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A study of the issues surrounding the understanding of historic military artefacts as primary source documents with particular emphasis on the sword

1. Introduction

This work is the synthesis of a series of articles published over a twelve year period, which focus on the ways in which a military artefact, usually a sword, informs a more comprehensive understanding of the artefact and its owner. The significance of the sword throughout history as a 'document' in its own right, has largely been ignored or overlooked. The recognition of weapons as primary source documents adds a further dimension in deepening the understanding of social and cultural history and ultimately creates important new knowledge.

The aim of this work is to demonstrate their significance as unique objects, affirm the importance a multi-disciplinary approach, and more recently establish the critical importance of engagement with science and technology to gain a full understanding of the artefact under review.

This commentary will reveal significant discoveries in two connected areas. The first is that as a result of utilising a sword as a primary source document, an individual has been identified of enormous significance in the history of the Napoleonic Wars and until now has been unknown. Major Robert Harvey's role in the Peninsula War and as a close confidante of the Duke of Wellington has revealed sufficient new insights to create approaches from historical documentary producers.

The second area leads from this in the more detailed metrological and scientific analysis of swords and other military artefacts. As a result a new methodology is proposed that will great a new baseline standard for how the identification and evaluation of high value artefacts is approached by commercial auction houses and private collectors.

The core premise upon which military artefacts have been ignored as documentary evidence is based on two distinct but closely related misconceptions. The first is that artefacts in the arms and armour genre are regarded exclusively as weapons, tools to do a particular job, which, while adding contextual information to an historical

event, have little relevance in terms of being *the event* themselves. In other words, their value is solely to inform wider contextual understanding, rather than providing a unique source in their own right. The second issue leads from the first and relates to what might be described as the dialogue between the sword and its owner. It represents a failure to appreciate weapons in the context of providing detailed source information in their own right, and then, developing this to enable a more comprehensive understanding of their individual significance to individuals who were associated with them.¹

Not only do swords provide significant information through the manufacturing process, style, technological advances and textual information from their inscriptions, they also provide a broader understanding of the more personal nature of the relationship between a sword and the man using it. The most profound example is the sword of Major Robert Harvey not only providing a source of undiscovered information about him, but also thirty-two members of the Portuguese resistance in 1810 and the strategic thinking of the Duke of Wellington and his commanders.² Within the past few weeks, more material has been discovered in Lisbon comprising letters and maps further illustrating a previously unknown dimension of the war in Portugal and Spain between 1809 and 1814.³ At the time of the original publication of the sword, the opportunity for non-destructive analytical techniques to examine the signatures and manufacturing techniques could have provided crucial additional data.

Historically the sword held a unique place not generally associated with other weapons. One reason for this is because most other weapons have multiple uses.

¹ This approach is by no means unique, but has never previously been applied to this genre. There is a long history of utilising apparently limited sources to inform a wider debate without recognising the intrinsic value of the source material. For a similar example of a completely different subject see: M.W.Beresford, 'Prometheus Insured: The Sun Fire Agency in Leeds During Urbanisation 1716-1826', *The Economic History Review Second Series XXXV* No.3 August 1982.

² P.T. Wilcock, 'Testimonial Sword Presented to Major Robert Harvey 1810', *Royal Armouries Yearbook 7*, 2003, pp.102-105 and P.T.Wilcock, 'The Search for Major Harvey', *Wellington Congress*, University of Southampton, 2010.

³ Preparations are now underway as a result of the original research along with these new findings for a ninety minute television documentary on Harvey.

Axes can also be used to chop wood; spears for hunting, knives for eating. The sword however seems to have assumed a position of an enhanced status, almost a 'personality' that warrants special mention. In a brawl which took place in Leeds in 1320 the court heard a detailed account of the brutal encounter in which a weapon described as a 'Sword de Cologne' receives particular mention.⁴To warrant this attention the sword must have been sufficiently out of the ordinary and notable enough to not only be mentioned, but to identify its source. Even as early as the 14th century this area of Germany was renowned for high quality blades.

This synthesis is important because it draws together a series of pieces of research which begin to build a new understanding of the essence of the sword as a source document, which, this paper will contend, has been generally overlooked. The primary focus is the sword, however, the principle is not exclusive to this weapon and to illustrate the point articles relating to other military historic artefacts have been included in the portfolio because they too, carry a unique significance for their owners. More importantly they illustrate that the principle under examination is actually transferrable.

Perhaps one of the reasons for the relegated prominence of arms is that weapons by definition have a primary purpose of doing harm, and as social conventions around non-violent resolutions develop there is a subliminal desire to see them relegated to a position of functionality, almost embarrassment in a way which does not apply to most documentary sources. This may be one of the reasons that many of the finest collections such as the armoury of the Duke of Buccleuch and the Brunon Collection in France remained behind closed doors for so long.

Finally, after many of these articles have been published, a new dimension can now be applied which is highly unconventional in historical research but which reveals a new understanding of the objects and their context and promotes interdisciplinary academic engagement. The application of techniques such as x-ray fluorescence, computer tomographic scanning and high definition surface metrology have the ability to reveal a level of understanding which cannot be achieved by documentary analysis alone. As a result of these emerging technologies new knowledge is being

⁴ E.K. Clark, 'A Brawl in Kirkgate', 13 Edw. II., *Thoresby Society*, 4, 1895.

created through for example, microscopic analysis of surface finishes and inscriptions along with detailed analysis of decorative materials which in turn adds to the corpus of understanding in this area of research.

2. The need for a further dimension

In evaluating the sword as a source document, this commentary on the portfolio of articles contends that a number of opportunities have been missed to understand both the weapons and their owners in greater depth. These include the ability to create new knowledge and understanding, first of the artefacts themselves and then to allow these discoveries to inform a deeper understanding of other artefacts. It is the contention of the author that this has been achieved in the portfolio written over the past twelve years, creating both new insights and a broader spectrum of dissemination. The idea of objects having a particular meaning is not new. This is explored by Susan Pearce in her highly regarded work, 'Interpreting Objects and Collections'⁵ in which the compendium of essays explores the philosophical and historical context of object interpretation but notably without reference to a sword or indeed other weapon in any of the contributions. Weapons have continued to be overlooked despite the opportunity for a rich seam of new information to be discovered.⁶

The first missed opportunity is that a failure to recognise the place and significance of weapons, (and in the accompanying portfolio particularly swords) has allowed prospective research avenues to be overlooked. By bringing collections to a wider audience there is a process of demythologising them. Part of the reason for this is that weapons have suffered from the rise of political correctness with some museums withdrawing them from exhibition and as a result become consigned to an academically 'darkened room'. In so doing only the most prominent have been published and then in journals with an elite readership, often by private subscription.⁷ What has been missed is the importance not only of the high status and magnificent

⁵ S.M.Pearce 'Objects as Meaning or Narrating the Past' in *Interpreting Objects and Collections*, S.M.Pearce (ed.), London, 1994, pp.19-29.

⁶ For further discussion of the theory behind interpreting objects, collections and their interface with museums, S.Macdonald, *A Companion to Museum Studies*, Oxford, 2006; P.Mauries, *Cabinets of Curiosities*, London, 2002; G.Black, *The Engaging Museum: Developing Museums for Visitor Involvement*, Oxford, 2005 and G.Black, *Transforming Museums in the 21st Century*, London, 2012.

⁷ The excellent article by Blair & Delamer on Dublin Civic Swords was presented in the Proceedings of the Royal Irish Academy in 1988, which is an exclusive organisation. Journals such as the Arms and Armour Society Journal are available only to an elected membership and tend to be somewhat elitist.

pieces but of others, apparently less significant that have important contributions to developing knowledge. The demonization of weapons has in many cases, caused them to be withdrawn from public view, but in so doing has concealed them from a wider audience and hence created an unhealthy mystique which ultimately led to them to be considered unsafe.⁸

Broader engagement not only enables the exploration of the artefacts themselves but allows them to inform the wider context of their use. The social and cultural place of the sword is easily illustrated. Weapons have fulfilled roles from being purely functional items through to their use as part of the coronation of the British Monarch. In the coronation no fewer than five swords are involved in the ceremony, each symbolising a different aspect of the monarch's power from the Great Sword of State to the Sword of Mercy.⁹ Swords have been carried for personal protection such as the encounter referred to earlier in Kirkgate, Leeds in 1320 until the advent of firearms which could be more easily concealed. Some were worn purely for the purpose of fashion; some as badges of office such as Black Rod, and those like the sword intended for presentation to Admiral Lord Collingwood which was created to signify the gratitude of the nation for outstanding military achievements.¹⁰

Secondly, the value of the publication of these artefacts can create further impact by accessing hitherto private collections as a primary source for scholars. The publication of the Buccleuch armoury has made a significant contribution to new knowledge which would otherwise have remained undiscovered.

As a result of the publication of the article detailing the first sword owned by Napoleon Bonaparte¹¹ and an article in the same year relating to a snuff box

⁸ A more successful approach to this issue was achieved by the Royal Armouries with their NTK – 'No To Knives' campaign in 2009 which was accompanied both by testimonials from those who had used them criminally, those who had suffered from their use but also gallery displays and lectures about their historical and social context.

⁹ These swords are on display in H.M. Tower of London as part of the exhibition of the Crown Jewels.

¹⁰ P.T. Wilcock, 'The Finest Sword a Man Never Received - The Presentation Sword of Admiral Cuthbert Collingwood', *Journal of the 84th London Antique Arms Fair*, 2010, pp.11-17.

¹¹ P.T. Wilcock, 'Napoleon's First Sword?', *Arms and Armour* 5 (2), 2008, pp.194-201.

presented by Napoleon to Marshal Ney,¹² the author was contacted and invited to visit a private stately home to examine a collection of swords owned by the Ponsonby family. The owner had read the articles and considered them to be sufficiently rigorous and sympathetic to their collection of swords to invite further research.

The Ponsonby family are significant historical figures. Sir William Ponsonby led the ill-fated charge of the Union Brigade with the 'Scots Greys' at Waterloo where he was killed. His nephew Colonel Frederick Cavendish Ponsonby was also severely wounded at Waterloo leading the 16th Light Dragoons and their successor Henry Ponsonby became Private Secretary to Queen Victoria. Until this relationship was established, access had never before been permitted to the significant family archive and of particular interest access to the swords carried by Frederick Ponsonby during the Peninsula Campaign and at Waterloo. One of these (Appendix image 1), is unique and was designed to his personal specification. This material has never been in the public domain and an examination of Ponsonby's 'fighting' sword reflects significantly upon his thinking in terms of swordsmanship and how best he could engage the enemy as well as a new insight in Britain at the time into sword design. The link between this sword design and the Ottoman yataghan blade has never before been conclusively established.

The presentation of the paper at the Wellington Congress in 2010¹³ led to a meeting between the author, the curator of the Wellington Collection at Apsley House and the Marquis of Douro (now the 9th Duke of Wellington). The paper on Major Harvey was a development of an earlier publication¹⁴ identifying him as a close confidante of Wellington. The result has been that the University of Huddersfield's Arms and Armour Research Institute and the author have been responsible for the displays of weapons at Wellington Arch for the 200th Anniversary of the Battle of Waterloo, with the author invited to give a guest lecture at Apsley House, the London home of the

¹² P.T.Wilcock, 'Marshal Ney's Snuff Box', *Yorkshire Regiment Journal* (3), 2008, pp.113-115.

¹³ P.T.Wilcock, 'The Search for Major Harvey', *Wellington Congress*, University of Southampton, 2010.

¹⁴ P.T.Wilcock, 'Testimonial Sword Presented to Major Robert Harvey 1810', *Royal Armouries Yearbook* 7, 2003, pp.102-105.

Duke of Wellington. As a result of this the author has been commissioned to assess and publish the private collection of swords owned by the 1st Duke of Wellington which are still retained by the family. These have never been on public display and the family are keen not only to develop a more comprehensive understanding of the swords but also to utilise whatever non-destructive technologies are available in increasing their understanding of the blades.

The publication of these articles, and the new knowledge uncovered as a result, creates further research opportunities, particularly the investigation, analysis and publication of the material in the collections that are newly accessed. In the examples illustrated there is material of local, national and international significance not only to historians but also to those working in the field of manufacturing technology. As well as the publication of significant individual artefacts there is an opportunity to explore the theme of the collections to bring a new perspective to the understanding of their owners. One of the most remarkable opportunities was provided with an invitation to publish the armoury of the Duke of Buccleuch and Queensberry.¹⁵ John, 2nd Duke of Montagu for example was appointed Master General of Ordnance from 1740-1742. He was then removed from office for several months under allegation of corruption. By later 1742 he had resumed his post which he held until his death in 1749. As a result of archival research based on the publication of the armoury of the Duke of Buccleuch and Queensberry, there were a number of swords located there which were clearly marked to the Tower.¹⁶ Alongside this discovery, the archives yielded a series of inventories belonging to the Tower of London and dated immediately prior to his removal from office. Montagu, knowing that there were anomalies, appears to have transferred the ledgers to Boughton House so his misdemeanours could not be conclusively proven.

