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CONTENTS

Robert C. Savage	Introduction	p. 1
Erik D. Schmid	Link Details from Articles of Mail in the Wallace Collection	p. 2
Tobias Capwell	A Fragment of Scottish Mail	p. 21
Robert W. Reed Jr.	Armour Purchases and Lists from the Howard Household Books	p. 25

<u>Introduction</u>

It is with great pleasure that I write this brief introduction to what will surely become an invaluable contribution to the field of arms and armour studies and in particular the study of mail armour; *The Journal of the Mail Research Society*.

Despite the long history and wide geographical use of mail, from the 6th or 5th century BC to the present day, this form of armour has suffered from a comparative paucity of accessible studies. Although references to mail armour occur in all the major texts concerning armour it is usually just a passing reference. The large holdings of the Royal Armouries library, for instance, list only about 40 specific entries on the subject. Why this is so is not clear; maybe a Norman cavalryman depicted in mail hauberk is not quite as appealing as his late-15th century German counterpart, pictured in full plate armour. Maybe the aesthetics of the sculptural qualities found in plate armour, as well as its more complex construction techniques, are more highly regarded than those associated with a 'shirt' of mail. Whatever, this has not always been so, after all one of the first great exhibitions of armour, held in London in 1880, was entitled The Exhibition of Ancient Helmets and Examples of Mail. It also comes as something of a shock to realise that what are probably the best known papers on the manufacture of European mail, by E Martin Burgess, appeared some 50 years ago!

With exciting discoveries currently being made about the construction of mail, such as the galvanisation of Indian mail, the inception of this Journal provides a new and long overdue forum for informed discussion concerning mail armour.

My heartiest congratulations to Erik Schmid for taking this idea forward. I wish the Journal well and, like other readers, look forward to the following issues and their contents.

Robert C Woosnam-Savage *Curator of European Edged Weapons* Royal Armouries, Leeds, England, 2003

For further information regarding the Royal Armouries visit: www.armouries.org.uk

Link Details from Articles of Mail in the Wallace Collection

BY ERIK D. SCHMID

Several examples of mail from the Wallace Collection, London, have been selected for discussion in order to explore some of the intricacies of this enigmatic form of armour. Although the main focus of this paper will be the differences in link design within this group of items, other areas such as tailoring will also be discussed. Of the twenty mail items in the collection, six will be examined here.¹ This paper is not meant to be an in depth examination of each piece; rather it is a brief overview.

To fully appreciate mail, one must look at the particular garment as a whole. It is very important to pay special attention to the tailoring and to the individual links; each link is a work of art in its own right. No two riveted links in any mail garment are exactly the same. This is because each was made by hand using the simplest tools. Even so, mail-makers were clearly able to create individual links of iron that, for all intents and purposes, are almost identical. This alone is a testament to their skill as expert craftsmen.

The Making of a Link of Mail

Throughout this article individual pieces of mail will be referred to as being of either high or low quality. To explore the differences between the two categories, an explanation of the specific construction techniques that yield certain physical characteristics must be presented.

Mail is thought to have originated in the Celtic areas of Europe sometime around the fifth century b.c.e.² It is essentially a metal fabric made up of interlocking links made either of wrought iron or steel. Links made of gold, latten, or some other yellow metal were sometimes added as decoration, usually forming borders on the sleeve edges, collar and/or hem. Each link is connected to four others (Figure 1). Though there are variations,³ mail made in this fashion is by far the most common.

Wire is used as the base material from which the individual links are made. The most common way to make wire is with a draw-plate, a block of metal or stone having a series of tapered holes, each hole being of a slightly decreasing diameter. A piece of high-quality wrought iron is first hammered into the shape of a rod.⁴ This rod is



1. Reproduction mail made from 0.050" (1.27mm) pure iron wire. (Photo courtesy of the author)

worked until it is thin enough to be passed through the largest of the holes. The rod is then repeatedly passed through the succession of holes until it is of the desired size. The length of wire is first wound around a mandrel of desired size to form a coil. The individual links are then cut from this coil with either a hammer and chisel or with an hand-cutter of some sort. A pinching-type cutter seemed to work well when the author attempted to reproduce links of a reasonably accurate form.⁵ To facilitate the remaining manufacturing steps, the links need to be softened by heating them to a yellow heat. This can be done by stringing them onto a length of wire and placing them in a bed of hot coals. They should then be allowed to cool slowly. Once cool the ends of each link are lapped.⁶ How this lapping was accomplished is unclear. When the outer and inner diameters are measured, many original links are shown to have very consistent dimensions.⁷ The use of a single pair of tongs can yield very similar, and also very consistent, results.⁸ After the links are lapped, either the entire link or just the lapped area needs to be flattened. This flattening of the lapped ends is required to create an area that can be successfully pierced with a rivet-hole. To pierce this area, the use of a highly tapered drift is required. This drift must be hardened and tempered in order to perform this task flawlessly over thousands of repetitions. An improperly prepared drift will either break or bend after only a few links. Keeping a drift from breaking has as much to do with proper technique on the part of the craftsman as it does on the physical properties of the metal. A large portion of medieval mail appears to have the ends of its links closed with wedge-shaped rivets. Into the hole punched using the drift is placed just such a rivet. This tiny wedge can be made either from flattened wire or from strips cut from small plates of wrought iron. Generally all rivets seem to have been made from low-carbon wrought iron, even when the rest of the link is hardened and tempered steel. The reason for this is unclear. However it may be due to the fact that a low carbon wrought iron rivet is much more malleable and thus easier to peen than one made from high carbon steel. Using a special pair of tongs that has a dimple carved into one side of the jaws, the joint is then peened shut. This dimple is what gives the rivet its distinctive shape. In addition to the rivet, these tongs also give shape to the entire lapped area. The use of tongs fastens the joint much more securely than if it were only peened with a hammer strike to the backside of the rivet while the other side is placed over a formed depression in a block of metal.

For a mail link to be considered of a high quality it should have a very uniform transition from the lapped joint area into the rest of the link. In addition to the joint area, the remaining portion of the link should also have an even cross-section. Links of the same garment should also have uniform dimensional qualities when compared with one another. The rivet should be peened in such a way so as to be completely formed into a domed shape and not be so long as to be simply folded over. Mail of a lower quality, among other things, will not have these characteristics.⁹

Although mail could be manufactured with relative ease (the procedures are not particularly complex), it did take considerable time to produce; this time factor made it an expensive commodity. Until armour fell out of use mail seems to have been one of the most expensive types of protection.¹⁰ This was especially true if the mail was made of steel rather than iron.

A2

This is a very fine example of a fifteenthcentury mail shirt (Figure 2). It has short elbowlength sleeves with a body length that extends to the middle of the thigh. The bulk of the shirt is composed of riveted iron¹¹ links with an overall inside diameter of 0.259" (6.63mm) with a variance of +/- 0.030" (0.75mm). Each link has a very faint D-shaped cross section; the outward face of the link is flat while the underside is slightly convex. The lapped and riveted joint of each link has a distinctive shape known figuratively as the 'watershed effect.'¹² In essence this means that there is a central ridge running the length of the lapped joint (Figure 3). The sides of this ridge slope away, not unlike the roof of a house, while the rivet dome acts as the chimney; this can be clearly seen in figure three. In some cases the underside of each joint also has this characteristic shape, but without the rivet dome (Figure 4). It is possible that this shape was produced through the use of setting tongs with specially-shaped jaws. After the link is pierced and the rivet inserted, these tongs are used to squeeze the lapped joint together. The special indents in the jaws of the tongs give the link its distinctive appearance. Two sizes of iron links were used in



2. A2 mail shirt. (Photo courtesy of the Trustees of the Wallace Collection, London)

the making of Wallace Collection Inv. A2. Those comprising the bulk of the main body are of a slightly thicker (0.052", 1.31mm) material, while the links of the last eleven inches of the body and the lower portion of each sleeve are marginally lighter (0.031", 0.78mm). These heavier links have roughly the same inside diameter as the lighter links; 0.291" (7.38mm) for the body compared with 0.279" (7.08mm) for the extremities. They also have a slightly larger outside diameter due to the thicker wire they are made from, 0.447" (11.34mm) as opposed to the lighter links' 0.401" (10.17mm). The use of heavier links in the torso may indicate that this shirt was used as a primary defense.

Many of the links also exhibit a groove,¹³ which runs along their circumferences. This groove can be found on many mail garments that involve this link type. It has sometimes been thought that this might be a result of the flattening process, where the link might have been placed in a coining die of sorts and then struck. This is not entirely logical, since the groove is not located in the same place on every link. A more probable explanation is that it is a product of the wire manufacturing process. The drawplate employed may have had a small defect, which produced this groove. The absence of it on many links may also give us insight into the manufacturing practices of mail-makers. If the mail-maker had drawn the wire used in the manufacture of this shirt, one would expect all of the links to exhibit this characteristic groove. They do not. The links that do not have this groove might represent repairs. However, there are really far too many of them for that to be the case. An alternative explanation might be that the wire was purchased from several outside sources. The rest of the manufacturing steps could have been completed 'in-house.' Certain medieval guild records state that each workshop could only have one master craftsman accompanied by two journeymen and two apprentices,¹⁴ With this in mind the number of workshops devoted to mail-making must have been most numerous, considering the amount of mail that was produced. Guild regulations did also differ from area to area; mail-makers may very well have also had special guidelines.

None of the links in this shirt have a completely round circumference. This may indicate that the link ends were lapped by hand. Several other lapping methods, using techniques thought to have existed during the fifteenth-century (such



3. Lapped joint of an A2 link exhibiting the "watershed effect". (Photo courtesy of the Trustees of the Wallace Collection, London)



4. Underside of lapped joint displaying a convex appearance. The rivet can also be discerned from the rest of the link. (Photo courtesy of the Trustees of the Wallace Collection, London)



5. Armpit area of A2 showing ninety-degree seam attaching sleeve to the body. (Photo courtesy of the Trustees of the Wallace Collection, London)

as pushing the links through a tapering hole located in a block of iron¹⁵), failed to achieve the same result as hand-lapping in the author's experiments. Notice the similarity between the links in the author's hand-lapped reproduction sample (Figure 1) with the original links of Wallace Collection Inv. A2 (Figure 5). As mentioned earlier, the underside of each link is slightly rounded (Figure 4). This was most likely caused by the link being flattened in some sort of shaped depression. Whether or not this depression was intentionally carved, or was the result of repeated link flattening in the same area is hard to determine. The flattening could be achieved by placing a hardened metal block over the link and then striking it with a hammer, or by simply striking the link with the hammer directly. Both methods will yield similar results. The rivets used were of a flat wedge-shaped design.

