belonged to or even their place of production. Also very poignantly, the team recovered a number of the crew's personal belongings such as buttons from clothing, items from their flight suits, a pocket compass, a fragment of a comb and a pocket-knife. In the 2015 excavation (Figure 4, Trench 3 and 4) fragments of blue cloth, likely to be from one of the crew's uniforms was found. Of particular interest is a cap badge of the Royal Australian Air Force, found during survey work in 2014. There was only one member of the RAAF in the flight crew, so the badge certainly belonged to Mid Upper Gunner Hugh Birch who sadly lost his life during the crash. Hugh Birch was born in Bunbury (Western Australia) in 1923, and at the suggestion of the Australian Embassy in Germany, the team placed an advert hoping to trace the Birch family in the local newspaper *The Bunbury Mail*. Despite no longer living there, the family by chance saw the advert and the sister in law of Hugh Birch got in

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

touch almost immediately. The restored badge has now been returned to the Birch family via the Australian Embassy.

Excavation of a second area (Figure 4 Trench 3) closer to the top of the hill in 2015, revealed not only the previously mentioned fragment of uniform, but also a quantity of curved Perspex likely to have been from the Mid Upper turret. Nearby Trench 4 provided a confirmed location for one of the four Hercules radial engines. The parts that remained in situ, sat within a small impact crater made as the engine block drove its way into the hard bedrock.

Evidence for the salvage operation undertaken by the German Army was also found during excavation. A slightly bent shovel was recovered from the centre of the site. It had not belonged to the bomber's crew but had more than likely been used during the clear-up operation. Work also identified a linear spread of artefacts from the impact site of the cockpit towards a woodland path that lay some 80m away. This probably represents the small debris that began to fall from inside the forward compartment as the wreckage was removed. According to eye-witness accounts from local villagers (some of whom assisted with the clear-up operation), the wreckage was dismantled into smaller parts which a single person could carry, to help with the removal work (hessenARCHÄOLOGIE 2014). The rough terrain, woodland and slopes of the hill meant that it was difficult to get vehicles close to the crash sites and so it seems much of the material was removed by hand and dragged from its resting place.