¹⁵ P.T.Wilcock, 'The Armoury of His Grace the Duke of Buccleuch and Queensberry', *Arms and Armour* 9 (2), 2012, pp. 181-205. The 2nd Duke had a long standing relationship with Barbar who was responsible for the original layout of the armoury in 1718. After his death his sons continued to supply the Duke, evidenced by numerous archival records and the fact that the armoury holds over sixty examples of Barbar's work. This is the largest single collection known by this outstanding gun maker.

¹⁶ Of many examples one of the most obvious is a falchion marked 'Made in Hounsloe for the Tower'.

The fact he was under suspicion is well documented, however the presence of the ledgers at Boughton reveal a new level of deception. This was only revealed through the discovery and examination of swords in the armoury marked to the Tower of London. His return to office in 1742 may indicate his deception was a success.

There is however a third dimension which has so far been almost entirely overlooked. This research must now move into a new phase and away from a purely historical context. Non-destructive scientific techniques are now proving to be a crucial avenue in developing an understanding of some of the artefacts in the portfolio. The analysis of inscriptions on swords and when they were applied can only be undertaken scientifically and provides an added element to the life history of the weapon. The discovery of whether the inscription was contemporary with manufacture or applied later adds a further level of understanding of the artefact and its historical journey. It may for example reveal an attempt at later attribution proposing an historical engagement that never existed.¹⁷ The application of new technologies in tandem with historical analysis creates both a new perspective and exciting new knowledge. Continued access to many of the artefacts which were the subject of the articles will enable valuable new insights to be revealed through the application of analytical techniques.

The treatment of a sword as a primary source document in its own right provides a wealth of information which if the artefact is regarded as merely peripheral is missed. However, the application of scientific analysis to artefacts to provide a further dimension of research can no longer be regarded as an occasional optional extra but should be a dimension to be considered in any research into historic weapons.

¹⁷ This has been seen this year, the 200th anniversary of Waterloo, on several swords with later attributions in an attempt to identify their presence at the Battle of Waterloo and thus enhance their financial value.

3. Literature review

It is the contention of the author that part of the rationale behind this research is that there is a paucity of literature taking a multi-disciplinary approach to the study of edged weapons and swords in particular. The literature tends to be either one dimensional in that it deals in an entirely descriptive manner with the piece or two dimensional, in that there is additional contextual information relating to its historical context or owner. Only in the rarest circumstances does a third dimension of scientific analysis appear.

In this commentary the focus is on the principal works on edged weapons dealt with chronologically. While there are numerous secondary sources, many of which are referred to in the portfolio, many are designed for the popular market and add little new material to the corpus of knowledge. Even articles regarded as being at the forefront of the genre due to the diligence of research and exhaustive nature of the detailed examination of the artefacts such as Blair's 'Dublin Civic Swords'¹⁸ still examines the swords from an elitist perspective aimed at a highly specialised readership rather than attempting to apply a broader and more inclusive approach. In some cases publication, particularly in journals not subject to review, is used more to establish provenance than a genuine attempt to understand the history of the artefact.¹⁹

In researching the background to any particular weapon there are several sources: These include manufacturer's records,²⁰ auction and sales catalogues,²¹ journal articles,²² and state and government records.²³ Literature relating specifically to

¹⁸ C.Blair & I.Delamer, *Dublin Civic Swords*, *Proceedings of the Royal Irish Academy*, 1988.

¹⁹ Baron Earlshall, 'The Basket Hilted Swords of Lieutenant General Echlin', *Man at Arms* November/December, 1991.

²⁰ These include Wilkinson; Klingenthal; Solingen sources; a series of smaller manufacturers.

²¹ Auction catalogues from major auction houses such as Sothebys, Christies, Bonhams, Wallis and Wallis, Holt's in the UK along with Maigret, Czerny, Drouot, Cowans and others in Europe and the USA.

²² The main journals in use for this type of research include *The Journal for the Study of Army Historical Research* and the *Journal of the Arms and Armour Society* in the UK and *The Bulletin of the American Society of Arms Collectors* and *The Canadian Journal of Arms Collecting* in America though neither of these remain in production.

swords again falls into distinct categories which to a degree mirror those above. Prior to this, reliance was placed upon depictions in art, tapestries, and even coins.²⁴

One of the most frequently occurring images of swords from the Middle Ages are those appearing on the tombs of knights. William Marshall (1147-1219) whose exploits have recently been documented in Thomas Asbridge's book *The Greatest Knight*²⁵ is depicted carrying his sword both on his tomb in the Templar Church in London and on a rarely seen statue, based on the tomb image in the House of Lords placed there in the 19th century. The practice of displaying knightly swords with helms in churches has now almost completely ceased but the art of the stone mason still allows many swords to be recognised from tombs in churches.²⁶

Chronologically, the earliest references appear in 'fight books' such as Angelo's Fechtbuch and Talhoffer's Fechtbuch²⁷, and the unique I.33²⁸ held by the Royal Armouries which is believed to be the earliest example of its type. Later examples such as the 1389 manual by Johannes Liechtenauer²⁹ develop the techniques of the teaching of one of the earliest fight masters. Paulus Hector Mair in 1542 provides one of the most comprehensive compendia of fighting techniques based upon his experience both as a fencer and a collector of fight manuals.³⁰ It is not until the 17th century that English accounts are produced, in this case by William Cavendish,

²³ These include The London Gazette, records in the National Archives, British Library and Regimental Archives. Since the early 19th century, lists of changes in patterns have provided further information.

²⁴ There are examples from the early Roman period of *Justicia* carrying a sword depicted on coins through to examples from Viking Northumbria to modern depictions.

²⁵ T. Asbridge, *The Greatest Knight*, London, 2015.

²⁶ For a more specific analysis see: J.Martindale 'The Sword on the Stone some resonances of a medieval symbol of power (the tomb of King John in Worcester Cathedral)', *Anglo Norman Studies XV, Proceedings of the XV Battle Conference*, p.199-241, Woodbridge, 1992.

²⁷ Talhoffer's Fechtbuch published in 1467 is essentially a guide to fighting techniques and styles.

²⁸ I.33 more often known as the Tower Manuscript is regarded as the earliest Fechtbuch believed to date from c. 1275 and currently located in Leeds.

²⁹ J.Liechtenauer (Hanko Döbringer) Cod. HS. 3227a Germanisches Nationalmuseum Nürnberg, 1389.

³⁰ Paulus Hector Mair, 'Brief Instructions Upon My Paradoxes of Defence', Mscr.Dresd.C93/94 Sächsische Landesbibliothek 1542.

Marquis of Newcastle, in two separate volumes. Both however follow a very narrow and specific theme.³¹

These fight manuals tend to focus on techniques rather than the weapons themselves though Mair makes reference to a range of swords he has utilised.

Another group of books are typological reference works relating to weapons which only began to emerge in Europe during the late Victorian era in response to the requirements of antiquarians who had begun to assemble collections of arms and armour. In some cases these have led to museum exhibits such as the Wallace Collection and the Brunon collection in Aix-en-Provence.

The value of these references is significant but has essentially focussed upon the typological and stylistic identification of edged weapons. In France Christian Aries³² developed a series of portfolios between 1965 and 1990 which set out to identify every pattern of French sword including those carried by officers, despite the practice of officers having a high degree of freedom in the choice and style of their own weapons. Similarly Gerd Maier³³ compiled a series of illustrated volumes detailing the swords of the German states. Both of these were of enormous value however there were two significant issues.

The first was that they were almost entirely descriptive, which while of great value in identifying patterns of sword provided only very limited contextual information.

The second issue was that many authors regarded their works as definitive and as result these became universally accepted as being the primary reference sources, with anything falling outside their scope being regarded as unauthorised or even a forgery. The flaw in their argument seems obvious today where digital media allows for greater access to images in collections worldwide. An added consequence of this has been the assumption by subsequent authors that these works are in fact definitive. As a result the otherwise excellent three volume work on French swords

³¹ W.Cavendish, Marquis of Newcastle, 'Mathematical Demonstration of the Sworde' Harley MS 5129 and 'Truthe off the Sorde' 1676, Harley MS 4206, British Library.

³² C.Aries, *Armes Blanches Militaires Francaise*, Nantes, 1966-1990.

³³ G.Maier, *Suddeutsche Blankwaffen 3 (Bayern)*, Oberhofen, 1968.

by Michel Petard³⁴ in some instances still repeats errors originating in Aries. The issue of perpetuating established inaccuracies or errors is not a new phenomenon; however when these cause artefacts failing to appear in the original portfolio, to be regarded as having doubtful provenance, an extreme disservice is being done to developing academic research with potential new and unique material being dismissed. Much of this originates from the propensity to create typologies where none really exists, a key originator of which was the archaeologist Pitt Rivers part of whose collection still forms the basis of the Pitt Rivers Museum in Oxford.

There have been a number of volumes either covering weapons relating to a particular country, or in some cases attempting to catalogue weapons more broadly. One of the most regularly referenced is Eduard Wagner's magnum opus 'Cut and Thrust Weapons'.³⁵ This is arguably the first and still most comprehensive analysis of swords from the earliest existing known patterns and not only comprises typological references but some commentary of their use and deployment. Heribert Seitz's two volume work published in 1965 traces edged weapons from the earliest examples discovered until the 19th century and begins to provide not only a description but some analysis of their use.³⁶ In the latter category A.N.Kulinskiy³⁷ attempts, in one volume, to cover all European edged weapons, though despite being the only example in Russian, still has several significant omissions. One of the better catalogues of swords from a single national source is 'Danske Blankvaben'³⁸ by Nielsen, but once again restricts itself to profile images and a basic description of the sword and its component parts.

³⁴ M.Petard, *Des Sabres et Des Epees* (3 volumes) Editions du Cannonier, Nantes, 1999-2005.

³⁵ E.Wagner, *Cut and Thrust Weapons*, Spring, 1967.

³⁶ H.Seitz, *Geschichte und Typenentwicklung im europaischen Kulturbereich Von der prahistorischenZeit bis zum Ende des 16 Jahrhundert (Vol 1) and Vom 16. bis 19. Jahrhundert (vol.2)*, Wurtzburg, 1965.

³⁷ A.N.Kulinskiy, *European Edged and Staff Weapons*, St.Petersburg, 2003.

³⁸ K.S.Nielsen, *Danske Blankvaben* Forlaget, Sixtus, 1978.

There have been some valuable attempts at gaining a deeper understanding of the typology of swords. The best known are the works of Ewart Oakeshott.³⁹ He attempted to define and categorise medieval swords essentially based on their physical form and followed on from Jan Petersen's work in the early 20th century on Viking swords.⁴⁰ In this endeavour he categorised twenty three possible forms, creating a typology, however there remain many examples in collections and museums which would be regarded as 'near fit' rather than exact matches. These works are now over 20 years old and doubtless new technologies would have been a valuable tool in determining some of the types. More recently Cyril Mazansky has written a comprehensive work on the typology of Scottish basket hilted swords which provides a valuable contribution but is not exhaustive, and also risks a 'best fit' position when identifying hilts.⁴¹ The most recent addition to the corpus is an important book by Tobias Capwell⁴² which deals primarily with swords in the context of fencing and fashion in the 16th century.

In the UK the first comprehensive catalogue was a two volume edition by May and Annis 'Swords for Sea Service', containing both illustrations and details of manufacturers.⁴³ The accepted reference text on British pattern swords remains 'Swords of the British Army' by Brian Robson.⁴⁴ Robson not only deals with the patterns but provides some commentary on how the swords were utilised and the process of change leading to the different patterns being commissioned by the Board of Ordnance and latterly the War Department. In more recent years a valuable book, 'English London Silver Hilted Swords'⁴⁵ provided a comprehensive guide to the sword manufacturing community in London, with excellent biographical detail on

³⁹ E. Oakeshott, *Records of the Medieval Sword*, Woodbridge, 1991 and *The Sword in the Age of Chivalry*, London, 1964.

⁴⁰ J.Petersen, *De Norske Vikingsverd*, Oslo, 1919.

⁴¹ C.Mazansky, *British basket hilted swords a typology of basket-type sword hilts*, Leeds, 2005.

⁴² T.Capwell, *The noble art of the sword: fashion and fencing in renaissance Europe, 1520-1630*, London, 2012.

⁴³ W.E.May and P.G.W.Annis, *Swords for Sea Service* (2 volumes), HMSO London, 1970.

⁴⁴ B.Robson, *Swords of the British Army*, National Army Museum, London, 1996.

⁴⁵ L.Southwick, *London Silver Hilted Swords*, Royal Armouries, Leeds, 2001.

many leading sword cutlers but by focussing on the biographical material, valuable as it is, no longer deals with any of the typological aspects of the swords themselves. A book which comes closest to a multi-disciplinary approach is a privately published study of British cavalry swords by Richard Dellar, giving not only details of specific swords, mainly from his own collection, but a good deal of contextual information.⁴⁶

The records of the Wilkinson Sword Company have now become more widely available, and along with records of the numbers of blades relating to year of manufacture, Robert Wilkinson-Latham has published facsimile copies in three volumes, from the company records, of the designs of etching on blades. Because these volumes contain copies of some of the original drawings and designs there is a degree of insight into the rationale behind the design and manufacturing process but it remains limited to one manufacturer.⁴⁷

There are significant numbers of books which principally focus on detailing markings on weapons. Perhaps one of the most comprehensive is Heer's 'Der Neue Stockel Journal-Verlag' first published in the late 1970's.⁴⁸ In France around the same time Pierre Jarlier published his excellent study of both sword cutlers and gun makers.⁴⁹ He collaborated with Jean Jacques Buigne in 2001 to produce 'Le Qui est Qui de L'Arme en France'⁵⁰ which provides a detailed biographical listing of manufacturers from 1350 to 1970. With over 22,000 references this creates a valuable reference resource but with an understandably narrow focus.