This garment also displays a fair amount of tailoring, as shown by the gray areas on the diagram in Figure 6; all of these areas were identified by Martin Burgess when he studied the shirt in the early nineteen-fifties.¹⁶ The sleeves are connected by a ninety-degree seam under the armpit (Figure 5). The use of link contractions under the arms has given the sleeves a slight taper. A separate piece of mail makes up the collar. It is composed of three rows of iron links and one of latten. Located on either side of the collar there are expansions of one link every other row for nine rows, which extend from the front of the collarbone area up over the shoulder at an outward angle. This allows the shoulder blade area of the shirt to be slightly larger than the front, which allows the wearer greater flexibility. These expansions are then contracted on the back of the shirt with the same number of rows. These contractions are shown as the two inverted triangles directly under the shoulder expansions in the diagram (Figure 6). Two other contractions located in the centre of the front and back of the shirt further help to shape the shirt to the contours of the wearer. These contractions occur every other row for four rows.

There are four evenly spaced expansion seams found in the lower portion of the garment. These are shown as the four triangles along the lower edge of the shirt in the diagram (Figure 6). These expansions occur every fourth row for four rows. Another interesting feature is the use of two separate expansion/contraction areas not shown in the diagram, which are located at either



6. Diagram by author.



7. Latten links of A2. (Photo courtesy of the Trustees of the Wallace Collection, London)

side of the shirt towards the bottom of the garment. Sometimes referred to as a *"knot row expansion"*¹⁷ these two areas make the back of the garment four rows longer than the front. This same type of expansion/contraction is also used on the sleeves of A10-11 (Figure 32). This degree of tailoring gives A2 a superior, form-fitting quality.

Latten links, sharing the same characteristics in terms of appearance as the iron ones, are used as decorative edging on the hem, sleeves and collar (Figure 7). Latten is much more difficult to work than iron. It work-hardens very quickly, which makes it prone to splitting and cracking. Thus it must be softened before working. This is accomplished by heating the links in a forge until they are bright red in colour and then promptly quenching them in water. Once made into links the latten cannot be re-hardened into its initial state. However, it can be slightly re-hardened through either work-hardening or by bringing the links to a bright red heat and then (very slowly) cooling them in some sort of heat-retaining medium such as sand. Each latten link in A2 has been closed with a ferrous rivet. In the front of the shirt on the left side of the collar split is a large latten link embossed with the name ernart couwein in gothic miniscule (Figure 8). This link could have been made either by pouring molten latten into a pre-formed mold or by striking a pre-made latten link in a coining die. Maker's marks like this one can be helpful in dating a particular piece, but care must be taken to make sure that the link was not added at a later time. This can be done by examining the links surrounding it and checking that they match the others in the main areas of the garment. Unfortunately, only a handful of mail garments with maker's links such as this one are known to exist. In regard to its maker's link and to the style of iron link used in its construction, A2 has been dated to the second guarter of the fifteenth century and is thought to be of German manufacture.18

A7

This shirt appears to have been made up from several different mail items, each of which were themselves composed of very fine links. This assertion is based on the fact that some of the links exhibit a high degree of craftsmanship while others are of a much poorer quality. The shirt has long wrist-length sleeves; the body of



8. Maker's link of A2 bearing the name ernart couwein. (Photo courtesy of the Trustees of the Wallace Collection, London)



9. A7 mail shirt. (Photo courtesy of the Trustees of the Wallace Collection, London)

the garment extends to the waist (Figure 9). Unlike the flattened links of A2, the links of both the body and sleeves of A7 have a round cross section. They are also in a much more corroded state. It should be noted that, due to this corrosion, the links are now quite different in appearance; when new the links would have been slightly thicker and would have had a somewhat rougher appearance. The smoothing effects of wear and corrosion have produced a visual quality that was probably not originally present.

The links of the body (Figure 10) are of very high quality, having a round or slightly oval cross-section with only a small amount of flattening occurring at the lapped joint. The creation of links using wire of this thickness (0.027", 0.68mm) and diameter (0.187", 4.74mm OD.) must have required a great deal of skill. Although they show a large amount of corrosion, the possible method used to create them can still be discerned.

The lapped joint on links made using this very thin wire would have only been flattened a small amount before piercing. If the link is flattened too much, the setting tongs will not perform their function adequately. Too little and the piercing operation becomes much more difficult to execute properly. A hardened and highly tapered drift, looking somewhat like a tiny chisel, is required to pierce a slit through wire of such thinness. Great care must be taken when using this type of tool, or it will easily be broken. However, when used correctly, a drift will pierce tens of thousands of links before sharpening is required.

The rivet bulge is composed mainly of the link itself with the rivet making up only the very top portion, or crown. This effect is caused both by the piercing and rivet setting operations. The rivets used in these links are of the flat wedge design and are very long and thin. After many years of corrosion and wear, it becomes virtually impossible to distinguish between the rivet and the link. This is especially true of the underside of the link (Figure 11), which has no rivet dome to help identify the lapped joint. The only way to locate it is to look for a slight bulge in the link.

Links of a somewhat lower quality were used in the construction of the sleeves (Figure 13). These would have been crafted using the same process as the body links.

However, the setting tongs used on these links seem to have been of a different shape. This could indicate that the shirt was made up from pieces of mail manufactured by separate work-



10. A7 body links, top. (Photo courtesy of the Trustees of the Wallace Collection, London)



11. A7 body links, underside. (Photo courtesy of the Trustees of the Wallace Collection, London)



12. This is an example of the type of rivet used on the links of the sleeves of A7. This type of link was also used to connect the latten edging found on the lower edge of the body and also to attach the dense mail patches that make up the armpit areas. (Photo courtesy of the Trustees of the Wallace Collection, London)

shops. Also, the manner in which the link ends were initially lapped does not appear to have been as consistent as the process used on the body links. These two combined factors have produced a style of link that seems inferior when one compares them with the body links.

The rivets used on these links seem to have been much longer than those used in the body links. It is thus easier to distinguish between the rivet and the link (Figure 12). Judging by the size and shape of the rivet dome, the setting tongs used in the creation of these links seem to have had a deeper and broader dimple than the tongs used on the body links. The depressions in the tongs' upper and lower jaws must have been much shallower as well, which resulted in an increased flattening of the lapped area. Some areas of the shirt made up of these links suffered considerable corrosion at one time (Figure 13).

Decorative latten links have been used to create borders along the end of each sleeve, the top edge of the collar, along the hem of the body, and along a split located in the front of the chest (extending approximately eight inches from the top of the collar). The sleeve ends are composed of six rows of riveted latten links and seven rows of whole latten links. These are woven in the alternating row fashion, in the same manner as are the decorative links on the hem of the body. Along this lower edge are seven rows of whole and riveted latten (Figure 14). These rows were connected to the body using the same type of links as are used in the sleeves.

The whole latten links appear to have been punched from a sheet, due to their very uniform appearance. The technology for welding brass by brazing was known, but there does not appear to be any evidence that this method was employed in the production of these links. Over time, the inner and outer edges of the whole links have been worn smooth and have been slightly rounded. The riveted latten links appear to have been produced using the same manufacturing method as that used on the sleeve links. The lapped area on many of the latten links is strikingly similar to that of the sleeve links.¹⁹ The size and shape of the rivets used can be clearly seen in the case of the center link in Figure 12. Manufacturing links from very thin latten wire (0.025", 0.63mm) requires a great deal more patience than when one is working with the thicker wire (0.045", 1.14mm) used for the latten links of A2. When softened, these delicate links require only a tiny amount of force to bend them



13. Corroded links of A7. (Photo courtesy of the Trustees of the Wallace Collection, London)



14. Solid and riveted latten links of A7 (along the lower hem of the body). (Photo courtesy of the Trustees of the Wallace Collection, London)



15. Latten links edging the collar slit of A7. (Photo courtesy of the Wallace Collection)

into shape. The force required to drift a hole through the lapped ends is also infinitesimal.

In the front of the shirt is an eight-inch slit that descends from the center of the collar area. While it is also trimmed in latten links (Figure 15), they appear to be of different make than the others. Instead of being woven in an alternating row fashion of riveted and whole links, these latten links are all riveted, or were at one point; some are missing and others have been replaced with butted latten links. These butted links may or may not have been a contemporary repair. Metallurgical analysis of these links might help to answer this question. Many of the original riveted links have lost their rivets. This conveniently allows for an unobstructed view of the pierced joint. One can then work out the size and shape of the drift used in the piercing operation, and also the hardness of the links prior to drifting. These latten links also share the characteristic drawplate groove found on the links of A2. Another interesting feature of these links is the fact that many of them have been completely flattened, rather than having only the lapped joint flattened. The lapped area on many of these links also bears a resemblance to the lapped area of the ferrous links of the body. Sleeve-type links have also been used, in such a way as to suggest repair work.²⁰ These latten links have not been used to edge the slit extending into the small dense links of the collar itself. However, along the top edge of the collar are two rows of latten links. The uppermost row is comprised of tiny whole links. These are connected to the ferrous links of the collar by a row of riveted latten links. This arrangement bears resemblance to the collar of the mail standard A9.

Under each armpit there is a section of mail constructed of a much heavier wire (0.040", 1.01mm) than the wire used for the links of the sleeves and body (0.027", 0.68mm). The inside diameter of these links is comparable to that of the other links (0.140", 3.55mm vs. 0.132", 3.35mm). These patches of especially dense mail were probably inserted in order to provide extra protection for this vital and vulnerable area; the underarms are an especially tempting target, since there are no bones to impede the progress of a sharp, thrusting weapon into the vitals. These links exhibit the same shape in regard to the lapped joint that is found on the sleeve links; this implies that they were made by the same person or at least with similar tools. This dense area is attached to the higher quality links of the



16. Dense links which comprise the armpit reinforcements of A7. (Photo courtesy of the Trustees of the Wallace Collection, London)



17. Area of A7 where the dense weave of the armpit reinforcement connects to the looser weave of the main body. The collar is also connected to the body in this fashion. In this image one can also see the sleeve type links used to join the links of the reinforcement to the smooth links of the main body. (Photo courtesy of the Wallace Collection, London)

body by means of links of the same type as those used in the sleeves (Figure 17). Judging by the degree of wear on the body links it is entirely possible that it is older than the mail of the sleeves where the rivet is still discernable from the link. The collar is composed of the same dense links as the armpit reinforcements.