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

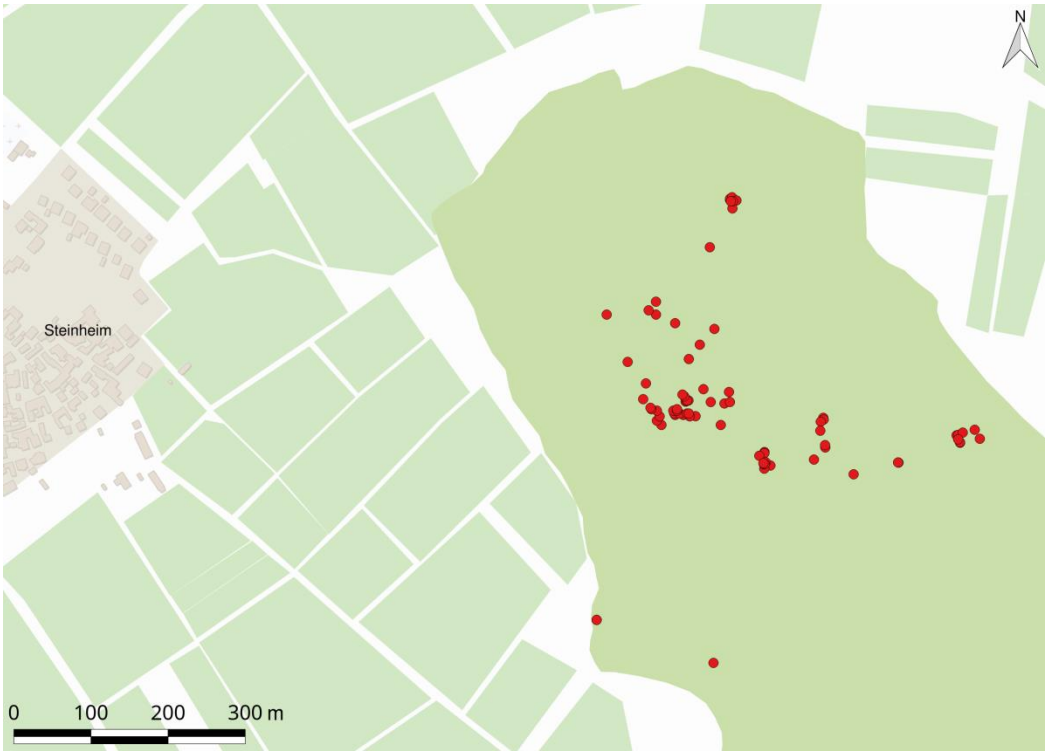

Figure 8 *Distribution of objects recovered from a survey of the hilltop, giving an indication of the nature and extent of this archaeological site. Material has probably fallen from a height of around 6,000ft (Source topography: © OpenStreetMap contributors).*

Discussion

At first glance, perhaps the excavation of an WWII aviation crash site that no longer had any 'significant' visible surface or buried remains, might seem an unattractive or even futile proposition. However, it is for this reason that the site represents a welcome challenge for the application of traditional archaeological approaches to a WWII aviation crash site. The results of our first campaign of work at the site have already illustrated the potential for examining this crash site in a systematic and archaeological way.

An exploration of the value of applying various archaeological methods to the investigation of a historic aviation crash site is, we believe, a necessary and worthy aim and one that we have only just begun to get to grips with. Some traditional

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

archaeological excavation methods will no doubt have to be fused with more pragmatic approaches to recording a site covered with literally thousands of small objects, but the premise of recording detailed location and identification of material, remains an important means for extracting the maximum level of information from a crash site.

Using this approach it has been possible to trace the passage of Halifax LV881 during its final moments. Not only can the general distribution of objects be charted via a metal detector survey, but areas for more detailed excavation targeted. Within these locales a gridded excavation areas can then provide a higher resolution recovery of objects that allows us to focus at an almost forensic level on these scatters of objects. This work has enabled us to confirm exactly where different elements of the aircraft came to rest and confirmed that the aircraft had indeed exploded at some considerable height above the ground. A further consideration of the location of the engines also seems to confirm that these heavier objects became distributed in a way that suggests the aircraft had indeed been spinning before it exploded. If we also consider information from contemporary accounts of where the Tail Gunner Ronald's body was found, we have a final trajectory of he stricken aircraft. These exploratory methods have much in common with traditional air-crash investigation approaches and it would be logical to develop a closer dialogue with Air Accident Investigation practitioners in order to enhance the quality of work currently being carried out. This we believe will be an important avenue for future research.

Personal items belonging to the crew also allow us to glimpse the more human aspects of the crash. Eye-witness accounts provided good information about the fate of each crew member, but despite the careful removal of three bodies from the crash site a variety of personal items were still present at the scene more than 70 years later. Coins, pen-knives, badges and alike highlight the potential of an aviation crash site to act as a kind of time-capsule born of a single historical event. What more tangible link to the past can there be than to look through the bombsight lens recovered from the excavation and know that you are the first to do so since the bomb aimer himself? These objects highlight to us that there is much that we can witness and experience via our interaction

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

with the material remains that rarely finds its way into official testimony. Perhaps these aspects of the crash site fall more readily into the ethnography of wartime aviation, where we are able to explore the story of particular bomber crews or of individuals themselves. It is also not too grand to suggest that we can use an individual crash site to capture the spirit of a particular age or to explore the historical context of an aerial combat operation.