A more cohesive attempt to combine both the markings and patterns of sword within their historical context was provided in a volume by Jean Jacques Buigne and Jean L'Hoste. 'Armes Blanches; Symbolism; Incriptions; Marquages; Fourbisseurs et

⁴⁶ R.J.Dellar, *The British Cavalry Sword 1788 – 1912, Some New Perspectives*, Bath, 2013.

⁴⁷ R.Wilkinson-Latham, *Wilkinson Sword patterns and Blade Rubs 1844-1954*, West Sussex, 2008.

⁴⁸ E..Heer *Der Neue Stockel Journal-Verlag*, 1978.

⁴⁹ P.Jarlier, *Repertoire d'Arquebusiers et de Fourbisseurs Francaise*, St Julien de Sault, (3 volumes), 1976.

⁵⁰ J.J.Buigne, P.Jarlier, *Le Qui est Qui de l'arme en France*, Editions Portales, La Tour du Pain, 2001.

Manufactures'.⁵¹ This is still the most successful attempt yet to combine the study of patterns, styles and markings and after fifteen years continues to be regarded as the principal source for those requiring a more detailed contextual account of French sword manufacture from pre-revolutionary France onwards.

There have, in recent years, been more popular volumes produced, however they are almost completely devoid of primary sources and in some cases are little more than pictorial guides. These include the two works by Richard Bezdek⁵² and an increasing number of books by Harvey Withers.⁵³ Suspicions of the level of detail however may be raised by the fact that both Withers and Bezdek claim to provide completely comprehensive accounts in one volume from 1400 to the present day.

Research has also been undertaken on the metallurgy of swords, and though little has been published one of the leading researchers in the field is Dr Alan Williams, late of the Wallace Collection in London. Williams has undertaken detailed research, though not all of a non-destructive nature, and while in a highly focussed area of study has provided some valuable insights into the metallurgical structure of sword blades particularly those produced during the medieval period in Europe. Williams was one of the first scholars to take a scientific approach to the understanding of swords and particularly how the blades were forged and manufactured. His work is significant because it creates a foundation for the deployment of some more advanced techniques including 3D Neutron Tomography and high definition micro X-ray Fluorescence. One of the drawbacks for Williams has been lack of access to some of the more advanced techniques for surface analysis. This illustrates one of the challenges of working within the museum environment rather than the academic one and absolutely reinforces the need for collaborative research to ensure the most

⁵¹ J.L'Hoste and J.J.Buigne, *Armes Blanches; Symbolism; Inscriptions; Marquages; Fourbisseurs et Manufactures* La Tour du Pain, 1999.

⁵² R.H.Bezdek, *German Swords and Sword Makers 14th-20th Century*, Boulder Colorado, 2000 and *Swords and Sword makers of England and Scotland*, Boulder Colorado, 2003.

⁵³ H.Withers, *British Military Swords 1786-1912: The Regulation Patterns. An Illustrated Price Guide for Collectors*, Sutton Coldfield, 2003 and *World Swords 1400-1945: An Illustrated Price Guide for Collectors*, Sutton Coldfield, 2006.

advanced outputs can be achieved.⁵⁴ The exception to this rule has been achieved by the museum at Klingenthal, the home of French sword manufacturing. In 2005, the museum journal published an excellent article, the research for which had been conducted in association with the *Societe Messier-Bugatti a Molsheim*.⁵⁵ This collaboration with the French aeronautical group SAFRAN facilitated a detailed article examining the structure and grain of the metals used in blade manufacture during the 18th century as well as an analysis of the chemical composition of the metals at the time. This enabled a more comprehensive understanding of the internal structure of the steel and the contribution to the strength of the blades by virtue of the variation in crystal structure. Such collaboration with industry is replicated in the UK with the relationship between National Physical Laboratories and the Arms and Armour Research Institute at the University of Huddersfield. The opportunities for further developments and publications will be assessed in the final section of this commentary.

The final area of publication covering swords and their context is in academic journals. These tend to be created to meet the interests of special interest groups of military historians and those with an interest in collecting arms and armour. These have been the target publications for some of the articles in this portfolio. They provide an outlet for the dissemination of research in peer refereed journals and as such meet a demand. The principal but rather exclusive journal dealing with Japanese swords is *Nihon-To*. One of the most challenging issues for their editors is the limited circulation.⁵⁶ As a result of the fact that some of these journals fail to appear in citation indexes they tend not to attract some of the leading academics in the field. This, coupled with the fact that some are exclusive to the membership of special interest groups such as the Journal of the Arms and Armour Society, membership of which is by election, or the journals only being available by

⁵⁴ A.R.Williams, 'The sword and the crucible: a history of the metallurgy of European swords up to the 16th century', Leiden, 2012 and A.R. Williams, 'Methods of Manufacture of Swords in Medieval Europe: illustrated by the Metallography of some Examples', *Gladius*, 1977. 13: p. 75-101.

⁵⁵ M.Adolf, 'Autopsie d'une Lame de Cavalerie'. *Association pour la Sauvegarde du Klingenthal*, numero 7, 2005, pp.26-33.

⁵⁶ In most cases despite being of high quality and being peer reviewed, these journals which are not open access often have a subscription base of only a few hundred.

subscription, severely limits their accessibility in attracting a wider readership, a contribution to a broader educational perspective, and hence developing a higher profile for the genre.

As a result the articles in this portfolio are spread between journals which are special interest and publications which reach a wider audience but still within a defined interest group. Both the Yorkshire Regiment Journal and the prospectuses of the London International Arms Fair are more widely read and have solicited further research projects. A similar publication by the Park Lanes Arms Fair has also produced some valuable contributions; however it has tended to publish articles aimed at a highly specialised audience and usually focussing on high status artefacts.

An interesting anomaly is the appearance of articles on swords in some of the more high profile society magazines. These seem to begin to emerge around the end of the 19th century through onto the 20th century with articles appearing in both *Apollo* and *Connoisseur*.⁵⁷

The establishment of national museums, particularly in Europe, have also provided comprehensive sources of information if not strictly literature, and these have subsequently been supplemented by the dispersal of country house armouries such as the Littlecote armoury.⁵⁸ This level of dispersal makes armouries such as the Buccleuch example so unique. In this case the house has the advantage of not only having the weapons but also the archival material and in some cases paintings to support in depth analysis. The importance of the article featuring this armoury is underpinned by the fact that despite there being several references to it, it has never been formally catalogued.⁵⁹ Finally there are the national collections of Europe⁶⁰

⁵⁷ For two notable examples see: H.Akeroyd, 'Sword Collecting' *Connoisseur*, Vol. 52, No. 205, September 1918 p.30-32 and C.Milward, 'Further Notes on London and Hounslow Swordsmiths, *Apollo*, Vol. 35, April 1942 p.93-96.

⁵⁸ T.Richardson and G.Rimer, *Littlecote: The English Civil War Armoury*, Leeds, 2012.

⁵⁹ It is interesting that no attention has been given to this armoury in over 30 years since at the point it was last visited by the Master of the Royal Armouries A.V.B.Norman he describes it as rivalling in some aspects the collection of HM Queen at Windsor and the Royal Armouries (then at the Tower of London), itself.

which, though catalogued, provide very little interpretation of the collections other than occasional typology and in some cases contextual information relating to their use.

In conclusion, while there continues to be a range of literature providing detailed examples of swords and their manufacture, there is little which provides a deeper understanding of the character of the sword. Neither does it reflect its owner and how the choice of sword, its deployment and use along with its subsequent detailed study brings a more comprehensive synthesis of all its aspects and hence a deeper understanding of the artefact itself. Perhaps the most telling analysis comes from the library of the Royal Armouries in Leeds. This is considered to be one of the foremost collections of books and articles on swords. A survey of the 2,034 books, articles and pamphlets, held there, only a handful deal in detail with metallurgical analysis of swords and again, these focus entirely on that aspect of the weapon.⁶¹

This text illustrates that the literature alone cannot lead to the discovery of new knowledge and only by applying the multidisciplinary interface between the artefacts, analysis and the secondary sources can this further dimension be satisfactorily achieved.

⁶⁰ These are many and varied but among the more accessible are at Windsor, Royal Armouries, Vienna, Paris, Madrid, Berlin and Brussels.

⁶¹ One of the most recent of these is: R.Hill, A.R.Williams and C.M.Owens 'Preliminary results of medical computerised scanning (CT) of swords and other edged weapons', *Journal of the Arms and Armour Society*, Vol.21 No.4 (September 2014), p.141-155.

4. The theme or 'golden thread' of the portfolio

The portfolio of articles spans a period of twelve years and the choice of subjects has always been motivated by the desire to bring to light new and undiscovered material, adding to the corpus of knowledge in this field of study. This relates either to the artefact itself or in some cases its initial owner.

In each case the objective of the article has been the goal of revealing a new dimension to the understanding of the object and its relationship to those who owned or created it. The advent of emerging scientific analysis techniques has now provided a further dimension to the creation of new knowledge by using such techniques to uncover information that through conventional historical research could never be revealed.

The selection of artefacts published in this portfolio has also been driven by each holding some unique significance outside the material existence of the object itself. It may have been that a sword has taken part in an engagement of particular importance but more often it is that the weapon holds a significance which transcends the piece itself. The contention here is that it holds a numen⁶² which makes it unique in its own right and of a higher level of significance to those who either owned it or were charged with its use. This concept will be dealt with more fully in the section dealing with the essence and character of the sword but it may have its roots in some of the religious relics of the middle ages.

It is no surprise that some of the finest swords in the world remain shrouded in mystery. Their intrinsic material value or cultural importance has often caused owners to keep them from public gaze. It is therefore the role of the scholar in any discipline to address the task of bringing a piece and its significance to the attention of a wider audience. All of the subjects of the articles contained here relate to conflict and in every case the research has revealed new insights either on the artefact itself, or often those individuals who were intimately involved with it.

⁶² The concept of objects carrying some form of numen is explored in depth by Rudolf Otto in his seminal work, R. Otto (J.W. Harvey tr.) *The Idea of the Holy*, Oxford 1958. In this work Otto defines numen as "non-rational, non-sensory experience or feeling whose primary and immediate object is outside the self" deriving it from the Greek term *noumemon* meaning an unknowable reality.

The catalyst for this research, and arguably the most important discovery to date, was a sword located in 2000 bearing the name, *Roberto Joanni Harvey* and a date of 1810. The reverse was covered with details of what appeared to be the contributors to the sword and their locations. It is this sword which in many ways typifies the theme of the portfolio. Major Robert Harvey was a relatively unknown officer with the 53rd Foot who subsequently entered the Portuguese service.

Robert Harvey has no entry in the Oxford Dictionary of National Biography, neither is there any reference to him in Charles Oman's seminal seven volume work on the Peninsula War. He fails to make an appearance in any of the leading biographical accounts of Wellington with only Gareth Glover including a brief reference to him from Bingham's diaries, which is limited to a disparaging comment regarding his promotion to Colonel in the Portuguese service.⁶³

Perhaps more remarkably, Professor Charles Esdaile, credited with being the foremost living historian of the Peninsula War makes no reference at all to Harvey, despite publishing 'The Peninsula War – A New History' in 2003 and 'Peninsula Eyewitnesses' in 2008. He is mentioned in *War of Wars* by Robert Harvey (a distant relative)⁶⁴ though utilising information based almost entirely on the author's first publication of the sword.

After some detailed investigation it was possible by 2003 to comprehensively identify Harvey and make a preliminary publication of the sword in the Royal Armouries Journal.⁶⁵ Harvey exemplifies the characteristics of some of the individuals who feature in these articles. Continuing research meant that by 2010 a far most comprehensive study of Harvey was presented to the International Wellington Congress at Southampton University.⁶⁶ By 2010 more details had emerged but particularly surrounding his intimate personal relationship as a confidante of the Duke of Wellington. It emerged that as a recipient of the Commander's Cross, a

⁶³ G.Glover, *Wellington's Lieutenant, Napoleon's Gaoler*, Barnsley, 2005, p.105.

⁶⁴ R.Harvey, *War of Wars*, London, 2006.

⁶⁵ P.T. Wilcock, 'Testimonial Sword Presented to Major Robert Harvey 1810', *Royal Armouries Yearbook 7*, 2003, pp.102-105.

⁶⁶ P.T.Wilcock, 'The Search for Major Harvey', *Wellington Congress*, University of Southampton, 2010.

Portuguese award, only Marshal Lord Beresford, General Lord Hill and Wellington himself had more campaign honours inscribed on the medal than Harvey. It had by then been discovered, that he had been the escort to Wellington's son at the Duke's funeral in 1852 and as such held a highly esteemed position in the Duke's entourage. One of only 24 busts at Wellington College represents Harvey, who was chosen from over one hundred possible candidates by Prince Albert after Wellington's death.