Based on the information presented, it seems reasonable to conclude that this shirt may be a composite of several different mail items. It is an excellent demonstration of the ways in which mail was recycled; old fragments or damaged pieces could quite easily been reconstituted into new garments. This piece has been attributed to sixteenth-century Germany.²¹

A8

In the case of this interesting mail cap, many years of corrosion and wear have taken a heavy toll (Figure 18). It is primarily composed of small (0.246", 6.24mm OD.) D-section links (Figure 19). It also exhibits four seams of round cross-section links (Figure 21). The quality of the D-sectioned links is much lower than those of A2. The flattening of these links is also much less pronounced. There is also a great deal of inconsistency among the links in terms of overall shape. It is as if the flattened links of A2 were combined with the lapped joint on the sleeve links of A7. Four inter-linked triangles make up the main body of the piece. These triangles are joined together through the use of the aforementioned seams made up of links having a round cross-section. The use of these round cross sectioned links (Figure 21) may indicate that A8 was made up from one or more scrap pieces of mail. When constructed in this manner, the links crowd each other at the apex of the cap (Figure 20). These round cross-section links have a lapped joint similar to the flattened links. It is quite possible that many of the links that exhibit very little corrosion are repair links. The round cross-section links have slightly larger outside and inside diameters (0.292" & 0.198", 7.41mm & 5.02mm vs. 0.246" & 0.157", 6.24mm & 3.98mm). Under examination, the two link styles appear to be very similar in terms of the size and shape of the lapped joints. This implies that they were probably set with the same tongs, but not formed on the same mandrel. This situation could in turn be another indication that this piece is of a composite construction.

When using a construction method similar to



18. Mail cap, A8. (Photo courtesy of the Trustees of the Wallace Collection, London)



19. D-section body links of A8 showing corrosion. (Photo courtesy of the Trustees of the Wallace Collection, London)



20. Top of A8 mail cap showing bunching of the links where the top of the four triangles are connected. (Photo courtesy of the Trustees of the Wallace Collection, London)

this one, the piece tends to hang in an uneven fashion. In other words, the areas directly beneath the expansion seams hang lower than the rest of the piece. In this case there are four seams; this results in four corresponding low spots (Figure 18). When fitted with its padded lining this piece would probably sit rather high on the wearer's head. The way this piece would have been worn is not clear. Its shape is not unlike that of a cervelliére (metal skull cap) worn either under or over a mail coif during the thirteenth and fourteenth centuries. It has been dated to the sixteenth century, but no provenance has been assigned to it. Mann states that caps of this sort are a great rarity.²²

A9

One cannot help but feel a sense of awe when confronted with the sheer virtuosity of the craftsman who made this exquisite piece of armour. It is composed of five distinct link types, while several others have been added, presumably as repairs. The mantle and collar are composed of two styles of iron links; the other three link types are of latten. These are located in decorative rows at the top edge of the collar and bottom edge of the mantle.

The collar is composed of very fine links woven so tightly that they are completely fixed and unable to rotate (Figure 23). This situation is similar to the collar and underarm links of A7. Link thickness is the one aspect that differentiates them (0.040", 1.01mm for A7 and 0.035", 0.88mm for A9). The wire used in their manufacture is semi-round in cross section. Marks caused during the drawing process are readily discernable. Each link has been closed with a wedge shaped rivet and peened with setting tongs. The rivet heads slope slightly to the right (Figure 23). This is a good example of a link feature being caused by tool wear. When rivets are continuously set in the same area of a pair of tongs, over time the depression that forms the rivet will slowly change shape. This change usually happens slowly over several thousand strikes or more, depending on the hardness of the setting tongs. The back of the rivet is barely discernable due to corrosion and wear, but can be made out with some effort (Figure 24).

There is a readily discernable line of expansion links, occurring at a frequency of one every row beginning at the sixteenth row in the middle of the collar. As can be seen in Figure 22 the



21. Round cross-section links used to connect the triangles. (Photo courtesy of the Trustees of the Wallace Collection, London)



22. Mail standard, A9. (Photo courtesy of the Trustees of the Wallace Collection, London)



23. Tightly-woven collar links of A9. (Photo courtesy of the Wallace Collection, London)

central portion of the collar is twice as wide as it is on either side. This expansion line continues into the mantle. The shape of the finished links seems to indicate that they have been lapped by hand. Even so the links have a very uniform appearance; this indicates a high level of precision on the part of the craftsman. The links are all slightly ovoid in overall shape.

Unlike the links of the collar, the links of the mantle (Figure 25) have a flattened cross section. The interesting thing about these links is that they are flattened on both sides, which also makes them unlike the D-sectioned links of A2 and A8. The overall condition of these links is rather poor.

It almost appears as if the piece were put together rather hastily, or by an inexperienced craftsman. There is a great deal of difference between the two main components of this standard as illustrated by the links of the collar (Figure 23) and the links of the mantle (Figure 25). The flattening of the links seems to have been accomplished with a hammer, judging by the varying widths at different points on the individual links.

Each of the mantle links has been secured with a wedge-shaped rivet (Figure 26). However this rivet was not properly set. If it had been, it would not exhibit such crisp edges. Had this rivet been set correctly it would display a much broader and crushed appearance, much like those in the collar links (Figure 23). Because this rivet was never set properly, it is not difficult to discern its original form previous to use. The amount of initial flattening that the link received prior to riveting can also be worked out.

Along the top edge of the collar are two rows of decorative latten links, one solid and one riveted (Figure 27). The riveted latten links appear to have been made in the same fashion as the ferrous collar links. It is quite possible they were also made with the same tools. The uppermost row of the collar is made from solid latten links; these were most likely created by punching them from a sheet. They have a slightly smaller inside diameter than the other links of the collar, which helps to stiffen the weave.

Along the lower edge of the mantle are two rows of riveted latten links (Figure 28) of similar size to the ferrous mantle links (Figure 25). They are comparable in size to the ferrous links, but do not seem to exhibit the same amount of flattening.

This standard also shows signs of wear. The



24. Underside of A9 collar link. The rivet is barely discernable. (Photo courtesy of the Trustees of the Wallace Collection, London)



25. Flattened mantle links of A9. (Photo courtesy of the Trustees of the Wallace Collection, London)



26. Underside of A9 mantle link's lapped joint. Wedge-shaped rivet is clearly visible. (Photo courtesy of the Trustees of the Wallace Collection, London)

vast majority of the mantle links exhibit some form of post-manufacture deformation. There is also a small section that has been repaired with round cross-section links, which appear to have been closed with a round rivet.²³

This piece has been dated to the late fifteenth century, and has been assigned a questionable provenance associating it with the Comte de Nieuwerkerke.²⁴

A10-11

The last two pieces discussed in this article are a pair of mail sleeves (Figure 29). They are unique in that they are made entirely of latten. This could mean that they were intended only for parade. The mail was tinned, presumably to make it look like iron with latten trim, or possibly like silver if the tinning was bright. They are made of alternating rows of riveted and whole latten links (Figure 30). The whole links were probably punched from a solid sheet and have a washer like appearance, whereas the riveted ones were made from drawn wire and have a round cross-section. Both links have similar outside diameters (0.212", 5.38mm for the riveted links and 0.213", 5.40mm for the whole links). Their inside diameters, however, differ significantly (0.142" for the riveted and 0.129" for the solid).

The quality of the riveting is quite poor. Many of the links have lapped joints that are split and torn. The rivets used are quite long and wedgeshaped. Many of them were not peened smoothly. Instead they seem to have been simply folded over during the setting process. This lack of quality may indicate that this piece is of a later date, when mail was no longer needed as a primary defense.

These sleeves seem to have been constructed from several pieces. This sort of feature is easier to see when two pieces of alternating row mail are connected to each other than it is in the case of all-riveted mail. When pieces of alternating mail (that have a dissimilar row orientation) are connected to each other, there will be two rows of riveted links connected to each other (Figure 31).

These sleeves also exhibit a fair degree of tailoring. The armpit of each has been constructed in the same fashion as those of mail shirts such as A2. Contractions along the lower edge of each sleeve taper it to better form to the arm (Figure 32). These contractions are the same as those used on A2 to make the back longer than



27. Latten collar links of A9. The row of whole links along the top edge were possibly made by punching and were probably used to tighten up the weave thereby making the collar somewhat stiffer. (Photo courtesy of the Trustees of the Wallace Collection, London)



28. Latten links along the lower edge of the mantle. (Photo courtesy of the Trustees of the Wallace Collection, London)



29. A10 tinned mail sleeve made of latten links. (Photo courtesy of the Trustees of the Wallace Collection, London)

the front. Another feature is the use of contraction/expansion seams going around the arm at the elbow joint (Figure 33), which provide the wearer with greater ease of movement. They allow the arm to bend without having the mail bunch up overmuch in the bend of the elbow; the sleeve can thus also be much more closely fitted, since the mail is shaped to allow the elbow to flex without squeezing. There are actually two seams on each arm. Each starts at the inside of the elbow on the front of the sleeve. Expanding one ring every other row they then extend down both sides of the arm ending several rows before the bottom of the elbow.

These sleeves have been dated to the fifteenth/sixteenth centuries with no provenance given.



30. Riveted and whole latten links of A10. (Photo courtesy of the Trustees of the Wallace Collection, London)



31. Riveted links connecting sections of mail with dissimilar row orientation. (Photo courtesy of the Trustees of the Wallace Collection, London)



32. Knot row contraction, shown here by the arrow, used along the sleeve of A10. (Photo courtesy of the Trustees of the Wallace Collection, London)



33. Elbow seam of A10. (Photo courtesy of the Trustees of the Wallace Collection, London)

Acknowledgements

I am very grateful to David Edge, curator and conservator of armour at the Wallace Collection for allowing access to the mail under his supervision and for answering my many questions. I would also like to thank Tobias Capwell, curator of arms and armour for Glasgow Museums, for his guidance, patience, and numerous helpful insights in relation to the preparation of this article. I would also like to thank Mark Chapman for doing the painstaking work of measuring the links I produced.