Of course we are also frequently reminded of the involvement of individuals within the community where the crash occurred and the continuing impact that traumatic events can make upon them. Several villagers from Steinheim and Rodheim witnessed the crash in the early hours of March 31st 1944, or had some involvement in events that followed. During a public meeting about our fieldwork, the sight of an elderly gentlemen brought to tears as he recalls the aftermath of the crash to relatives of the crew, demonstrated the indelible mark left by the conflict on the minds of so many from this wartime generation. This witness had seen the parachute of Alan Lawes hanging from a tree and the bodies of the deceased airmen laid carefully next to the wreckage; a sight that the young boy would not forget. Their testimony remains a hugely important but ever-dwindling resource for our understanding of the past. They have the ability to breathe life into our imaginings and remind us of contemporary attitudes to things we see as subjects to study. Methodologically, at the LV881 crash site it has been possible to test the eye-witness accounts of what happened and prove that for the most part they remain reliable. However, it has also highlighted occasions where the passage of time has clouded memories of what had taken place, with certain aspects of these accounts appearing exaggerated or in some cases in direct conflict with the evidence. This leads us to the obvious conclusion that the archaeological data can provide vital corroborative evidence whose validity is less affected by the passage of time. Indeed, as our eye-witnesses slowly disappear its value can only increase. We must also be mindful to recognise that a crashed aircraft such as a bomber, retains a variety of meaning for communities on both sides of the conflict to which it belonged. Just as the aircraft might signal a brave act of defiance to one group, it also symbolises a terrorising threat to another. In the end, its departure from one place and its crash on a hill-top in another

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

weaves a link between the two places. It now resides both physically and spiritually within a new community that has adopted it into 'their story'.

In September 2015, project research work culminated in the visit of relatives of the crew, the then commanding officer of RAF 10 Squadron Wing Commander Jamie Osborne, members of RAF 10 Squadron Association, representatives of the Bundeswehr, the local mayor, archaeologists, students and local people to the crash site for a memorial service. It provided a time to reflect and a time to talk. It brought back old memories and forged new ones. The reconsideration of the events that brought Halifax LV881 to Stenheim has ensured that the links forged by these events will continue in the future and remind us that this is history still in the making (Figure 9).

Figure 9 *Memorial service held at the crash site in September 2015. Archaeological work has brought together relatives of the crew, current serving military personnel, local people and students from several European universities (Photo: hessenARCHÄOLOGIE).*

Whilst our project had one undoubted goal, that of exploring a site threatened by illegal metal-detecting, it also provided an opportunity to explore what possibilities this kind of

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

site might have to engage in specific research questions. These questions lay at the heart of current debate about the nature and purpose of interventions on historical aviation crash sites. Many continue to ask if there is any real value to exploring such sites? We believe that there are obvious answers to this question but we must get better at articulating our response.

A careful but time-consuming approach to the recovery of very small objects, such as pieces of plastic or Perspex, can at first glance seem to yield little of value. But to consider the exploration of a crash site in this way is to de-value the broader significance of it both as an expression of cultural identity and a capsule encoded with access to the past. We remain in awe of aviators as much now as we always have done and it is the same fascination that drives us to explore these crash sites as that which brought people to see their wrecked flying machines during the war itself. Only now we have no excuse for not extracting as much information from our visits as we possibly can, because if we do not, our opportunities to do so will continue to dwindle. Each site is different and requires a personalised approach, dependant on the circumstances of the crash, type of aircraft, location or underlying geology, but the premise remains: we must do our very best, as rigorously recording and exploring these sites as is possible. They are a finite resource that continues to dwindle in the absence of enough desire to either protect them or value their presence.

Acknowledgements

The remains of Halifax LV881-ZA-V were once a symbol of conflict between nations, but their legacy is now one of peace and reconciliation, forged through new friendships and a greater understanding of our shared wartime heritage.

The organisers of the Summer Academy would like to thank the town of Hungen, the villagers of Steinheim as well as all the associations and local businesses who have provided invaluable support to the project. The authors would also like to extend their thanks to Ann Bihan of 10 Squadron Association for her research on the crew and their

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

families. We are grateful for the support of RAF 10 Squadron Association and to members of RAF 10 Squadron and the Bundeswehr of the Federal State of Hesse for attending the memorial ceremony in 2015. Finally, we would like to sincerely thank all the relatives of the crew of LV881 who have embraced our project and supported it throughout.

IN REMEMBRANCE of all those who lost their lives during 'The Nuremberg Raid'.

ARCHIVE DOCUMENTS AND UNPUBLISHED REPORTS

hessenARCHÄOLOGIE (2014) *Eye-Witness Interviews*, Hungen-Steinheim.