Further research is continuing on the list of names on the blade. Though most were correctly assumed to be leaders in the Portuguese *Ordeneza* (Portuguese guerrilla resistance forces) with one exception, Jose Ribiera identified from the diary of General D'Urban,⁶⁷ none of the other names have been identified until earlier this year. A visit to the locations listed on the obverse of the blade, along with detailed work with the National Library in Lisbon, has revealed all but one of the contributors. The corollary is that a book is now being prepared for publication detailing the life and career of Harvey including his hitherto undocumented exploits with the Portuguese guerrilla forces against the French. The key to this was entirely dependent upon the 'document' on the blade. Harvey's anonymity had been critical to Wellington and Beresford as he had acted as their spy in the region and was referred to in correspondence between the men simply as 'our friend'. Without the sword and the information on the blade, Harvey would remain an obscure Napoleonic officer. The result of the discovery means he may soon be regarded as one of Wellington's most significant confidantes and perhaps one of Britain's bravest unsung heroes.

As part of the publication of the book, His Grace the Duke of Wellington has suggested that the launch should be at Apsley House, the London home of the Dukes of Wellington where Harvey's sword, medals (now reunited as a group) and letters will be displayed as part of a special exhibition.

⁶⁷ B.D'Urban, *The Peninsula Journal of Major General Benjamin D'Urban 1808-1817*, B.J.Rousseau (ed.) London, 1930.

Two apparently very different French swords further contribute to the theme of documentary sources on an artefact which in both cases had been overlooked, misunderstood or mistakenly ignored.

In 2008 the author noticed a plain sword in a case in the War Gallery at the Royal Armouries in Leeds.⁶⁸ On further enquiry it was identified as a sword which had belonged to Napoleon; however the file notes relating to it were sparse. The inscription identifies the sword as a gift from a friend in his early life at military academy, Alexander Desmazis. It transpired that the Desmazis brothers, Alexander and Gabriel were both at the *Ecole Militaire* with Bonaparte and subsequent research indicated a strong possibility that if this was not his first sword, it was certainly one of his earliest. The argument for it being his first is supported by the correlation of the date of the inscription and the date of Napoleon's passing out parade. This material had previously gone substantially unresearched if not unnoticed, despite the intimate inscription describing them as friends.

The essence or numinous of such artefacts is reflected in an encounter with an American collector and Napoleonic enthusiast during a seminar given by the author at the Royal Armouries.⁶⁹ During the final session the visitor asked if he might be allowed to handle the sword. On agreeing he cradled the sword in his hands and was moved to tears simply by virtue of who the owner had been. There is doubtless a degree of personality cult attached but the effect was undeniable. It is interesting to note that a sword originally made for Napoleon and subsequently owned and carried by Wellington was sold in 2005 by Christies for £60,000.⁷⁰ The sword carried by Napoleon at the Battle of Marengo sold at Osenat's Auction House in Paris in 2007 for £3.26 million.⁷¹ It remains the most expensive sword ever sold at auction perhaps reflecting the continued iconic status of its owner.

⁶⁸ Royal Armouries IX.908.

⁶⁹ *Weapons of the Napoleonic Wars: Hands on History Seminar*, Royal Armouries, Leeds, October 2007.

⁷⁰ Christie Manson and Woods, South Kensington Sale 7109, Lot 164.

⁷¹ Osenat Auctions, Fontainebleau, Paris 10th June 2007.

The previous year the author was invited to become a trustee of the Prince of Wales Regiment of Yorkshire Museum. During a tour of the museum, the curator, (a retired army officer), pointed out a highly decorated sword. It was catalogued as a musician's sword and had come into the collection as a result of a bequest from a late officer. The value listed in the accession book was £50. An initial examination of the sword indicated first that it was high status and therefore unlikely to belong to a rank and file musician. The signature beneath the cross guard was identified as that of Nicolas Noel Boutet at Versailles. Boutet was one of a select group of Napoleon Bonaparte's personal armourers and had an unparalleled reputation for designing and creating iconic weapons, often given to his favourite generals as presentation pieces.⁷² (Appendix image 2)

Further research uncovered the fact that the sword had been looted at Waterloo by a Royal Artillery officer, Lieutenant Edward Trevor, whose son subsequently joined the 14th Foot, one of the antecedent regiments of the Prince of Wales Own Regiment of Yorkshire, and by descent the sword had found its way into the museum. It is a pattern of sword of which only a small number were produced, the museum at Klingenthal believes less than twenty. By a process of elimination, and the identification of where Lieutenant Trevor was deployed on the battlefield, it has now been established that the most likely owner was Marshal Kellerman, one of Napoleon's most famous commanders.

This research utilised the identification of images on the sword; the inscriptions on the blade; the signature on the hilt and the contextual information behind its discovery to draw to prominence one of the most significant 'Waterloo' artefacts to appear for the 200th anniversary of the battle.

Both of these swords illustrate the theme of creating a comprehensive understanding of the weapon by the application of research which then is able to tie it in to specific historic characters and to documented historical events.

⁷² P.T.Wilcock, 'The Spoils of War: The Enigmatic ANVI Glaive de General', *88th London International Antique Arms Fair*, 2012, pp.11-15. Permission was sought to reproduce part of the article in a French journal, P.T.Wilcock, 'Le York Army Museum' *Soldats Napoleoniens*, Octobre 2013, pp. 80-83

The theme continues with two articles published in 2010, both concerning swords presented to British naval officers. While the swords are very similar style and quality, the careers of the officers could not be more diverse. One sword was presented to an officer who by any standards could be considered a rogue, Lieutenant Home Riggs Popham,⁷³ the other to a man who, after Nelson, might be regarded as one of the most famous naval officers in British history, Admiral Lord Collingwood.⁷⁴

In both cases they were the recipients of two of the finest swords ever presented in Britain, one in respect of the charting of the highly treacherous coast of *Caffraria*⁷⁵ by Popham and one to the man responsible alongside Nelson for the success of the British fleet at the Battle of Trafalgar. The power of the narrative in both cases is not just the sword but the legend of the man surrounding it. It was also important to ensure that within the account there was a high level of detail of how the swords were produced and by whom. A secondary aspect of this research is to provide as wide a contextual perspective as possible, while retaining sufficient interest for both the general and specialist reader to ensure that the narrative helps to inform and educate as wide an audience as possible.

Perhaps the most remarkable challenge, due to its sheer complexity and being previously substantially unresearched, was the publication of the armoury of the Duke of Buccleuch and Queensberry.⁷⁶ Here was an armoury which as a result of a decision made by the late 9th Duke had received almost no attention from researchers and yet it had been described by A.V.B. Norman thus:

“by far the most important and historic family gun room to survive in the British Isles....the series of family swords from the 16th century onwards is

⁷³ P.T.Wilcock, 'Risk and Reward: The Life and Presentation Sword of Lieutenant Home Riggs Popham', *Arms and Armour* 7 (2), Royal Armouries, Leeds, 2010, pp.142-154.

⁷⁴ P.T.Wilcock, 'The Finest Sword a Man Never Received' *84th London International Antique Arms Fair* 2010, pp.11-17.

⁷⁵ Caffraria was the name given to territory in the eastern part of South Africa, between Cape Colony and Natal. It was notorious for its difficult coastline and for ships becoming wrecked there.

⁷⁶ P.T.Wilcock, 'The Armoury of His Grace the Duke of Buccleuch and Queensberry', *Arms and Armour* 9 (2), 2012, pp.181-205.

*unparalleled anywhere in the world...the armoury at Boughton far surpasses the collection in the [Royal] Armouries both in quality and condition*⁷⁷

Norman was not overstating the case. The armoury tells the complete history of the Montagu-Douglas-Scott family and because it has been preserved in such wonderful condition provides an unparalleled 'control group' for the evaluation and examination of other weapons outside of the collection. The invitation from the current Duke to publish the armoury provided a unique opportunity for an approach involving not only historians but scientists and engineers. As well as the collection itself, the main strength is that much of it is supported by archival material since the archives too have all been preserved. What remains a mystery is, given Norman's observations and indeed elsewhere in his letter comparing the collection to HM the Queen's at Windsor, the Royal Armouries made no further effort to work with the Duke to publish any of the pieces until Tessa Murdoch's book on the house at Boughton in 1992.⁷⁸ Perhaps however the most valuable aspect of the armoury is its existence as a time capsule encompassing so many aspects of the lives of its custodians over the centuries.

This article was in many ways the catalyst to the argument for a holistic approach to the study of swords and military artefacts, not least due to the willingness of the owner to subject items to non-destructive analysis. The social political and economic history of one of England's greatest families could be assessed at one end of the spectrum including unique items such as the only two intact surviving Puckle Guns⁷⁹ to the most intimate and personal items such the sword and clothing worn by James Scott, 1st Duke of Monmouth, before his execution in 1685. The particular historic strength of the Puckle Guns is that there is comprehensive documentation relating to their deployment on the expedition to St. Lucia and St. Vincent in 1722 after the 2nd Duke was appointed governor.

⁷⁷ From a letter to His Grace John, Duke of Buccleuch and Queensberry from A.V.B.Norman, Master of the Royal Armouries, 28th October 1987.

⁷⁸ T. Murdoch, *Boughton House, The English Versailles*, London, 1992.

⁷⁹ The Puckle Gun is a cylinder fed flintlock repeating gun often described as the first machine gun. Only four were made and the only two surviving intact are owned by the Duke of Buccleuch.

The attraction of swords and their place in society has been brought into clearer focus in 2015 with the 200th anniversary of the Battle of Waterloo. This is represented by the final two articles. 'Birmingham Swords at Waterloo'⁸⁰ was specifically commissioned by 'West Midlands History' with the intention of providing a social history context to the production of edged weapons in Birmingham and their ultimate deployment to the troops at Waterloo. It was possible to maintain the theme by being able to identify and illustrate swords which, having been manufactured in Birmingham, found their way to the battlefield. The most remarkable is a 1796 Light cavalry sabre manufactured by Josiah Reddell and Thomas Bate in Birmingham around 1808.⁸¹ The sword carries the Tower acceptance stamp and hence must have been accessioned into the Tower armoury at some point. The unusual anomaly however is that the sword has a repair to the scabbard and regimental markings which identify it as being a sword issued to the 8th Silesian Landwehr Hussars. Careful research has uncovered the fact that a batch of these swords was despatched from the Tower, to arrive in Coblenz in 1813 to re-equip the Prussian forces after the destruction of the steel mills during Napoleon's fateful retreat the previous year. The regiment was deployed as part of the Prussian forces during the '100 Days' campaign in 1815.

The author's discovery of the sword, and the analysis of its inscriptions that had been dismissed by a museum as later additions, revealed a unique sword with an historical provenance previously unknown. This as a result creates new knowledge regarding both the deployment of these weapons and, due to the successful identification of the markings, confirmation of this sword's part in the '100 Days' campaign. (Appendix image 3)

A significant point of note is that this is not a high status sword but one which is of basic munition quality. Yet, like the more high status examples it reveals crucial new and undiscovered historical information.

⁸⁰ P.T.Wilcock, 'Birmingham Swords at Waterloo', *Fortunes of War Waterloo Special edition*, West Midlands History, Birmingham, 2015, pp.29-31.

⁸¹ This sword is currently on loan and on display in the Wellington Arch London as part of the 'Waterloo 200' commemoration sponsored by English Heritage.

The final article in the portfolio dealing specifically with swords returns to a previously explored theme, the French cavalry sabre.⁸² This is an example of how the advances in research over only a few years are able to change the scope and extent of publications. The nature and type of swords recovered from the battlefield at Waterloo was explored in the second article in this portfolio, 'From the Field of Waterloo'⁸³ which concentrated on the methodology for dating French swords purportedly recovered from the battlefield at Waterloo. This revolved around various stylistic and design factors as well as the identification of the *poincons* or proof marks to be found on both the blades and the scabbards. At the time there was no access to the refined techniques of surface metrology now available. The conclusions were that most were in fact not recovered from Waterloo but saw subsequent service in the French army before being sold off and finding their way onto the collectors market. The 2015 article takes a far more holistic view and demonstrates the genesis of this type of research. Not only does this article discuss the swords themselves but focuses much more comprehensively on the manufacturing process, some of the individuals involved and the developing technological processes that were applied.

More importantly a further dimension can now be added. For the first time data from analysis conducted in the laboratories at the University of Huddersfield and by colleagues at National Physical Laboratories are able to provide new insights using the latest advances in surface metrology. This creates an on-going dialogue with the swords as new information is revealed. This information includes previously unknown proof marks and inscriptions.

While the majority of pieces in the portfolio relate to swords there are a handful of brief articles which have been included because they illustrate the breadth of the approach and the fact that while the author has chosen to focus on swords, the capacity for a synthesised approach has a broader application. It also reinforces that emerging scientific quantitative analysis technologies have a significant part to play

⁸² P.T.Wilcock, 'From Klingenthal to Waterloo: The French Cavalry Sabre', *94th London International Antique Arms Fair*, 2015, pp.36-43.