NOTES

^{1.} Inv. A2, A7, A8, A9, and A10-11. See Mann, J.G., "*European Arms and Armour in the Wallace Collection*", 1962

² Rusu, M., "Das Keltisch Furstengrab von Ciumesti in Rumanien", *Germania* 50, 1969, pp.267-269

^{3.} The author has examined and repaired a mail shirt made with links woven in a six-in-one pattern (where each link has six others pass through it). In the authors opinion this shirt is most likely of seventeenth or eighteenth-century Middle Eastern/Indian manufacture.

^{4.} In order for the wire to be drawn successfully, the parent metal must be of sufficient quality so as to avoid breakage during the drawing operation. That is, it must have very few silicate inclusions otherwise it will continually fracture during drawing.

^{5.} The author has found that to successfully separate the individual links from the coiled wire and leave the links ends with a shape similar to that found on many pieces of original European mail (particularly that of German manufacture), a pinching-type cutter is needed.

⁶ This process of link manufacture is not the only method used. In a forthcoming article the author will demonstrate another method that may have been commonly used in Europe.

^{7.} Tables I & II contain the data collected by the author from selected mail items in the Wallace Collection, London, UK. Due to time con-

straints, all of the measurements were not taken. These missing measurements will be gathered at a future date yet to be determined. The measurements given for A7 were taken from the smooth links of the main body with the exception of the one latten link. There are several different link styles present on this shirt. Due to time constraints this was the only one recorded at this time. A more thorough analysis is planned for the future. The diagram at right shows where the various measurements, with the exception of the mound height, were taken on each link.

⁸ A sample of twenty links made by the author, were measured to determine if links made completely by hand, rather than using tools like those developed by Burgess, could achieve the tight tolerances found on surviving examples. It was found that the links generally deviated from one another by only several tenths of a millimeter. It should be noted that these links were hastily manufactured. It is quite possible that had the author taken more time, the tolerances would have been even closer.

^{9.} This is a mail link having a rough overall appearance in terms of its lapped area. The rivet is bent over rather than being properly peened, which would give it a more mushroom-type head. This effect was most likely caused by the setting tongs having a dimple that was too deep for the rivet. The lapped area has been flattened too much which has given it a very broad and non-uniform shape. This was probably caused by the setting tongs not having enough of a depression on the inside edge to accommodate all



(9)



TABLE I							
Object	OD1	OD2	ID1	ID2	Lap 1	Lap 2	Mound Height
A2 - 1	11.34mm (0.447")	10.43mm (0.411")	7.38mm (0.291")	5.88mm (0.232")	5.17mm (0.204")	2.86mm (0.113")	2.30mm (0.091")
A2 - 2	10.17mm (0.401")	10.02mm (0.395")	7.08mm (0.279")	5.93mm (0.234")	5.17mm (0.204")	2.41mm (0.098")	2.08mm (0.082")
A2 - 3	10.98mm (0.433")	9.72mm (0.383")	7.79mm (0.307")	6.24mm (0.246")	5.00mm (0.197")	2.23mm (0.088")	1.90mm (0.075")
A7 - 1	4.74mm (0.187")	5.02mm (0.198")	3.35mm (0.132")	3.07mm (0.121")	2.18mm (0.086")	1.16mm (0.046")	0.98mm (0.039")
A7 - 2							
A7 - 3	5.58mm (0.220")		3.55mm (0.140")				
A8 - 1	6.24mm (0.246")	6.44mm (0.254")	3.98mm (0.157")	2.74mm (0.108")	3.09mm (0.122")	1.87mm (0.074")	1.31mm (0.052")
A8 - 2	7.41mm (0.292)		5.02mm (0.198")				
A9 - 1	7.36mm (0.290")	7.58mm (0.299")	5.00mm (0.197")	4.26mm (0.168")	3.55mm (0.140")	2.00mm (0.079")	1.14mm (0.045")
A9 - 2			3.29mm (0.13)				
A10/11 1	5.38mm (0.212")		3.60mm (0.142")		2.33mm (0.092")		1.44mm (0.057")
A10/11 2	40mm (0.213")		3.27mm (0.129")				

A2 (1) Body links, (2) Extremity links, (3) Latten links A7 (1) Smooth body links, (2) Latten, (3) Collar and armpit links

A8 (1) Body links, (2) Round section links A9 (1) Mantle links, (2) Collar links A10/11 (1) Riveted links, (2) Whole links

17



	TABL	ЕП
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Object	Thick-	Width	Thickness	Width	Thick-	Width
	ness A	A	B	B	ness C	C
A2 - 1	1.31mm	1.64mm	1.06mm	1.87mm	1.14mm	2.00mm
	(0.052")	(0.065")	(0.042")	(0.074")	(0.045")	(0.079")
A2 - 2	0.78mm	1.62mm	0.78mm	1.54mm	0.98mm	1.29mm
	(0.031")	(0.064")	(0.031")	(0.061")	(0.039")	(0.051")
A2 - 3	0.78mm	1.47mm	0.91mm	1.31mm	0.81mm	1.54mm
	(0.031")	(0.058")	(0.036")	(0.052")	(0.032")	(0.061")
A7 - 1	0.68mm	0.68mm	0.71mm	0.68mm	0.71mm	0.68mm
	(0.027")	(0.027")	(0.028")	(0.027")	(0.028")	(0.027")
A7 - 2	0.63mm (0.025")					
A7 - 3	1.01mm (0.040")					
A8 - 1	0.76mm	0.93mm	0.78mm	0.98mm	0.78mm	1.01mm
	(0.03")	(0.037")	(0.031")	(0.039)	(0.031")	(0.04")
A8 - 2	0.68mm (0.027")					
A9 - 1	0.55mm	0.98mm	0.53mm	0.98mm	0.48mm	1.21mm
	(0.022")	(0.039")	(0.021")	(0.039")	(0.019")	(0.048")
A9 - 2			0.88mm (0.035")			
A10/11 1			0.78mm (0.031")			
A10/11 2						

A2 (1) Body links, (2) Extremity links, (3) Latten links A7 (1) Smooth body links, (2) Latten, (3) Collar and armpit links

A8 (1) Body links, (2) Round section links A9 (1) Mantle links, (2) Collar links

A10/11 (1) Riveted links, (2) Whole links

of the material of the link's lapped ends. (Photo courtesy of the Trustees of the Wallace Collection, London)

^{10.} Gaier, C., "L'Industre et le commerce des Armes dans les Anciennes Principautes belges du XIIIme a La fin du XVme siecle", *Societe d'Edition "Les Belles Letters"*, Annexe 5, 1973.

^{11.} Ferrous links of A2 tested by Dr. Alan Williams and David Edge and were found to be iron and not steel.

^{12.} Burgess, E.M., "The Mail-maker's Technique", *The Antiquaries Journal*, 1953, Vol. 33.1-2, pp.48-55.

^{13.} The groove can be clearly seen in these links. It is not in the same position on each link, which lends credibility to the idea that it was caused during the manufacture of the wire and not during the link-flattening process. (Photo courtesy of the Trustees of the Wallace Collection, London)

^{14.} Reitzenstein, Alexander von, "Die Ordnung der Nurnberger Plattner" Waffen- und Kostümkunde, (München, 1959) New Series, I, 54-85. idem."Die Ordnung der Augsburger Plattner" ibid.(München, 1960) New Series, II, 96-105.

^{15.} Burgess, E.M., "The Mail-maker's Technique", *The Antiquaries Journal*, 1953, Vol. 33.1-2, pp.48-55

^{16.} Burgess, E.M., "Further Research into the Construction of Mail Garments", *The Antiquaries Journal*, 1953, Vol. 33.1-2, pp.193-202

^{17.} Burgess, E.M., "Further Research into the Construction of Mail Garments", *The Antiquaries Journal*, 1953, Vol. 33.1-2, pp.193-202

^{18.} Mann, J.G., "European Arms and Armour in the Wallace Collection", 1962

^{19.} These two links are from the lower hem of the body of A7. Both the latten link on the left and the ferrous link on the right seem to have almost identical lapped joints. Other than the rivet length, their overall appearance is quite similar, which may indicate that they were manufactured with the same tools, at least in regard to the rivetsetting operation. The position of the rivet in each link is also nearly identical. This along



(13)



(19)

with the fact that the ferrous links connect the latten links to the dissimilar links of the main body also seems to indicate that they were manufactured in the same shop, perhaps even by the same person. (Photo courtesy of the Trustees of the Wallace Collection, London)

^{20.} The sleeve-type links identified by the arrow, have been used in what appears to be a repair, further indicating that this shirt could be of composite manufacture. This image was taken of the links located on the right side of the collar slit. (Photo courtesy of the Trustees of the Wallace Collection, London)

^{21.} Mann, J.G., "European Arms and Armour in the Wallace Collection", 1962

^{22.} Mann, J.G., "European Arms and Armour in the Wallace Collection", pp.3-4, 1962

^{23.} Round-section repair links of A9. (Photo courtesy of the Trustees of the Wallace Collection, London)

^{24.} Mann, J.G., "European Arms and Armour in the Wallace Collection", 1962



(20)



(23)

BY TOBIAS CAPWELL

In the collections of Glasgow Museums is a small, somewhat forlorn piece of mail (Figure 1). It measures roughly 20cm by 27cm, and is in a rather tattered state. It is impossible to determine the sort of garment from which it came, since it is not large enough to contain any real clues.

Yet it is quite an important fragment. The reason for this is that it is one of only a few examples of Scottish mail known. The fragment can tell us little about itself, although a few facts are however known about its find context.

The fragment was given to the Art Gallery and Museum, Kelvingrove, in 1884 by A.G. McIntyre. It was apparently found by one William Fisher of Balfron (north of Glasgow), 'while cutting peat in Flanders Moss at a depth of seventeen feet.'¹ It was thought at the time to be a 'portion of a jacket of chain mail',² although there is simply not enough of the material left to be sure whether it was indeed part of a mail shirt; it equally could have come from a coif, mantle, or from some other garment.

This was not the only time something of interest has been found in Flanders Moss. A Bronze Age bucket, several swords, and even Britain's oldest known wheel have also emerged from the boggy depths of this area, which is today a national nature reserve. The Moss is a small remainder of what was once the great Forth Valley boglands that stretched from Aberfoyle to beyond Stirling; it now forms the largest raised bog left in the British Isles. Since this area contains so much evidence, of thousands of years of change in the landscape and in human culture, it is impossible to assign a date to this piece of mail or to associate it with a particular event. Mail was known in Britain in pre-Roman times, and probably remained in use into the seventeenth century in Scotland; thus it is difficult at the present time to reduce the possible date-frame.