Excavation Report 2014 and 2015 of hessenARCHÄOLOGIE

City Archive of Hungen, Hof Grass Hungen local archives.

TNA AIR 27/145 *10 Squadron Operations Book, March 1944*. 10 Squadron Association and The National Archive (accessed March 2015).

Archives of Unterlagen der Abschuss Kommission des Oberkommandos der Luftwaffe (Accessed April 2015).

Personal Wartime Diary of Flight Engineer Alan Lawes (accessed March 2015).

Personal Archive of Mirko Mank, *Notes and archive material belonging to night fighter pilot Emil Nonnenmacher* (accessed April 2015).

A705 166/5/484 *File of Flight Sergent Hugh Birch* (RAAF). National Archives of Australia (accessed January 2015).

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

A705 166/5/484 *J. H. Sanderson, Sqn Ldr Commanding Section No 14, MREU No 3 Investigation Report January 16th 1947*. Contained within File of Flight Sergent Hugh Birch (RAAF). National Archives of Australia (accessed January 2015).

PUBLISHED LITERATURE

Alders, P., Gottwald, M., Hubbard, S., Mank, M., Marter, Ph., Recker, U., Röder, Ch., Visser, R., Halifax LV881 – Zeugnisse des Luftkrieges über Hessen. *Hessenarchäologie 2014*, *2015*, 203-207 (Weisbaden).

Becker, Th., Steinbring, B., Röder, Ch., Bodendenkmalpflege und 2. Weltkrieg. Ein neues aufgabenfeld in der denkmalpflegerischen Alltagsarbeit. *Denkmalpflege und Kulturgeschichte 4/ 2015*, 25-33 (Weisbaden).

Chorley, W. R (1997) *Royal Air Force Bomber Command Losses of the Second World War (1944)* (Hersham: Crecy).

Foreman J., Matthews J. And Parry S., (2004) Luftwaffe Night Fighter Combat Claims 1939-45 (Walton-onThames: Red Kite).

Mank, M. (2007), *Vergilbte Akten – Verglühtes Metall. Eine Chronik des Luftkrieges im Landkreis Giessen 1939–1945, Bd. 1: Die ersten Jahre 1937 – März 1944* (Cölbe-Schönstadt: Burgwald-Verlag).

Middlebrook, M. (2003), *The Nuremberg Raid: 30-31 March 1944* (Barnsley: Pen & Sword).

Nichol, J. (2013) The Red Line (London: Collins).

National Archives of Australia http://recordsearch.naa.gov.au/ (Accessed January 2015).

To link to this article: https://doi.org/10.1080/15740773.2017.1414423

NOTES ON CONTRIBUTORS

PIM ALDERS, is a Senior Lecturer and Course Director for Archaeology at Saxion University of Applied Sciences in Deventer, The Netherlands. His research focuses on conflict archaeology.

MICHAEL GOTTWALD, is an Archaeologist with hessenARCHÄOLOGIE and staff member of the Hessen International Summer Academy.

STEVEN HUBBARD, is an Archaeologist with hessenARCHÄOLOGIE and staff member of the Hessen International Summer Academy. His interests include WWII aviation archaeology.

MIRKO MANK, is an Independent Aviation Archaeologist who has researched and published accounts of WWII crash sites in Hessen. He has worked closely with hessenARCHÄOLOGIE over a number of years.

DR PHIL MARTER, is a Senior Lecturer in Archaeology at the University of Winchester. His research focuses on the archaeology of conflict and in particular the remains of the European Air War during WWII.

DR UDO RECKER, is the Federal State Archaeologist of Hesse. He is founder of the International Summer Academy and works to promote the international protection and understanding of wartime remains.

CHRISTOPH RÖDER, is an Archaeologist with hessenARCHÄOLOGIE and Kommission für Archäologische Landesforschung in Hessen, Germany. Christoph is Director of the Hessen International Summer Academy. His interests include WWII archaeology.

RONALD VISSER, is a Lecturer in Archaeology at Saxion University of Applied Sciences in Deventer, The Netherlands. He is interested in digital applications in Archaeology.

To link to this article: https://doi.org/10.1080/15740773.2017.1414423