⁸³ P.T.Wilcock, 'From the Field of Waterloo: The Dating of French Cavalry Sabres', *Arms and Armour* 1 (1), 2004, pp.69-74.

in the evaluation of the most exclusive and expensive antiques in public hands as well as artefacts in museums.

There are five short articles or research notes, all of which were written at the request of the museums where the objects are located. The motivation behind agreeing to write them was twofold. First to encourage the museums themselves to engage with a wider conceptual understanding of the artefacts in their possession but secondly to attempt to determine whether the approach applied to the study of swords was equally applicable to other military artefacts.

'Marshal Ney's Snuff Box'⁸⁴ is particularly topical because of its regimental legend of it being seized by Lt. Colonel Cameron at Waterloo. Circumstances make this unlikely mainly due to his attention being diverted by having his arm blown off! The documentary evidence at the museum however indicates that there is little doubt that Waterloo is where the box began its journey to the Green Howard's Museum. The importance of the article is that it also uses an artefact as a catalyst to bring a more comprehensive understanding to both the story and to the protagonists, Cameron and Marshal Ney but also the importance of a small military artefact which was considered sufficiently important to the jewellers Wartski's to be included in 1966 in a work now regarded as seminal on the subject of European gold boxes.⁸⁵ It also underlines the need for a more inclusive understanding of how artefacts find their way to their current locations. While the artefact has its own historical significance, this example made by the famous Parisian jeweller Pierre-Andre Montauban, it also carries with it a journey which has historical significance in its own right, and reflects upon the lives of two established historic characters.

The technology now available through advances in surface metrology mean that this box should now be re-examined to gain a more comprehensive understanding of some of the techniques, particularly to understand the surface finishes employed by the leading artists of the day and a detailed micro X-Ray Fluorescence (XRF) analysis of the portrait which may well confirm elemental data which has so far only been the subject of speculation.

⁸⁴ P.T.Wilcock, 'Marshal Ney's Snuff Box', *Yorkshire Regiment Journal* (4), 2008, pp.113-115.

⁸⁵ A.K.Snowman, *Eighteenth Century Gold Boxes of Europe*, Wartski, London, 1966.

The article researching 'The Amherst Flag'⁸⁶ is significant for two reasons. The first is that it was discovered in a frame facing a wall in a store cupboard without the museum being aware either of its significance or even of its existence. The second reason relates to the observations around the emotional significance of artefacts or their numinous. The regimental colour is a flag that throughout history men have fought and died to defend. The loss of such meant humiliation and disgrace for the regiment and those responsible. It is therefore fascinating that despite the attribution that this flag had been flown over Quebec after the city had been taken by Wolfe's army, there had been no research to explain how it might be, or indeed why it was in fact a naval ensign. Only through this article could it be confirmed that it was a naval ensign that was flown above the city and later presented to General Amherst.

In this instance the primary source document, the flag, carried no text or information other than an oral tradition which had never been confirmed. Through this article its importance to the history of the Regiment has become paramount, not least because of the emotional relationship between a colour and a military unit as its representative emblem. Further opportunities have now been made available for analysis of some of the detached fibres from the flag. The chemical content of the dyes and high magnification of the thread will yield important information, particularly because this is still believed to be the earliest example of its type.

Another artefact with strong regimental significance is the regimental drum. The article detailing the history of the Mons Drum⁸⁷ recounts the journey of what is now no more than a battered shell but its emotional significance was such that it gained a place in the history of the Duke of Wellington's Regiment with its commanding officer Colonel J.A.C. Gibbs.

The battle and subsequent retreat at Mons held huge significance as the first major engagement of the war. The valour and casualties were extreme and the subsequent accounts of the appearance of an angel, (The Angel of Mons) have become embedded into regimental lore.

⁸⁶ P.T. Wilcock, 'The Amherst Flag', *86th London International Antiques Arms Fair*, 2011, pp.28-32.

⁸⁷ P.T. Wilcock, 'It Will All Be Over by Christmas', *92nd London International Antique Arms Fair*, 2014, pp.26-30.

An earlier version of the article (not included in the portfolio)⁸⁸solicited further information and following the publication of the version in The London International Antique Arms Fair prospectus, a film company have contacted the University wishing to investigate making a documentary based on Gibbs, the drum and their links with Edith Cavell, the nurse who was controversially executed by the Germans.

The London International Antiques Arms Fair commissioned an article to commemorate the Battle of Vittoria in 1813.⁸⁹ The subject of the article, a chocolate pot also had a chequered history, being looted from the carriages of King Joseph Napoleon as he fled the field after the battle. This currently resides in the Officer's mess at Huddersfield Drill Hall but arrived there by a curious route since a later inscription identifies it as having been 'liberated' by an officer of the 16th Light Dragoons. The Drill Hall is the historic home of the 5th Battalion, the Duke of Wellington's Regiment. The chocolate pot's inclusion here is important because it was one of the first artefacts where a degree of scientific analysis was utilised to determine its provenance. The Sheffield Assay Office was able to confirm, after testing the silver that it was of a type which would have been used during the early 19th century and probably in Portugal. This would make perfect sense as Joseph Bonaparte had until 1813 been King of Spain.

The response from the owners has been highly supportive. While it had always been assumed that the pot was genuine and there had been little reason to doubt the account of its acquisition, their approach now is that it holds a special significance and takes pride of place, principally because of the research that has confirmed its authenticity. The article not only brought the pot to a wider audience but has in some way enhanced its emotional significance to the Regiment. Of further scientific interest is that the University has been invited to scan and quantify the inscription in the Centre for Precision Technologies to attempt to determine when this may have been added.

The selection of the portfolio has been designed to support a central theme or 'golden thread' running throughout. All relate to specific artefacts which have

⁸⁸ P.T.Wilcock, 'Colonel JAC Gibbs and the Mons Drum', *Yorkshire Regiment Journal* 8, 2010, pp.94-96.

⁸⁹ P.T.Wilcock, 'King Joseph's Chocolate Pot', *Yorkshire Regiment Journal*, 12, 2012, pp.95-97.

particular importance in their own right but have remained unresearched. The theme however is that in all cases the artefacts themselves, if treated as source documents in their own right, reveal new knowledge which can in turn, inform further historical research. Most importantly however is the need for a full spectrum approach utilising the latest precision technologies to achieve a more comprehensive understanding of each piece.

Culturally the sword has significance as an iconic reference point. It not only serves as a weapon but its style, form, manufacture and decoration lead scholars down new avenues of research. It has been illustrated here that inscriptions that had previously been either taken for granted or in some cases completely ignored have allowed further discoveries, in some cases of great historical importance.

The other artefacts similarly, while not having the same unique status of the sword still yield important information if treated in a contextually holistic manner. It is also true that the status of all these artefacts varies greatly. In terms of monetary value they range from many hundreds of thousands of pounds to a few hundred. Yet importantly all are subject to the same treatment and can reveal equally important new insights.

In all the examples under discussion without exception they were located in a place which made them impossible to be examined in any detail. In some cases such as the Glaive de General, fundamental assumptions had been made about the artefact which were ultimately proven to be unfounded. Only by allowing the academic community to engage with the artefacts and to investigate them in a broad context will the opportunity for a deeper understanding be achieved.

An approach which synthesises an historic as well as scientific perspective challenges the current academic silo mentality which often baulks against the idea of interdisciplinary collaboration. Without this approach there have been and will continue to be aspects of the artefact which will remain hidden. A collaborative and holistic approach to the examination and analysis of artefacts and particularly swords has already proved invaluable.

As an aside, it is critical that there must be an established partnership between the custodians of the artefacts and those able to conduct the analysis. This requires a

high degree of mutual trust. Cannonballs from the Mary Rose were taken to the Paul Scherer Institute in Switzerland in 2013 and subjected to non-destructive 3D neutron tomography. This is a complex and expensive process however the result was that iron cube inclusions were identified within the cannonballs. Similar inclusions have been found on cannonballs on the wreck of the Santa Clara which sank in 1564 on a journey from Spain to the New World. These discoveries are important not least because of the information they provide about how the shot was manufactured. The final piece in the jigsaw however may be provided by a volume discovered in the archives of the Duke of Buccleuch and Queensberry at Boughton House. Here is a book compiled by one of Henry VIII's *cannoniers* in Calais, John Flemyng. Flemyng provides a detailed account of experiments he has undertaken with cannon, powder, shot along with calculations on what appears to be the ballistic properties of the guns. This is believed to be the earliest known example of such a document in existence and may have been commissioned as a direct result of the Mary Rose incident where King Henry VIII lost his prized flagship.

This collaboration between the arts and humanities and science and engineering disciplines is already bringing to light some of the most significant information ever revealed on this subject. The importance however is that without this collaboration and a synthesised multi-disciplinary approach neither group could possibly maximise the full potential of the discovery. In so doing however a significant contribution can be made to the understanding of aspects of history science and engineering, all intertwined in this work.

5. The essence and character of the sword

The idea that a sword is itself imbued with a personality or numen, appears early in Western mythology.⁹⁰ *The Life and Death of Cormac the Skald or Kormac's Saga*⁹¹ was originally written in Icelandic around 1300 AD though the author is unknown. It provides a characterisation of a sword named *Skofnung* that Cormac is persuaded to try and borrow from another warrior *Skeggi of Midfiord*. Skeggi's negative response revolves not around the righteousness of Cormac's cause but the character of the sword itself:

"Dalla said he should see Skeggi of Midfiord and ask for the loan of his sword, Skofnung. So Cormac went to Reykir and told Skeggi how matters stood, asking him to lend Skofnung. Skeggi said he had no mind to lend it. Skofnung and Cormac, said he, would never agree: "It is cold and slow, and thou art hot and hasty."⁹²

Despite Skeggi's initial refusal, Cormac, after persuasion from a fellow warrior borrows *Skofnung* but with limited success. The implication of his struggle was the mismatch of the character of Cormac and the character or personality of the sword.

Similarly in the *Völsunga Saga*⁹³ the sword destroyed by Odin while battling with Sigmund carried the name *Gram*. Forged by Volund (Wayland the Smith) the sword had been imbued with mystical powers by Odin. After Sigmund's death the pieces of the sword were reforged, given to his son Sigurt who used it to slay the dragon *Fafnir*. The characterisation theme is developed further in that even after reforging, the sword retains both its name and its powers and is featured in Wagner's 19th century *Ring Cycle*. The concept was further developed by Tolkien in *The Lord of the Rings* when Aragon received the sword that was reforged, bearing the inscription, "*Anar.NányëAndúril I né Narsil i macilElendilo.Lercuvantan i móliMordórëo.Isil,*"

⁹⁰ The earliest examples appear in both Viking and Icelandic texts such as *The Chronicle of the Kings of Norway*.

⁹¹ Originally written in Icelandic sometime between 1250 - 1300 A.D. author unknown. Translation by W.G. Collingwood & J. Stefansson, Ulverston, 1901.

⁹² W.G. Collingwood and J. Stefansson (Tr.), *The Life and Death of Cormac the Skald* Chapter 9, Ulverston, 1901.

⁹³ J.L. Byock, *Saga of the Volsungs*, London, 1999.

which translates as "Sun. I am Andúril who was once Narsil, sword of Elendil. The slaves of Mordor shall flee from me. Moon."⁹⁴ The value of such items, bearing the provenance of Hollywood rather than Norse history, was reflected in the sale of an example in New York in 2014 for over a quarter of a million pounds.⁹⁵ But perhaps the most famous iteration in English is the account of King Arthur and his sword *Excalibur*.⁹⁶ Hurling into the lake by Merlin there are clear parallels between this and the account of Sigurd and Gram. Both the practice and the legend reached the highest echelons of society. Asbridge in his work 'The Greatest Knight' makes reference to the sword carried by Richard I bearing the name *Excalibur*.⁹⁷ The placing of medieval swords both in churches and on and within the tombs of brave knights was not only symbolic but a reaffirmation of the protective powers of the weapon in the afterlife.

Examples of swords carrying names inscribed upon them still appear on the market. In September 2014⁹⁸ the sword of Sir Humphrey de Bohun was examined by the author along with colleagues from the Centre for Precision Technologies in Huddersfield. This was represented as a sword captured at the Battle of Hastings in 1066 with an early Viking blade carrying an inscription. It later became a family piece retaining the blade but with a later 13th century hilt. The blade was considered to have mystical qualities and continued to be carried by the family until being defeated at the Battle of Bannockburn in 1314. Analysis using the Alicona⁹⁹ focus variation

⁹⁴ An example of Aragorn's sword *Anduril* made for the film *The Lord of the Rings – The Return of the King* is currently held in the Royal Armouries in Leeds Class mark IX-5619.

⁹⁵ Bonhams New York Lot 369 'Aragorn's sword Andúril, made for Viggo Mortensen, from Lord of the Rings: The Return Of The King' 24th November 2014 for £279,039 including buyer's premium.

⁹⁶ T. Malory and H. Cooper. *Le Morte D'Arthur: The Winchester Manuscript*. Oxford, 2008.

⁹⁷ T. Asbridge, *The Greatest Knight*, London, p.43.

⁹⁸ Christies Out of the Ordinary Sale 9935, 5th September 2014 – The Sword of Sir Humphrey de Bohun.