The fragment is composed of iron rings having an internal diameter of between 5mm and 8mm. Some metal has clearly been lost due to corrosion (Figure 2). The links are round (or possibly ovoid) in section. A number of links are broken or bent out of shape, but for the most part the piece is in a remarkably good state of preservation. Each of the rings is riveted to four others, two above and two below, in the standard man-



1. Scottish mail fragment Inv. 1884.54 . (Photo courtesy Glasgow Museums: Art Gallery and Museum, Kelvingrove)



2. Close-up of links showing considerable corrosion. (Photo courtesy Glasgow Museums: Art Gallery and Museum, Kelvingrove)

ner.

Mail with a specifically Scottish provenance is rare in the extreme. The only complete mail garment with a Scottish attribution is a mail shirt (Figure 3) that was taken by its private owner³ to the Perth Museum and Art Gallery for examination in 1986; it was subsequently passed on to the National Museum of Scotland for an opinion.⁴ It is now in the permanent care of Perth Museum. This habergeon includes a distinctive bronze fastening at the neck (Figure 4) with Scottish (highland) decoration. The clasp itself was thought to date from the seventeenth century, although the mail itself could easily be older. The mail itself varies considerably in link type and weave. The mail of the collar is, as was indeed typical, of a much denser weave then the material used for the body and sleeves. The orientation of the rows of links is also quite strange and inconsistent; this may indicate that the garment was made up entirely from recycled pieces; at the very least it has been extensively patched. The largeness and flatness of many of the links is odd (Figure 5); this may be evidence that the shirt is not as old as it is meant to appear, as has been suggested previously. Equally, the garment may never have been of a particularly fine quality; the link-size may simply reflect the material's 'munitions' grade.

Another substantial group of fragments of what may be Scottish mail was for many years at the chapel at Barhobble in Galloway.⁵ These eighteen small, corroded lumps were once a piece of mail constructed of iron links with a 5mm internal diameter and a 7mm outside diameter. They also contain 'brass' decorative links, as well as some others that seem to be a 'white-brass' alloy. Judging from the group's total size and the size of the stone on which they were laid when found (250mm x 180mm) the garment may have been a coif as opposed to a full shirt, although it could also have been some sort of fragmentary relic. This piece of mail was apparently deposited in the chapel during the building's working lifetime, possibly as some form of funerary achievement. Another such find, also possibly a coif, was made in the Chapel of Wyre in Orkney in the 1930's.⁶ Though again very fragmentary, this group includes one curious piece. This is a heavily corroded fragment of mail (there are two link sizes here, 9mm/11mm and 10mm/14mm) attached to a larger iron link (15mm/25mm). This larger link passed through the top row of links of the frag-



3. Perth mail shirt. (Photo courtesy of Perth Museum & Art Gallery, Perth & Kinross Council, Scotland)



4. Bronze neck clasp. (Photo courtesy of Perth Museum & Art Gallery, Perth & Kinross Council, Scotland)

ment itself. A fair number of expansion links are still discernable in the body of the fragment, giving it what may have been a certain triangular shape. This suggests that the larger link was the crown-piece of a coif, off of which was built the cap of the coif, which was in turn made up of a number of rapidly expanding circular rows of links.

The National Museum of Scotland in Edinburgh also has in its collection numerous other small fragments having Scottish provenances, mainly in an excavated condition⁷:

H.LN 60 - Plain iron helmet with a dome-shaped skull, slightly ridged and with a long mail neck defense attached to the side and back of the rim, from the armoury at Inverary Castle, Argyll.

H.HX 852 - Five pieces of mail, together with several detached brass rings and groups of rings, probably from Wyre, Orkney.

H.HX 874 - Iron link of mail from Edgerston, Roxburghshire.

H.HXA 54 - Four riveted copper alloy links of mail, probably part of the fringe of a mail garment, from Threave Castle, Kirkcudbrightshire.

H.HXA 55 - Fifty butted <?> copper alloy links of mail, from Threave Castle, Kirkcudbright-shire.

H.HXA 105 - Link of mail, possibly pewter, from Threave Castle, Kirkcudbrightshire.

H.HXA 109 - Piece of mail from Threave Castle, Kirkcudbrightshire.

X.DW 2 - Fragments of iron mail from Carling-wark Loch.

X.FRA 119 - Iron mail from the Roman site at Newstead, Roxburghshire (80-180 AD).

X.FRA 120 - Bronze mail, from a *lorica plumata*, from the Roman site at Newstead, Roxburghshire (80-180 AD).

X.FS 224 - Corroded mass of iron mail, found at the site of the Roman fort at Chesterholm, North-umberland (120-400 AD).

X.GA 1096 - Link, mail.



5. Heavily flattened links of the Perth mail shirt. (Photo courtesy of Perth Museum & Art Gallery, Perth & Kinross Council, Scotland)

NOTES

^{1.} Object file note, Art Gallery and Museum, Kelvingrove, Glasgow.

^{2.} Object file note, Art Gallery and Museum, Kelvingrove, Glasgow.

^{3.} The garment at one time belonged to an amateur antiquarian in Scone who for years kept it 'in a garden shed.' Correspondence between Alison Reid, Assistant Keeper of Human History, Perth Museum and Art Gallery, Perth, and Dr. David Caldwell, Keeper of History and Applied Art, National Museums of Scotland, June 18th, 1986.

^{4.} Personal communication, Dr. David Caldwell, Keeper of History and Applied Art, National Museums of Scotland.

^{5.} Cormack, W.F., 'Barhobble, Mochrum: Excavation of a Forgotten Church Site in Galloway', *Transactions of the Dumfriesshire and Galloway Natural History and Antiquarian Society*, 70 (1995), p. 80. This object is now in the collections of the National Museum, Edinburgh.

⁶ Cormack, W.F., 'The Iron Mail from Wyre, Orkney', privately circulated ms, copies in the National Monuments Record of Scotland and Tankerness House Museum, Kirkwall.

^{7.} The author would like to thank Dr. David Caldwell for supplying these records.

Armour Purchases and Lists from the Howard Household Books

BY ROBERT W. REED Jr.

Part 1 - Armour Purchases

This article is an examination of the armour purchases of Sir John Howard, and the listings of armour loaned out to be used by his retinue. The author's aim is to provide the student of Western European armour with useful data that, when examined in conjunction with other sources, may begin to shed some light on the manufacture and trade in armour in England and The Low Countries.

Sir John Howard was born into a typical East-Anglian gentry family in 1421. His father had married well, to the daughter of Thomas Mowbray, Duke of Norfolk; this gave the Howard family a solid connection to a powerful patron, and would influence the course of John Howard's later career. While he served on the council of his cousin, John Mowbray, third Duke of Norfolk, as a young man, John Howard's political life was unremarkable until his open support of Edward IV during the campaigns of 1461. He joined Edward's host as a member of Norfolk's contingent prior to the battle of Towton,¹ where he led a contingent of the Duke's men. Howard's fortunes improved dramatically following the success of Edward's seizure of power. As a reward for his loyalty, Howard was knighted, given a post in the royal household, and received grants of manors. Additionally, he was made Sheriff of Norfolk and Suffolk, as well as Constable of the castles at Colchester and Norwich.

During the first years of Edward IV's reign, Howard served in military campaigns against the Lancastrians in the North of England and Wales. At this point he was acting as the head of Norfolk's contingent, rather than in an independent role. This service, coupled with his position in the royal household, brought him to the attention of the king, and soon Howard began to receive the benefits of royal favour. In 1467 Howard was made a knight of the body, and this was followed a year later by the exceptional elevation to the posts of Treasurer of the Household and Keeper of the Wardrobe, positions normally held by a peer. Early in 1470, the King bestowed on him a barony, making John Howard one of only eight men elevated to the peerage from the gentry during the reign of Edward IV.

Upon the restoration of Henry VI, Howard did not follow Edward into exile and instead remained quietly on his estates. He was however the first lord in East-Anglia to again rally to Edward upon his return from Burgundy. Howard's diplomatic career restarted soon after, beginning with his appointment as deputy-lieutenant of Calais under Lord Hastings. He served on a number of embassies to France, and was the chief negotiator with Louis XI of the peace that ended Edward's 1475 expedition to France. Howard's shipping interests (he owned some twelve ships, although not simultaneously) and careful management of his estates enabled him to increase his personal fortune by 800£ a year.

On the death of Edward IV in 1483, Howard's support of Richard, Duke of Gloucester's Protectorship and his continued loyalty to that same lord after his crowning as Richard III was rewarded with Howard's elevation to the Duchy of Norfolk (the duchy had been vacant since the death of Howard's cousin, John Mowbray). Much of the land had been awarded to Edward IV's youngest son, which was highly irregular. Although Richard did not restore all of the Mowbray lands to Howard, he made up in part for the diminished title by granting him other manors. Howard remained steadfastly loyal to Richard III. During the Duke of Buckingham's rebellion,² Howard played a notable role in keeping the south-east loyal to the crown. Howard continued his support of Richard during the invasion of Henry Tudor and died leading the Yorkist vanguard at Bosworth.

The Household Books

The Howard household books are important sources of evidence in a number of areas relating to the material culture of England during the fifteenth century. They are unique both in their timespan and in the extent their subject matter, detailing not only household purchases but also containing unique details. These range from detailed payments for the construction of a caravel to a description of the construction of a 'doublet of fence' or padded jack.³

The books as they have survived are not the entire system of accounting the Howard family employed, but are the record of monies received and disbursed by Howard himself, and by senior members of his household.⁴ The books, both as they were first set down and as they exist today, are composed of two manuscripts of two volumes each. The first set of accounts are comprised of the Phillips manuscript and the Norfolk manuscript, covering the years 1462 – 1469. The second set of accounts, once in the possession of Thomas Martin of Palgrave, cover the years 1481 – 1483.⁵

The entries in the first set of volumes have been made in a somewhat chaotic manner, items being frequently out of sequence. Regardless, the entries regarding armour purchases are more descriptive than those in the second set, and because of that descriptiveness they evidence the construction of armour in one case, and even detail the appearance of some armours in the list of 'armour lent'. The second set of volumes are more orderly as to entries, but omits the sort of detail that is encountered in the first set. This is unfortunate, since John Howard's larger purchases of armour fall for the most part into this second volume. While an initial commissioning payment on an item will be noted, later payments are not detailed, most likely due to Howard (now Duke of Norfolk) disbursing money to agents to settle unspecified debt.