⁹⁹ Alicona G4 infinite focus microscope.

microscope was able to confirm the originality of the lettering of the blade's inscription.¹⁰⁰

The idea of a sword having some numinous or spiritual power is reflected in the ritual disposal of weapons. A sword without an owner may be considered dangerous and as a result some archaeological finds from the mediaeval period yield swords which are not broken but simply folded so they can no longer be used. This seems to be a form of ritually 'killing' the sword without actually destroying its integrity.¹⁰¹ The Staffordshire Hoard has a cross folded in the same manner, perhaps for similar reasons. There was a reticence in some instances to 'harm' the sword itself and this is reflected in the fact that in some cases the swords are cast into rivers or watercourses where they were understood to be safe from harm yet remain intact.¹⁰²

The understanding of the interface between the realms of good and evil during the Middle Ages inevitably led to the adoption of the concept that swords may be imbued with mystical powers. The idea of intervention in worldly affairs by spiritual forces was after all being promoted in no small way by the monasteries and the church at large. Knightly orders such as the Templars were seen, particularly during the time of the Crusades, as God's warriors on earth, invested with spiritual power and therefore the extension to their weapons and armour being infused with holy protective capabilities was only to be expected. Not only did swords receive blessing from the clerics but armour did too. Whether there was a tangible link between the demise of the monasteries in the 1530's and a change in the nature of the imputed spiritual power of weaponry is unclear.

¹⁰⁰ It is believed that the sword was picked up from the battlefield by Sir Humphrey De Bohun, who was the victorious king's god father. The blade was remounted with the De Bohun coat of arms, where Sir Humphrey De Bohun, 4th Earl of Hereford and Essex carried it north to Scotland. He was killed eight years later at the Battle of Boroughbridge where a patient pikeman hidden beneath a bridge he was crossing speared him in the anus.

¹⁰¹ An example listed by the Portable Antiquities Scheme:
<https://finds.org.uk/database/artefacts/record/id/557262>

¹⁰² British Archaeology Issue 120, Sept/Oct 2011 records two swords, both iron discarded into the River Nene near Peterborough.

The Enlightenment seems to have heralded the beginning a more pragmatic use of inscriptions while still retaining an almost spiritual ancestral connection. The weapon is an officer's ladder hilted sword carried by officers of the British heavy cavalry, (Appendix image 4). The blade however is a 'claymore' style blade that has been shortened to allow for use on horseback and carrying the 1796 pattern hilt. The sword itself is, in its current form, poorly balanced principally because the blade is too heavy. The blade itself carries the crown and orb mark indicating a Solingen production of the 17th century. It is similar to some of the blades seen in the collection of the Duke of Buccleuch and Queensberry.¹⁰³ In several of these examples the blades are Scottish and date to the 17th century indicating a trend for the reuse of a 'family blade' in a later hilt. Whether there was a sense that this would bring good luck, or simply that the blade had served an ancestor well is unclear, however its importance in identifying a greater depth of historical information is unquestionable. A further sword in the Buccleuch collection supports this view and is featured in the catalogue of the Culloden Exhibition in 1996.¹⁰⁴ A curved basket hilted broadsword had been preserved in the family archive retaining an early blade dated and marked '*Anno Domini 1662*' but carrying a hilt that could be no earlier than 1690.

It is in examples such as this that the synergy of the portfolio of articles is best reflected. The swords in the Buccleuch collection are rich in examples from the period of the Jacobite Rebellion. A collection such as this which has been effectively sterile since it was begun in the 1520's allows for an invaluable control group of weapons. Examples of swords used during the Rebellion can be further elucidated by contemporary correspondence. The article '*The Culloden Papers*'¹⁰⁵ is a research note referring to two letters from Lieutenant William Aitkin who writes from the camp at Nairn the day of the battle. Aitkin served with Price's Regiment of Foot (later to become the 14th Foot) but he gives in both letters a graphic first-hand account of the action of the cavalry in wielding their sabres against the Highland infantry. Swords

¹⁰³ P.T.Wilcock, 'The Armoury of His Grace the Duke of Buccleuch and Queensberry', *Arms and Armour* 9 (2), 2012, pp.181-205.

¹⁰⁴ *Culloden: The Swords and the Sorrows*, Exhibition Catalogue, April – September, Edinburgh, 1996 p.27.

¹⁰⁵ P.T.Wilcock 'The Culloden Papers', *Yorkshire Regiment Journal* (5), 2008, p.91-2.

which were regarded as poorly balanced and ineffective were described as being carried by the returning dragoons “glutted with blood”. The first-hand account gives a clear understanding of the manner in which the sabres were utilised creating a new understanding of why heavy dragoons might have been deployed in that role.

It is not inconceivable that the use of a family blade combined both of these theories. It had served an ancestor well and therefore carried with it in some form the family tradition. The effectiveness may have been a less pertinent question, particularly as in some of the families where this practice would have taken place there would have perhaps been little expectation of them being involved in hand to hand combat. It is interesting to note that there is no comparable practice where family guns are involved when the preference seems, understandably, to be for the latest and most effective model.

The concept of the sword having some form of character or personality still exists in to the Early Modern era. The famous 16th century manufacturer Andrea Ferrara along with many others signed the blades of swords he produced. A number of those in the collection of the Duke of Buccleuch and Queensberry¹⁰⁶ carry names of a manufacturer followed by ‘*me fecit*’. Whether this is a reflection back to the times when a sword was very definitely understood to have a character or personality, or simply a style of marking is unclear but the theme appears to be consistent. Ferrara in particular was alleged to have come to Scotland to work, however there is little evidence for this theory. What is clear is that around this time significant numbers of blades appear with a range of variations of his signature. One reason may be the ‘designer label’ theory at a time when patents and copyright were either non-existent or unenforceable. A Ferrara blade carried status and an implicit statement of quality. As a result while he doubtless made many fine blades only a small percentage will, by now be able to be genuinely attributed to him. (Appendix image 5)

The concept of the sword or at least its blade having a personality is also supported by the appearance of mystical symbols etched on the blade to afford protection to the user. These symbols appear on a number of the swords in the Buccleuch

¹⁰⁶ P.T.Wilcock, ‘The Armoury of His Grace the Duke of Buccleuch and Queensberry’, *Arms and Armour* 9 (2), 2012, p.187 and at footnote 31 of the article.

collection and originate from the Middle East. Many swords particularly produced in France or Solingen carry symbols through into the early part of the 19th century, (Appendix image 6). The example illustrated was made in 1790 and carries a range of both cabalistic mystical characters and depictions which hark back to the Middle Ages such as 'the hand of God' and a Turk's head. These were believed to bring protection to the user but further reinforce the belief in a supernatural aspect to a sword in its relationship with its owner.

6. Identity: swords holding a particular significance

A final consideration in the synthesis of these articles must be how swords and other military artefacts relate to the identity of their owners or users. By taking a holistic approach to the examination of a sword far more can be understood than simply the detail of the artefact itself. In some ways it can be considered to provide a mirror reflecting both outwards giving an image of its owner, their environment and culture but also reflecting inwards to give an understanding of the art of its creator.

The armoury of the Duke of Buccleuch and Queensberry for example, has since 1520 amassed a collection of family swords that have been carefully preserved. Each one has, in its own right, characteristics which deserve further research and in some cases publication. However, each one was acquired by a member of the family to a particular end and therefore reflects another aspect of the family story. So, a selection of 18th century hunting or militia hangers was acquired by the 1st Duke to equip retainers on the estates. The fact that his staff approached a particular manufacturer to make these, in this case Samuel Harvey, reflects an understanding both of the need for quality, but even at a social and domestic level, the need to reflect status. Harvey was a well-respected maker of quality weapons. The acquisition of these weapons however also reflects upon the political situation of the time and the need for defence.

At the other end of the spectrum, there are a pair of 1796 pattern light cavalry sabres named to the Duke of Buccleuch and the Earl of Dalkeith (his son) dating from their colonelcies in two militia units at the beginning of the 19th century. It is fascinating to note that Buccleuch ignores both the main Edinburgh retailers and the high status London ones and has these swords made by Woolley and Deakin of Birmingham (Appendix image 7). This must have been a conscious choice. The swords are the finest pair known to exist to a father and son and there is no known Scottish connection between the family and the manufacturers. This example however provides us with a wealth of information about Woolley and Deakin as well as an understanding of the commercial choices made by the Duke's staff if not himself personally. This also helps to build an understanding of the political climate of the day that felt the need to raise militia and fencible units in such great numbers.

Finally, while it is true that artefacts may tell us about the person or family who owned them, in practice that may be secondary to what the collection or selection of artefacts tell us more broadly. The Buccleuch collection is owned by the Montagu-Douglas-Scott family. Their heritage has its roots in Scotland and England as a result of which the armoury reflects choices made by the whole ancestral family. More importantly the family have preserved an armoury by making value judgements about what is and is not significant to the history of their ancestors. So, there are swords, which appear at face value to have been removed from the Tower by the 2nd Duke, but at some point a choice has been made, consciously or otherwise, that these should be retained. They are of little financial value but in conjunction with archival material add a depth to the social and political history of the family and the country that might otherwise have been lost as weapons systems were upgraded.

The generosity of the current incumbent also allows the use of new technologies to examine a further facet of the manufacture of the swords for example how the diamond cut hilts were created and the manner in which the gilding and engraving was executed.

This insight is not exclusive to Buccleuch. Both the swords made for Lieutenant Popham and Admiral Lord Collingwood bear iconography that not only reflects the value placed on their endeavours by the donors but also the social and political milieu in the country at the time. In Collingwood's case, his death meant he never received the sword but their celebration of his life came in stark contrast to a political situation with the French Emperor which was threatening to overtake Europe and place England in isolation in Europe.

As part of this synthesis there is a need to begin to understand artefacts being on a journey. This is not only the journey of the owner or family but of the artefact itself. Over its existence it will undergo material alterations that add further information and knowledge to it. The 1796 light cavalry sword featured in the West Midlands History article¹⁰⁷ began its existence in a workshop in Birmingham. From there it was purchased by the government and someone, a worker at the Tower, stamped the

¹⁰⁷ P.T.Wilcock, 'Birmingham Swords at Waterloo', *Fortunes of War Waterloo Special edition*, West Midlands History, Birmingham, 2015, p.31.

blade and stored it. It was then withdrawn and made a sea journey to Coblenz. It was issued then to a soldier who relied upon that weapon to keep him safe and to restore him, after the war to his family. His armourer marked the sword with an individual number¹⁰⁸ after which it would be carried by a particular soldier. It has been repaired as a result of damage to the drag shoe. At the end of the war its journey becomes less clear but it returns to England and seems to have been returned to the Tower. During the sale of surplus artefacts in the 1960's it was sold into private hands and subsequently purchased by the author. It is now exhibited in Wellington Arch as an illustration of the Battle of Waterloo. This particular sword has had a remarkable journey.

¹⁰⁸ The weapon would be issued to an individual trooper. The regimental marking of 8th (Silesian) Landwehr Hussars would be added by the regimental armourer along with 3E (3rd Squadron) and sword number 175.

7. New technologies – the final dimension?

In 2003 when the first of the articles in this portfolio was published a research relationship between historians, scientists and engineers was highly unusual because of the academic divisions existing in many institutions. In many places this is still the case that there is no interdisciplinary contact and unfortunately academia is the poorer as a result.

The new frontier in the understanding of antique artefacts is now increasingly grounded in science and technology as well as in history. Regardless, the collaborative relationship is vital. In 2003 there would have been no possibility of examining the Harvey sword in the detail that is available today. Museums such as the Wallace collection were proud to be the owners of a large powerful microscope. The Royal Armouries at Leeds were considered to be at the forefront of technology by virtue of having an x-ray machine.

Most testing outside these parameters was destructive leaving museums and collectors with the challenge of weighing the potential damage against the knowledge gained. Even the 'touchstone method', the use of a microscopically clean piece of obsidian to remove traces of metal which are then chemically examined is still, at least technically destructive.¹⁰⁹ These techniques such as the one described earlier at Klingenthal yield important information but it is necessarily at a cost which now may be avoided. As has already been stated the work of Dr Alan Williams and David Edge at the Wallace Collection has made a significant contribution however the nature of funding for museums and advances in technology mean that the climate has changed permanently. A collaborative approach between academic institutions, museums, collectors and auction houses is now critical to continue to move the boundaries of knowledge forward in evaluating *objets d'art*.

A recent example of the value of emerging technology was provided by an approach from Christie's auction house. A French Imperial Eagle was scheduled to be auctioned with a reserve price of £125,000. Christies brought the artefact to the Arms and Armour Research Institute at the University of Huddersfield for evaluation.

¹⁰⁹ For a more detailed account of this method see M.Campbell, 'Gold, Silver and Precious Stones' in *English Medieval Industries: Craftsmen, Techniques, Products* (ed.) J.Blair and N.Ramsey, London 1991, p.111 ff.

The historical research indicated that an eagle of this type and number had been captured by the British navy in Martinique in 1807. It is recorded as having been transported back to England but subsequently, after the war, no trace could be found. The pattern and style matched the historical examples available and the examination of another example at a museum in Preston bore out this theory.

The use of micro X-Ray Fluorescence (XRF) using both the Bruker Tracer¹¹⁰ and the more refined and high powered Bruker Artax¹¹¹ raised some initial concerns because the historical data indicated that the eagle would have been gilded yet there was little trace of either gold or mercury. During the early 19th century, mercury would be used in the gilding process. This was noted but the eagle was also allegedly fire damaged which may have influenced those results. Next, in collaboration with a local gunsmith¹¹² micro endoscopy was utilised to analyse the welds on the interior of the casting. Historical research indicated that the eagles were originally produced in six sections. The welds appeared to be contemporary with the rest of the metal. Next the screws were examined on the base of the casket upon which the eagle was mounted. These appeared to be modern but the result of a recent repair. At this point while there were concerns there was no certain evidence to suggest to the client that this was not genuine. The final test was to utilise 3D X-ray Computer Tomography ¹¹³ within the Centre for Precision Technologies. The eagle was scanned and deeply set into the interior were two metric bolts. This confirmed beyond reasonable doubt that the eagle was a very accurate but 20th century reproduction. The value was subsequently amended to £2,500. (Appendix image 8)

From the same client a sword purporting to have been originally owned by a Norman knight known as the *de Bohun* sword was examined by the same team. Historical research indicated that the accounts relating to this knight and his sword were well established. The use of an Alicona¹¹⁴ infinite focus variation microscope allowed a

¹¹⁰ Bruker Tracer hand held portable XRF.

¹¹¹ Bruker Artax micro XRF.

¹¹² Aaron Wheeler Gunsmith, Bethel Street, Brighthouse.

¹¹³ Nikon XT H 225 3D CT Scanner.

¹¹⁴ Alicona G4 infinite focus microscope.

detailed analysis establishing in fact that the inscription on the blade, while difficult to decipher, and was contemporary with the blade itself but that the hilt appeared to be a later, albeit medieval addition. (Appendix image 9)

Without this type of analysis it would have been impossible to achieve the outcome by any other conventional method of investigation. The use of a more scientific approach is increasingly popular and it is refreshing to see that a helpful article using chemical analysis appears in the most recent *Arms and Armour* and is a welcome addition to their range of topics.¹¹⁵ Once again however the article concentrates entirely on the science rather than a more holistic evaluation.

In partnership with National Physical Laboratories, surface scanning techniques were utilised¹¹⁶ to identify the name of the owner or manufacturer of the brass chape of a French sword which through inappropriate cleaning had been almost totally erased. Here is perhaps the finest example of the most advanced technology restoring a facet of a sword's existence that had been lost. (Appendix image 10)

Finally an important advance was achieved by utilising current surface engineering techniques to analyse and evaluate proof marks. The modern application of these marks to unmarked sword blades is the most frequently used technique to add historic provenance to a sword. By a high resolution surface scanning technique¹¹⁷ detailed images can be obtained which can then be compared to a control group of known originals. This has already been used to identify forged proof marks. (Appendix image 11)

The importance of all these examples is underlined in four distinct elements. The first is that there is a complete confident multidisciplinary team who genuinely appreciate the value that each brings to the problem. The second is the use of emerging technologies to add to the breadth of understanding that already exists and take it to a further dimension. The third is the need for professionals who are genuinely

¹¹⁵ J.Worley, 'The Chemistry of Swords: Using Analytical Chemistry Techniques to Investigate Medieval Swords', *Arms and Armour* 12 (1), 2015, pp.52-65.

¹¹⁶ Taylor Hobson Form Talysurf PGI used to examine the erased inscription on a French Sabre de Petit Tenue.

¹¹⁷ Somicronic SURFASCAN 3D using SURFSTAND software.

empathetic to the task in hand and have some affinity with the objects being analysed. This seems to bring an added depth of understanding to the research. Finally there is a desire among those involved to share the outputs and make a genuine contribution to continuing education. It is for this reason that the laboratories in Huddersfield frequently host visits from industry, schools and museums at no cost to ensure a wider appreciation of what is now possible.

8. Conclusions and future research

In this synthesis of articles the author has endeavoured to illustrate the value of a holistic approach to the understanding of military artefacts and swords in particular. This work is considered to be important because it argues for the use of multidisciplinary methodologies to more comprehensively understand all there is to appreciate about a particular artefact, rather than what has, historically, been a piecemeal approach.

The critical nature of a complete evaluation rather than a range of unconnected different approaches to the sword mean that the final outcome will always be greater than the component parts. Because of a unified approach to the understanding of these artefacts there has been a consequential development in the relationship with owners. In discussions with some of the custodians of the finest collections in the world, they claim to have experienced a genuine affinity with the methods of investigation behind the research described here. As a result they have become eager to welcome further research and advocate to others for its value in their collections or situations.

Without doubt the focus of this work over the past twelve years has moved. The multidisciplinary nature of the research and the relationship with those who can make the artefacts available means that opportunities may now be taken to work with some of the most high profile collections in the world.

Nonetheless there are many examples of new knowledge that has been created during this period. The sword presented to Major Robert Harvey reveals an officer who may ultimately be regarded as one of Wellington's foremost comrades in arms and previously completely unknown.

The publication of what may have been the first sword owned by Napoleon brought to light new insight into his relationship with the Desmazis brothers. At the time of publication access to advanced surface metrology to comparatively analyse the inscriptions of blade and guard could have revealed even greater insights.

The French glaive has created a new understanding of this sword and its journey along with identifying its owner and the man who captured it. From the same battle, a small snuff box reveals a fresh personal account of owners before and after the

conflict. Work on the high status swords of Popham and Collingwood have deepened the understanding of both the commissioning and manufacture of the swords as well as of the owners themselves.

The British light cavalry sabre whose Prussian markings have confirmed a supply chain, critical to the success of the Allies in the Napoleonic Wars. While at the opposite end of the spectrum of status, analysis of the pair of 1796 swords to the Duke of Buccleuch and Earl of Dalkeith have established the production and supply of the highest status swords from their production source in Birmingham.

Finally regimental artefacts such as the Amherst Flag have been brought to prominence with research that both establishes the historic context of the flag at Quebec, and its place in the annals of regimental history.

The on-going analytical work into the *de Bohun* sword and the Imperial Eagle have established both authenticity and forgery in a way that conventional historical research could not possibly achieve.

Proposals are currently being developed to begin work on a detailed analysis of the weapons utilising a full range of scientific techniques, owned by the 1st Duke of Wellington and currently in the private collection of the 9th Duke. The intention is that these swords which have not been on public display will then be published.

The Ponsonby archive is available for research and again proposals to being work on some of the more delicate artefacts will begin in 2016. A leading gallery in Mayfair¹¹⁸ has asked to be involved with research into a range of objects from swords to early coinage. Their approach came as a result of visiting an exhibition where the Arms and Armour Research Institute had a stand.

Finally, His Grace the Duke of Buccleuch and Queensberry has made a long term commitment for research to be undertaken on a range of material from his collections. This commitment has included the joint funding of a researcher and archivist with the University. The great advantage of these collections is ironically, because the 9th Duke felt unable to allow access there remains solid provenance on

¹¹⁸ H&H Galleries, 55 Grosvenor Square, London.

almost all of the material there, often with archival documents to support the research.

Future publications resulting from the current articles include the publication of the *Fleming* volume which provides immense detail relating to the powder, ballistics and construction of Henry VIII's cannon. This will focus on the technical analysis of the data provided by the work and will be jointly authored along with Professors Liam Blunt and Tim Thornton. Alongside these the author is currently supervising a PhD programme dealing with some technical aspects of sword blades with a further two proposals currently under review.

The Duke of Buccleuch and Queensberry has also agreed to a detailed analytical study of the construction of the Puckle Guns. This is of enormous value in engineering manufacture; materials and firearms design because these guns were made in both bronze and iron hence a unique opportunity for comparative data.

Finally, access has been agreed to analyse a series of swords currently held at Drumlanrig Castle and owned by the Duke of Buccleuch. These portray a range of symbols and inscriptions on the blades dating from the early 16th century. These have never been published and the opportunity to utilise the most refined surface metrology techniques along with historical research in the castle archive, will bring a level of understanding of the construction of this type of sword and the surface of the blades which is unique.

As a result of the approach of looking at swords and military artefacts as primary source documents a number of contributions to new knowledge have been achieved. These fall into two categories, historic and scientific:

- The research and discovery of the Harvey sword has led to a unique and new perspective on that individual's influence on aspects of the Peninsular War and his lifelong relationship with the Duke of Wellington.
- The discovery of the Amherst flag has revealed a unique historical icon of immense significance to the fall of Quebec and ultimately the independence of Canada.

- The engagement with the Buccleuch Collection of Arms and Armour continues to reveal unique discoveries bringing completely new insights to light which in turn create new knowledge relating to the development of stately armouries and their deployment in England and Scotland
- The development of a unique 'one stop' approach to the analysis of historic weapons has allowed the creating of a standard approach to evaluating arms and armour
- This has led to the development of a cyclical methodology using a multidisciplinary approach which has now been established in the field of historic military antiquities and is transferable into other areas of objets d'art such as Islamic art and ancient Egyptian, Greek and Roman artefacts. Historical analysis leads to typological identification and then to using scientific techniques and precision engineering. The new insights discovered feed back into historical analysis and evaluation and the loop continues.

Much of the thinking around this began at the University Research Festival in 2009. The opening lecture was given by Professor Liam Blunt, Professor Bob Cywinski and Reverend Paul Wilcock and was entitled 'Melting Snow – What do a Scientist, an Engineer and an Historian have in Common?' The title refers to C.P.Snow's famous Rede Lecture of 1959 entitled 'The Two Cultures' addressing the divide between the sciences and humanities. This research would not be successful without the completely synthesised and multidisciplinary approach which ensures new discoveries will be accessible to a wide audience. The added value comes from the recognition not just of the component parts but of the whole story.

APPENDIX

Image 1: Sword owned and carried by Col. Frederick Ponsonby at Waterloo



This sword is an example of a unique and bespoke design, undiscovered until a few years ago. Its importance is in the fact that the style was later adopted for what became known as yataghan blades indicating an early understanding of effective blade design and function.

Image 2: Inscription signature of Nicolas Noel Boutet circa 1799



The signature of Nicolas Noel Boutet on a high status sword such as this is indicative of a piece emanating from the workshops of Versailles patronised by Napoleon who at this time was First Consul and later Emperor.

Image 3: British 1796 light cavalry sabre but with Prussian markings



This is a unique example of a sword with markings illustrating a remarkable journey from a Birmingham sword smith's workshop, to the Tower of London then exported to Coblenz to resupply the Prussian Army in 1813 and carrying Prussian markings. The regiment carrying it featured in the Waterloo campaign after which it was returned to England and probably sold into private a collection as surplus from the Tower. It is currently in the Waterloo 200 exhibition at the Wellington Arch in London.

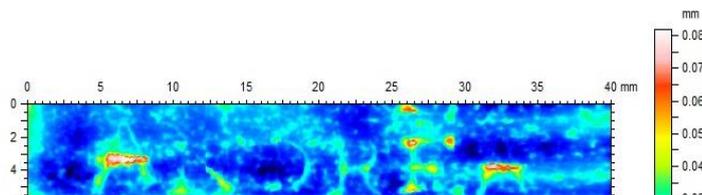
Image 4: 1796 Heavy Cavalry sword with early 'claymore' blade circa 1600



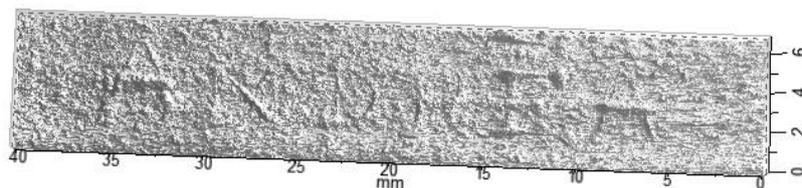
This is an example of the use of a much older 'family' blade remounted in a more modern hilt. The hilt of the heavy cavalry officer pattern 1796 whereas the blade may be as early as 1600. This practice took place to maintain continuity and good luck (the concept of numen or personality in the blade) despite in practice it being less effective than contemporary designs.

Image 5: Scans of a blade of Scottish Basket Hilted sword by Andrea Ferrara

(Lower images recorded on Talysurf PGI)



Colour contour image



Slope Illumination

This is an example of a blade by Andrea Ferrara on a Scottish basket hilted sword circa 1660. The analysis used for both slope illumination and the colour contour image illustrate the contrasting contours of the lettering. This is used to establish data on how the inscription was executed (engraved, stamped, tool markings, if it has been faked possibly laser) which then builds a data set against a known control group of other Ferrara blades.