The Pattern of Armour Purchases

In examining the armour purchases of John Howard, one of the first patterns relates to John Howard's personal purchases of armour for his own use. He was extremely conservative in comparison to patrons such as the Emperor Maximilian or Henry VIII, or any of the other more thoroughly studied armourer-patrons. This should not be surprising, for although he was wealthy in comparison to other members of his class, Howard was obviously not on the same level as a head of state. In the twenty years covered by the extant accounts, we find him making only two purchases of what would be termed 'hosting' harness, likely to be for his personal use. The first such entry occurs on August 2, 1463:

*Item, the same day to Cakebrede for a harness complete, save sallet and greaves - 5 marks.*⁶

This purchase could possibly represent a replacement or updating of John Howard's personal harness, possibly due to a change in body weight or shape, or for reasons of fashion. The next year we find a half-harness being loaned, amongst a list of men Howard led to the sieges of northern strongholds remaining in Lancastrian hands.⁷ Other entries list payments for cleaning and decoration, and detail personal gear brought on the 1481 expedition to Scotland; we know from these that Sir John additionally owned several sallets, and a 'bycocket.'⁸

The next purchase of full harness recorded (being specifically for Sir John) occurs almost twenty years later.⁹ Given that Sir John, by this time Duke of Norfolk, was fast approaching his sixtieth year, and taking into account the description of the armour payment being made, this likely represents a lighter harness for Sir John's field use. Although the 1470s is mainly not covered by the extant accounts, there is evidence that John Howard did not indulge in large purchases of armour for his own use during this decade. The other armours listed as being purchased for Howard himself are listed as a 'doublet of fence',¹⁰ and a 'Scottish jack',¹¹ along with several brigandines.¹² This was probably a case of purchasing different 'tools' for different jobs, or different armour for varying levels of threat.

That Howard apparently made concessions in terms of cost in regard to his own armour needs is illustrated by his first recorded purchase of armour, previously quoted in this article, where he omitted the sallet and greaves, apparently relying on already existing pieces to complete the armour. Evidence of Howard's frugality during the missing decade is scattered throughout the accounts – entries for such things as 'mending of my Lords hose', repairs to boots and doublets,¹³ as well as for the 'furbyshing' of armour (repair, refitting, and/or cleaning of existing pieces). This evidence, when examined in the light of Howard's record of steady income growth and investment in shipping,¹⁴ would seem to indicate that funds were expended as necessity dictated to maintain his or his family's station, rather than to indulge in armour-related extravagances; more money is regularly spent in the entries on the rich textiles demanded by his family's status.¹⁵

The overwhelming majority of Howard's armour purchases is for equipment to outfit his family, household, and tenants. With the exception of purchases for his sons, this is largely equipment of a different type and quality. The most obvious pattern is the increase in such purchases during the Howard household's active periods of military service. This increase in purchasing also coincides with Howard's promotions, first with his initial elevation to the peerage, and later with his installation as Duke of Norfolk. This would seem to be a logical pattern, given the inevitable increase in numbers of his staff and his habit of lending armour out to them.¹⁶ This equipment would probably have been stored in an 'armour house', similar to one kept by his contemporary John de Vere, Earl of Oxford, for whom a post-mortem inventory of said armour-house is still extant.¹⁷

Textile Defences

The jack is commonly thought of as being the most common type of armour worn by the common infantry during the fifteenth century. Interestingly, few are referenced in the Howard accounts; the exact meanings of terms used in the accounts are however often difficult to determine. In the equipment loaned during the expedition of 1464 there are references to 'Welsh' and 'Scottish' jacks,¹⁸ and 'doublets of fense'. The first mentioned would seem to be padded armours, but the third term is rather ambiguous. A description of a doublet of fence made for John Howard, dated 24 January, 1464, is clearly a type of jack:

And the 24th day of January, I took to the doublet maker of the Holter to make me a doublet of fence: for every quarter 18 folds thick of white fustian, and 4 folds of linen cloth, and a fold of black fustian to put without, and for every back quarter 16 folds of white fustian, and 4 of linen cloth, and one of black for the covering; and for the sleeves 1 fold of black fustian, and 6 of white, and 2 of linen cloth: and the same day I took him onward 20 d.¹⁹

This seems to be a defensive armour; the description compares well to that of a padded armour found in a memorandum of Louis XI suggesting the adoption of jacks by the Francs Archers in c. 1470.²⁰ Strangely, there is no entry that specifically describes an arming doublet, the foundation garment necessary for the wearing of full-plate armour. It is possible that some of the items described as 'doublets of fence', that appear in conjunction with other armour for the 1464 expedition, were such garments.

There are only three entries specifying the purchase or commission of padded defensive armours - all of which purchases are clustered together in January and February of 1464. These purchases consist of the doublet of fence above described, a 'Scottish jack' also for John Howard, and a doublet of fence "and oder gere ffor childer".²¹ Previously, on December 20th 1463, a substantial purchase of fustian, some 60 yards of cloth was made - "ffor to make doublettys of ffence".²² This purchase may represent the bulk of the cloth used in the manufacture of the textile armours made up for the immediate family by the doublet maker of Holt. Presumably, the doublets of fence and jacks itemized in the lists of armour loaned for the 1464 expedition were accounted for in earlier payment books no longer extant, but the lack of purchases of textile defences after February 1464 is somewhat surprising. The few listings of purchases for these textile armours account for a small fraction of the total monies spent on armour purchases, and the garments themselves make up only a small part of the total armours purchased.

Mail Defences

A substantial portion of the armour purchases made over the two decades covered by the accounts involve mail. Given the date, it should not be surprising that a large percentage of these mail pieces are supplementary defences, such as standards²³ and gussetts.²⁴ A large number of 'jackets of mail'²⁵ and haubergeons²⁶ are also listed; these greatly outnumber the textile defenses. In total, thirty-seven standards, nine gussets (presumably in pairs), thirteen jackets of mail, and one haubegeon are listed as being purchased over the course of two decades.

The majority of the mail purchased appears to come from local sources and was apparently manufactured in England. Evidence for this is found in an entry of 2 September 1469:

The Mail Man} Item, the same day my lord paid to Godfrey upon he North for making thirteen jackets of mail, and making them clean, and for the goldsmiths work to the same -15 s.^{27}

A mere twelve standards of mail are indicated as being purchased from what is likely a foreign source – one Harman Stolle,²⁸ who may have been a foreign merchant of armour; his name features prominently in entries for armour purchases in the last volume of accounts. The name itself and Howard's extensive dealings in Flanders and the Low Countries²⁹ suggest that Stolle may have been a Fleming.

Several items of mail or combined mail/textile defenses are mentioned. Their precise nature is however unclear. For example, a series of payments to two craftsmen for a single item, made on the 3rd of May 1469:

Parker of Southwark} Item, the 3^{rd} day of May, my master paid to Thomas Parker of Southwark, for stuff of linen cloth and fustian, and for workmanship of a gestron of mail – 10 s.

Armourer} Item, the same time my master gave to an armourer for the same gestron, and for making and fashioning of the same -10 s.^{30}

The term 'gestron' is usually used in Middle English texts to refer to a coat of mail.³¹ However, in this case there is clearly some form of textile work involved, either to cover or pad it in some way; this garment could be a form of 'jack stuffed with mail', as listed in the post-mortem Fastolf inventory.³² Equally it could possibly have been a cloth-covered mail defence of some kind.

Brigandines

The largest single category of armour purchased by John Howard during the years covered by the Household books are brigandine defenses. Howard purchased brigandines both for himself³³ and to fill his armour house. For example, in 1481:

The first day of April, my lord bought of Herman Stolle is sonne 10 pair of brigandines, 12 s. 6 d. apiece – 6l 5 s.³⁴

A number of purchases of brigandines were made with a variety of English brigandinemakers. Some of these manufacturers are named, notably Clayson of Harwich, Parre of Southwark, and Perse Devans. Also specified is one Thomas Clere, who is paid 3.d "...*For mending of his brigandines at Nottingham*".³⁵ In all, thirty-nine brigandines are listed as being purchased, with an additional purchase of an unspecified number for the sum of 61 5s. occurring on 5 April 1481.³⁶ As a purchase of ten brigandines for an identical sum from Harman Stolle is recorded the previous day, it is possible this denotes the purchase of an additional ten brigandines. This purchase occurs alongside a transaction for splints,³⁷ and is followed two days later by another purchase from Harman Stolle.

These brigandine purchases show a range of prices and valuations. Brigandines of varying quality are mentioned in the lists of armour loaned for the northern expeditions of 1464 and 1481. Prices paid range from 30.s, delivered to the brigandine-maker Parre of Southwark in December 1467 and February 1468, to a more normal entry of 12 s. paid '...for a pair of brigandines and the sleeves...' to Clayson of Harwich on 5 September 1463.³⁸ As recent research has shown,³⁹ these defenses were far more commonplace than once was thought. In the second part of this article, the variety of these defenses will be explored further.

Plate Armours

During the years covered by the Household Books a total of four complete or near-complete plate armours are listed as being purchased by John Howard. Only two of these harnesses appear to have been meant for his personal use; the first (previously mentioned) occurs on August 2^{nd} 1463,⁴⁰ while the second appears almost twenty years later to the day:

*Harness} Item, my lord paid to the armourer of Flanders upon his leger harness. – 6s. 8d.*⁴¹

This entry seems to be a partial payment on a commission, as are so many of the other entries in the accounts' last years. The final procurements of complete harness for the 1469 expedition 'to keep the narrow sea'⁴² are probably linked to the service of his son Nicolas, and John Nytre, who participated in this expedition. 30 September 1468:

Master Nicholas Howard. Item, the 30th day of September, paid for a harness complete for him, and an ostrich feather, 6£ 26s. 8d.⁴³

A related expenditure, to stand surety for payment for a sum of twenty-five marks for two armours for the Duke of Norfolk (August 1469) will be discussed below, as it relates to the origin of the armours purchased. Howard probably owned at least one complete harness previous to any of the purchases mentioned; the armourloans for the 1469 expedition, for example, include pieces of what was probably the Duke's older equipment. Howard, as a person of rank, was of course expected to bear arms in the service of his masters (firstly the Duke of Norfolk and later his king), for twenty years before the account books began.⁴⁴

Individual elements of plate armour were bought sporadically over the years covered by the household books. These acquisitions were mainly of helmets, the first occurring on August 2^{nd} 1463:

*Item, for 2 sallets with demi-visors, for yeomen 7s.4d.*⁴⁵

Most other purchases of plate armour occur after 1480. On the 5th of April 1481, a payment is listed:

For Splentes 1£1s.8d.⁴⁶

On the 7th of April 1481, a sum was:

whereof paid to Herman Stolle for 25 sallets, 2s. apiece - 1£.1s.⁴⁷

The purchases of plate armour are not at all consistent. That John Howard had previously purchased helmets and harness is made clear by the itemized armours loaned during the 1464 expedition; these armours are not otherwise accounted for. While purchases of plate armour are less frequent in comparison to those for brigandines, there are consistent entries for the cleaning and refurbishing of plate armour.⁴⁸

Armours

It is generally assumed that, during the fifteenth century, armour in England was mainly imported from Italy and Flanders. It is also assumed that little armour of quality was produced in England.⁴⁹ However, his household accounts clearly state that the Duke was almost exclusively purchasing armours from domestic craftsmen. While most of the armour purchased in England consisted of brigandines and mail, at least one significant commission of plate harness was recorded. The entry for this transaction is out of sequence, being recorded amidst earlier entries dating from 1463; it occurred in August 1469:

My Lord of Norfolk} Item, in August following, my master became surety for said lord to Thomas Armerer of London, for 2 harnesses by my lords desiring, for – 20 marks.⁵⁰

This is a considerable sum, easily the largest single transaction for one or two individual armours. The cost alone indicates that these were armours of quality; John Mowbray's rank demanded the best equipment. Since the Duke could easily have acquired foreign-made armour if he so chose, this transaction implies the existence of highly-skilled, native English armourers.

Most of the armourers named in the accounts are identified by name and location, presumably the town in which they pursued their craft. A few however are mentioned only by a single name or by a location alone. The first of these is 'Cakebread',⁵¹ the armourer from whom John Howard bought his first recorded plate armour. Again the sum, paid for a incomplete armour, implies that this harness was of a good quality, 5 marcs in total. Unfortunately the entry does not otherwise describe the armour in question.

Only one foreign armourer is mentioned, a Fleming.⁵² Unfortunately, the lack of further detail again renders an identification impossible. This armourer is listed as having been commission to make harness for the Duke himself; he must therefore have been well-skilled.

The last puzzle regarding the identity of the armourers and merchant dealers mentioned in the accounts is represented by Harman Stolle and 'Harman Stolle is sonne'. The entries including this person or persons in the accounts of 1481 occur in rapid succession, and all related to armour purchased in quantity. Since the armour purchased consist of mail, brigandines, helmets, and possibly splints as well, it seems reasonable to suggest that Stolle was an armour-merchant as opposed to a manufacturer. All other recorded purchases are for single types of armour supplied by individual craftsmen. This idea agrees well with what is known about guild regulations and procedures.⁵³ The identification of Stolle as a merchant also seems plausible given the type of goods sold, the lack of place identification, and the Dutch or low German name.

Other purchases of armour are unfortunately anonymous. One such enigmatic entry is dated 13th of May 1465:

Item, the same day delivered to him that made the shamfron $-4.s.2.p^{54}$

No further information is provided. This entry is followed by another similar payment for a lesser sum, apparently made to the same unnamed armourer.

Miscellaneous Purchases and Expenses

Perhaps the most common entries are payments for repairs to armour, for the cleaning of armour, for decoration applied to armour, and for items relating to the maintenance or transport of armour. Perhaps the most intriguing entry of this sort occurs on the 25^{th} or 26^{th} of August, 1463:

Item, paid to the armourer of Ipswich <illegible> work the day above said, <illegible> Item, my master paid the armourer of Ipswich for working at my masers place, for him and his men 7 days, delivered to him the 25th of August – 4 s. ⁵⁵

This is a tantalizing entry describing what seems to be an armourer being paid to 'furbish' existing pieces and possibly to conduct fittings with members of Howard's household. Another entry (5th October of the same year) describes a similar service, possibly provided by the same armourer; the work could also have been a continuation of tasks begun during the previous August:

Item, the same day my master paid to Robyn the Armourer of Ipswych for 12 days work in furbishing – 3.s. Item, the same day my master paid to his fellow for 12 days – 3.s. Item, to his man – 4.d. Item, for their bed and drink in the town – 12. d.⁵⁶

Among the most commonly bought items are arming points. Frequent entries are made for the purchase of these items by the dozen.⁵⁷ Less frequently purchased, and in bulk, are arming nails and brigandine nails.

NOTES

^{1.} "Blood Red Roses: The Archaeology of a mass grave from the Battle of Towton AD 1461", Oxbow press, 2000.

^{2.} "The Howard Household Books" Alan Sutton Publishing, 1996. Introduction, pp. ix-x. ³ Batty, J., "The History of Rothwell", *Rothwell*, 1877, p. 97. Knowles, R., "A Defensive Garment in the Church at Rothwell, West Yorkshire", *Journal of the Arms & Armour Society*, Vol. XI, 1985, pp. 299-305, pls LXX-LXXI

⁴ H.H.B., Introduction, pp x-xi.

^{5.} Of the first two volumes in manuscript form, the first is now BL Additional MS 46349, the second was in the possession of Howard's descendant, Henry, thirteenth Duke of Norfolk, and now resides in the library at Arundel castle, but it has not remained in the families keeping since the fifteenth century. The third and fourth volumes are in the possession of the Society of Antiquaries.

^{6.} Appendix. Book One, 215.

⁷ Haigh, Philip A. "*The Military Campaigns of the Wars of the Roses*", Alan Sutton Publishing Ltd. 1995, pp. 69-88.

⁸ For the 1464 expedition lists H.H.B., Vol. I pp. 194-196, and 439-449. For a brief list of Sir John Howard's personal armour during the 1481 expedition, see H.H.B. Vol. II . pp. 274-275

^{9.} Appendix. Book Four, 425.

^{10.} Appendix. Book One, 239.

^{11.} Appendix. Book One, 241.

^{12.} Eaves, I., "On the remains of a jack of plate excavated from Beeston Castle in Cheshire", *Journal of the Arms and Armour Society*, Vol. XIII, No. 2. September, 1989, pp.81-154.

^{13.} H.H.B. pp. 255 and 318

¹⁴. H.H.B. Introduction, pp. xviii – xix.

^{15.} H.H.B.

^{16.} H.H.B. Vol. I pp. 194-196 and 439-449.

^{17.} W.H. St. John Hope, "The Last Testament and Inventory of John de Veer, Thirteenth Earl of Oxford", *Archaeologia*, Vol. LXVI, 1914-15, p. 323.

^{18.} H.H.B. Vol. I pg. 194.

^{19.} Appendix. Book One, 239.

^{20.} V. Gay, "Glossarie Archaeoloquique du Moyen Age et la Renaissance" Vol. I, Paris, 1887. pp. 52, 632.

^{21.} Appendix. Book One, 241.

^{22.} Appendix. Book One, 158.

^{23.} Schmid, Erik D., "Link Details from Articles of Mail in the Wallace Collection" *The Journal of the Mail Research Society*, Vol. I. No. I., 2003, pp. 12-13.

^{24.} Hyll, Johan, "Traytese of the Poyntes of Worship in Armes, *Armorer Sergeant in the Kinge's Armory 1434*. Bod. Lib, Ashmole, MS. 856, art. 22. pp. 376-83.

^{25.} Appendix. Book Two, 541.

^{26.} Gaier, Claude, "L'Industrie et le Commerce des Armes dans les Anciennes Principautés belges du XIII^{me} à la fin du XV^{me} siècle", Paris, 1973 pp. 344-345.

^{27.} Appendix. Book Two, 541.

^{28.} Stolles name is first mentioned on the first of April 1481, and a series of purchases of armour are made in rapid succession, culminating with the purchase of six pairs of brigandines on the sixteenth of April. No further mention of Stolle is made in the Books. See Appendix. Book Three, 33-47.

^{29.} H.H.B. Introduction pp xxi-xxii, xxiv-xxvii.

^{30.} Appendix. Book One, 356. Book Two, 538.

^{31.} I would like to thank Tobias Capwell of the Art Gallery and Museum, Kelvingrove, Glasgow and Phillip Abbot at the Royal Armouries Library for their help in explaining the meaning of this term.

^{32.} J. Gairdner, "*The Paston Letters*" London, 1901 Vol. I pp.486-487. Jacks "stuffed with mail" are described in a French ordinance of 1471 F. Buttin, "*Du Costume Militaire*", p. 306.

^{33.} Appendix. Book One, 431.

^{34.} Appendix. Book Three, 33.

^{35.} Appendix. Book One, 265.

^{36.} Appendix. Book Three, 35.

^{37.} Appendix. Book Three, 35.

^{38.} Appendix. Book One, 222. While examples of Brigandines with sleeves can readily be found in fifteenth century art, no known examples are extant. For contemporary examples see Hans Memlings "the Mystic Marriage of St. Catherine" c. 1480. *Alte Pinakothek, Munich.* And "The Martyrdom of St. Ursula", 1489 *Hospital of St. John, Bruges.*

^{39.} DeVries, Kelly, "A 15th-century weapons dowry" *Royal Armouries Yearbook* 6, 2001, pp. 22-31.

^{40.} Appendix. Book One, 215.

^{41.} Appendix. Book Four, 425.

^{42.} H.H.B. Introduction xxi-xxiii.

^{43.} Appendix. Book Two, 567.

^{44.} H.H.B. Introduction pp. xi-xii.

^{45.} Appendix Book One, 215.

^{46.} Appendix. Book 3, p.35 These arms defences could range in complexity from the simple bar and chain and couter, as seen in Memelings "The Martyrdom of St. Ursula", 1489 *Hospital of St. John, Bruge.*, to defences as complex as demicannons of the vambrace with a fully developed couter, as seen on the late 15th century composite harness, catalogue A.20, Wallace collection, and a number of similar extant defences of late 15th century date. Given the relatively large sum involved in the purchase, it could represent either a larger number of more complex defences.

^{47.} Appendix. Book Three, 36.

^{48.} Appendix. Book One, 219, 226, 254, 260, 290, Book Three, 34, 42, Book Four, 304, 335.

^{49.} Ffoulkes, "The Armourer and His Craft", pp 123-125.

^{50.} Appendix. Book One, 215.

^{51.} Appendix. Book One, 215.