Image 6: 1788 Pattern cavalry sword carrying mystical symbols and cabalistic inscriptions



This example of the 1788 light cavalry sabre carries mystical and cabalistic inscriptions. These were applied based on ancient images to afford the owner a

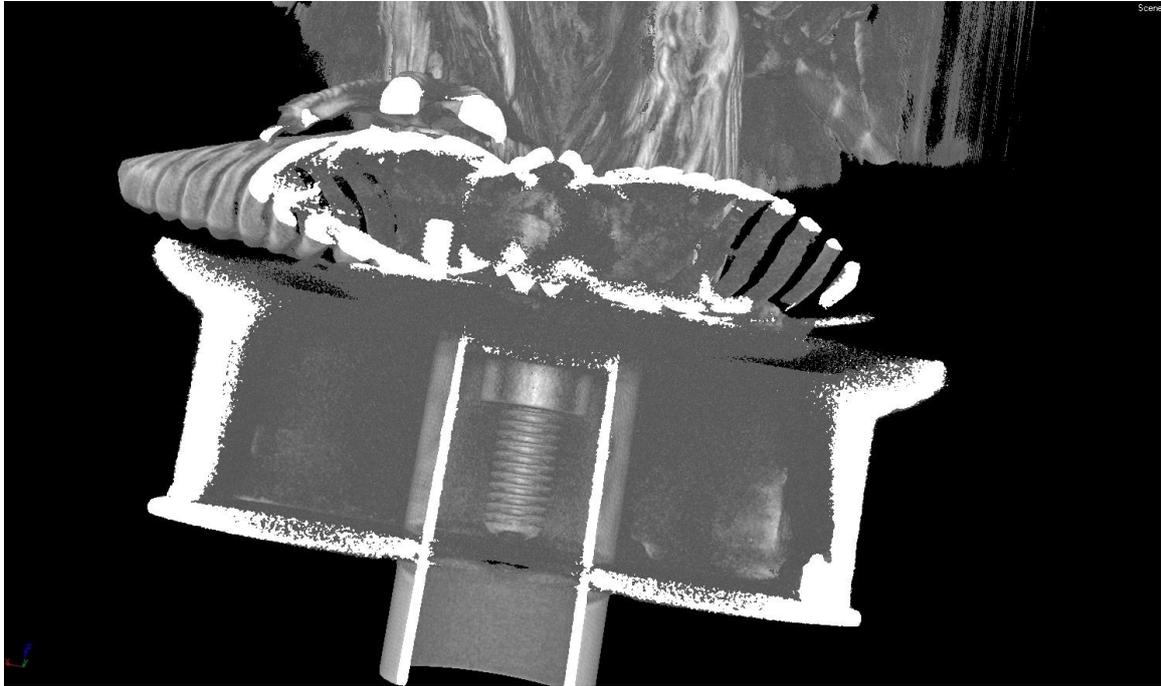
degree of spiritual protection from harm. They are seen on blades from the Viking period to the early 19th century.

Image 7: 1796 Pattern Light Cavalry sword to the Duke of Buccleuch 1800



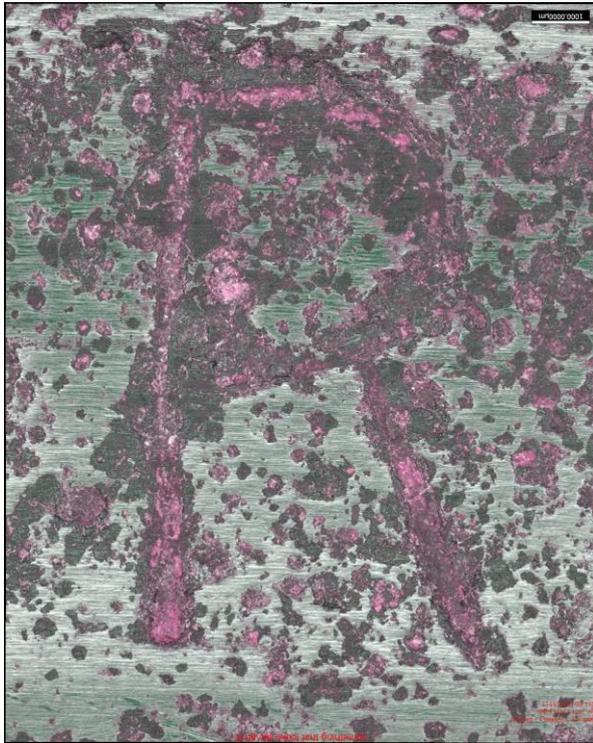
This sword is an example of the highly decorated sword from a Birmingham retailer and owned by the Duke of Buccleuch. Its value in analytical terms is that because its provenance and history are clearly known it provides a control for the examination of similar swords where the decoration may be a later forgery.

**Image 8: Scan of the base of the French Imperial Eagle revealing modern bolt
(Nikon XCT image sectioned)**



This is an x-ray scan using computer tomography to identify a French Imperial Eagle which had been forged with a view to deception. The image shows a metric bolt made during the 20th century which is inconsistent with a genuine Eagle which was manufactured in Paris in 1804.

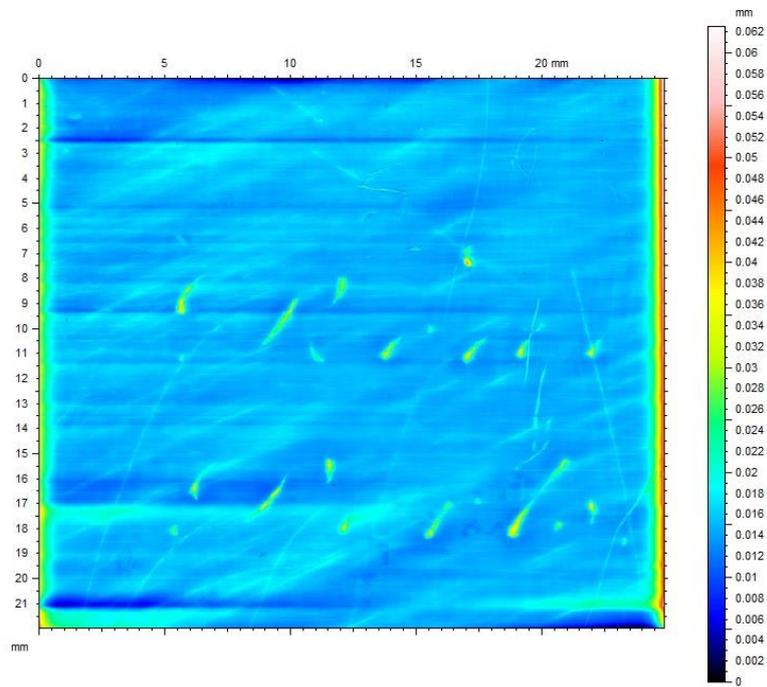
Image 9: Scan of part of the blade of the sword attributed to Sir Humphrey de Bohun. This example revealing the letter 'R' (Alicona Infinite Focus)



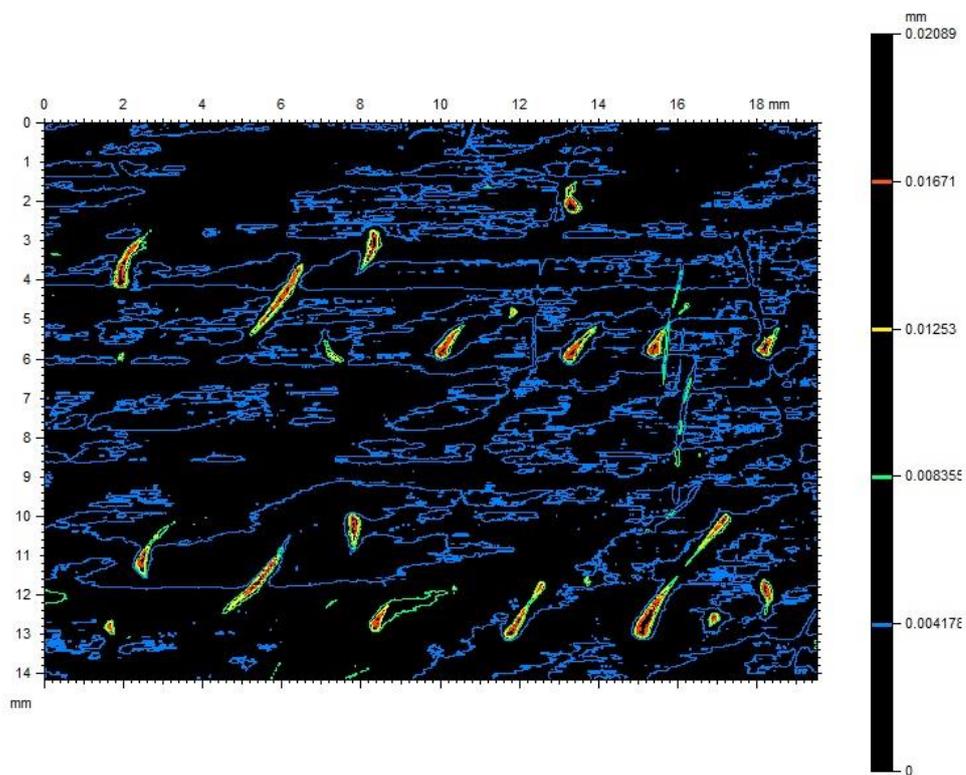
Colour contour/CRT
image

This image illustrates a letter from the blade of a sword from the middle ages. The analysis identifies any variation between the blade surface and the inscribed letter, including levels and depths of corrosion, and is of value in identifying whether the inscription is contemporary with the sword blade or was applied at a later date.

Image 10: Surface image of sword chape now revealing the identification of a Paris manufacturer (Talysurf PGI, courtesy of NPL)



Colour contour image above
slope filtered below



These pictures include both colour contour and slope filtered images are used to identify a worn inscription on a brass sword scabbard. The scabbard had been polished and the lettering lost however applying this technique, scanning in fine detail over several hours has revealed the name of Pirmet of Paris a well respected manufacturer of the late 18th century.

Image 11 French *poinçon* from the Revolutionary period measured on Somicronic SURFASCAN 3D using SURFSTAND software

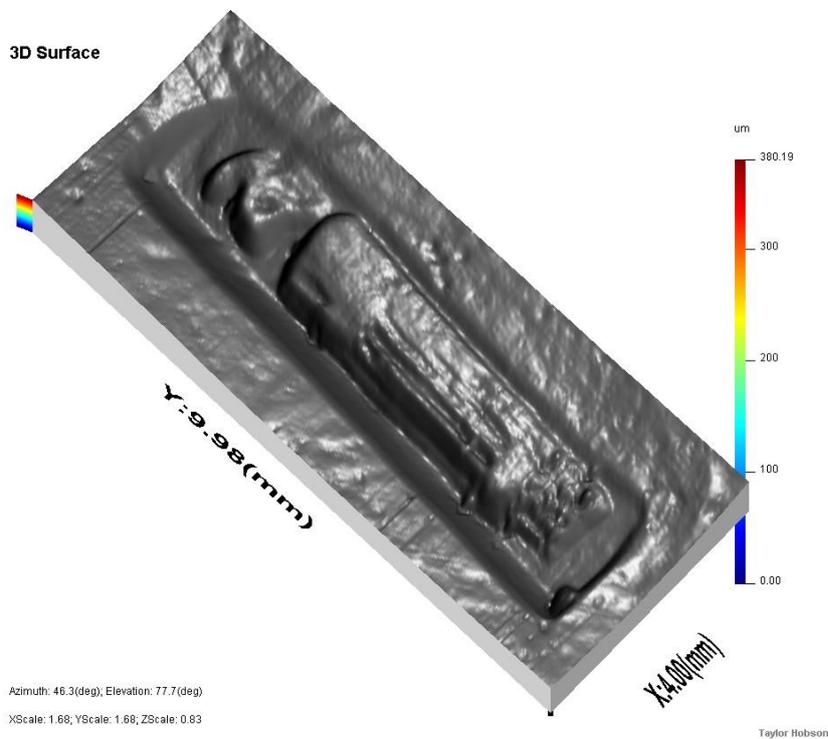
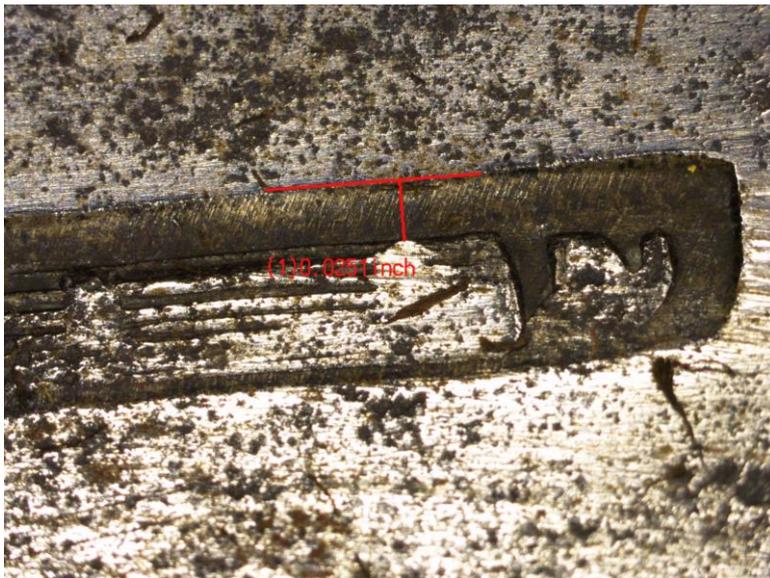




Image using Talysurf PGI courtesy of NPL



These images of the 'faisseau de licteur' (Proof stamp of Revolutionary France 1792-95) have been examined to provide data that helps to identify forgeries. Precise measurement of this unique mark allows comparative analysis of blades that have had the mark applied to enhance their financial value.