^{52.} Appendix. Book Four, 425.

^{53.} "English gilds : the original ordinances of more than one hundred early English gilds : together with The olde Usages of the cite of Wynchestre; the Ordinances of Worcester; the Office of the Mayor of Bristol; and the Costomary of the Manor of Tettenhall-Regis : from manuscripts of the fourteenth and fifteenth centuries", Early English Text Society, London 1870.

^{54.} Appendix. Book One, 287.

^{55.} Appendix. Book One, 219.

^{56.} Appendix. Book One, 226.

^{57.} Appendix. Book One, 218, 363.

The entries for armour purchases in the appendix of this article have been kept in the order in which they appear in the manuscripts as they are in print. Above each entry, or series of entries is the page number for reference, and beside it a notation as to date of entry when known. I have left them in their "natural order" for the ease of the reader referencing the Howard Books in their entirety, to enable them to place the armour purchases in the greater context of Howard's overall purchases.

Book One

158	20 th December AD 1463 Fol. 6	Item, my mastyr payed ffor ffusten ffor my lord ffor to make dobletlys off ffence conteynynge lx.yerdys,	XXV
215	AD 1469 Fol. 44	My lord of Norffolke} Item, in August folwynge, my mastyr became suerte for my said lord to Thomas Armerer of Lon- don, ffor ij. harneyses, be my lordes desyrenge, for	xx marc.
	2 nd August AD 1463 Fol. 45	Item, payd he same day ffor xij. Standardes off mayle, Item, ffor ij. Salates with demye vesseres, ffor yemen, Item, ffor vj. Normandy byllys, the same day, Item, the same day to Cakebrede ffor a harneyse complete, scave salatt and gravus	xvj. s. vij.s iiij d. xvj. s. vj. d.
		ssave salau and grevys,	v. marc.
217	August 11 AD 1463 Fol. 46	Item, ffor a harneys barelle Item, ffor a lock to the same Item, in hey to trosse the harneys, Item, j doseyn armynge poyntys,	xviij. d. iiij d. j d ob. iij. d.
218	August 19 AD 1463 Fol. 46 b	Item, ffor a doseyn armynge poyntys,	iij. d.
219	25-26 August AD 1463 Fol. 47	Item, payd to the armorer off Yipswyche werke the day a bouesoyed, Item, my mastyr payd the armerer of Jebyswyche for werkyng at my masterys place, ffor hym and hys men vij. Dayes, delyveryd to hym the xxv. day of August,	iiij. s.
222	5 September AD 1463 Fol. 486	Item, payd to Clayson of Herwysche ffor a peyre of bre- ganderys and the Sklevys, the v. day of Septembyr,	xij. s.
223	9 September AD 1463	Item, he payd ffor bregandere nayle,	iij.s. ix.d.
226	5 October AD 1463	 Item, the same day my mastere payd to Robyn the armerere off Yipswich ffor xij. dayis werke ffor beshynge,	iiij. s.

		APPENDIX	
226 (cont)		Item, the same day my mastere payd to his ffelaw ffor xij. Dayis Item, to his man, Item, ffor ther bed and drynge in the town,	iij.s. xij.d. xij.d.
	7 October	Item, govyn to John Browne the bregander makere, the Sayd day	iiii.d.
231	7 October AD 1463	Item, govy the sayd (day) to John Browne the armerer,	iiij.d.
239	24 January AD 1464	And the xxiiij. day of Janever, I toke to the dobelete make of the Holte to make me a dobelete of fense, for hevery for qwarter xviij. folde theke of wyte fostyen, and iiij. fold of lenen klothe, and a folde of blake fostyen to pote wethe howete; and fore hevery bake qwarter xvj. folde of wyte fostyen, and iiij. of lenen klothe, and j. of blake, for the kew- ferenge; and fore the sleves; folde of blake fostyen, and vj. of wyte, and ij of lenen klothe; and the same day I toke theme onward,	xx.d.
241	13 February AD 1464	Item, my mastyr payd the same day ffor xxxj. Yerdys off fustyen to the mercer off the Holte, Item, to the sayd mercer ffor iiij. yerdys off blakke ffusteyn, Item, the same day my mastyr payd to the sayd mercer ffor v. yerdys and a quarter off Brabante clothe, And all this my mastyr take to Rechard Smalshawe, to make a Scottysh jakke to my sayd mastyr; and my mastyr toke hym xv. Yerdys off ffusteyn off hys own, prise Item, the xv. day of Feverer, my mastyr payd to the taylor off Holt ffor makynge off a doblet off fence and odre gere ffor children, Besyde xx.d. he hadde before. Item, the same day my mastyr payd to a man off my lord Stanleyis that made my masterys doblet off ffence, ffor the makynge theroff and the powdre therto,	xj.s. iiij.d. iij.s. xxiij.d. v.s. iij.d. vj.s. iiij.d. x.s. iiij.d.
253	28 th March AD 1464 Fol. 63b	Item, payd to the goldsmythe that made the bokelys, pen- dawntes, and barrys to my masterys salat and his byecoket,	x.s. iiij.d.
254	29 th March AD 1464 Fol. 64	Item, the same day my mastyr payd to Derykke Armorer for makynge clene off a byecoket off my sayd masterys, and a bylle,	ij.s.
260	5 May Fol. 66	And the same day I dede reken wethe Weylyem Boteler har- mourer of Hepeswesche, and be is seyhenge he hathe bene here sene Hester xx. dayes, and is mane xij. dayes, and fore thes I take heme And I yafe hem the same tyme, And so he is al kontenete. *	v.j.s. iiij.d.

* Written in John Howard's own hand.

		APPENDIX	
264	14 May 1464 Fol.68	Item, payd the same xiiij. Day for a bokylle for a sallet	ij.d.
265	15 May 1464	Item, he xv. day of May, delyveryd to Thomas Clere for mending of his bregonderys at Notyngham,	iij.d
266	27 May 1464 Fol. 68b	Item, he xxvij. Day of May, delyveryd to Mechegod to pledge owt Brokys salatt	xij.d
285	16 May 1465 Fol. 79b	Testor} Item, the same day my Mastyr delyverd to the man that maketh his testor of mayle	iiij.s
287	13 May 1465 Fol.80	Item, the same day delyverd to hym that made the shawfron	iiij.s.ij.d
288	30 th May 1465 Fol. 80b	Item, the same day my mastyr paid to hym that made his shamfron	ij.s.iiij.d
289	30 th May 1465 Fol.81	Item, my mastyr paid ffor a shamfron of stele	vj.s. viij.d
290	1 st June 1465 Fol.81	Item, the ferst day of June, paid to Crystyne for powderenge and peyntyng of my maseteres sheldes and his sadylle,	X.S
		Item, the same day paid to the browdereres wyffe for sylke for my masteris helme at the justes of peace	xx.d
	Fol.81b	Item, the same day my mastyr paid to Porter the armorere for mendynge of diverse harneys,	viij.s
293	4 th June 1465 Fol.82	Item, for a brase for my masters helme,	vj.d
	7 th June 1465 Fol.82.b	Item, the same day my mastyr paid to hym that made his shamfron,	xvj.d
356	28 th May 1466 Fol. 109	Item, the same day my mastyr paid to Goodfrey uppon the northe, for a gestraunt of mayle and a swyrde for mastyr Thomas, and for dytenge of ii. Swyrdes, and new scabardes to the same, And so he is content into this day for alle thynges	XXXV.S
363	22 nd August 1466 Fol.111.b	Item, for vj. dosen of armynge poyntes	ij.s
401	27 th April 1467 Fol.128.b	Item, the same day my mastyr paid to an armerer for dressynge the harneys into a pype, and a hoggeshead, and a barell	vj.d

416	15 th July 1467 Fol.128.b	Item, the same day paid to an armerer at Pawles Cheyne, for an harneys barell	ix.d.
431	5 th December 1467 Fol. 143	Item, the Vth day of Decembre, my mastyr toke to Parre of Suthewerke in ernest to make a peyr of breganders for him selffe	X.S.

<u>Book Two</u>

12 th February 1469 Fol.71.b	Brygandyne maker} Item, the xij.th day of Feverer, may master delivered to the Brygandyne maker of Suthwarke,	XX.S.
18 th March 1469 Fol.73	Armorer.} Item, the xviij. day of Marche and he ix.th yere of the Kyng, my master delivered to the armorer of Col- chestir upone rekenyng,	V.S.
3 rd May 1469 Fol. 75	Parker of Suthwarke.} Item, the iij.d day of May, my mas- ter paid to Thomas Parker of Suthwarke, fore stuffe of lyn- nene cloth and fustens, and fore the warkemaneshipe of a	
	Armorer.} Item, the same tyme my master gafe to an ar- morer fore the same gestrone, and fore makyng and fa- cyonyng of the same	X.S. X.S.
2 nd September 1469 Fol.76.b	The mayle man.} Item, the same day my lord paied to Godfrey uppone he Northe for makenge of xiij. jackets of mayle, and makenge clene, and for the goldsmythes werke	
	Item, the same day my lord payed hym fore a standard of mayle,	xv.s. iij.s.
30 th September 1468 Fol. 109.b	Of the bregander maker xviij. peyere, and therof he ad in herneste, And I toke heme at ij. Tymes, Master Nicholace Howard.} Item, the xxx. day of Septem- ber, paid for a harness complet for hym, and an estriche fether,	iij.s.iiij.d. x.li. vj.li.xvj.s.viij.d.
15 th October 1468 Fol.109.b	John Nytre.} Item, paid for a harnes complete for hym the same day, and an estriche fether,	vij.li.v.s.
October	Item, paid to the brygandere maker for j. pere breg.,	xvi.s.viij.d.
Fol.111b.	Item, fore a pere of breganders,	xvj.s.viij.d.
	12 th February 1469 Fol.71.b 18 th March 1469 Fol.73 3 rd May 1469 Fol. 75 2 nd September 1469 Fol.76.b 30 th September 1468 Fol. 109.b 15 th October 1468 Fol.109.b October 1468 Fol.111b.	12th February 1469Brygandyne maker } Item, the xij.th day of Feverer, may master delivered to the Brygandyne maker of Suthwarke, Fol.71.b18th March 1469Armorer. } Item, the xviij. day of Marche and he ix.th yere of the Kyng, my master delivered to the armorer of Col- chestir upone rekenyng,3rd May 1469Parker of Suthwarke. } Item, the iij.d day of May, my mas- ter paid to Thomas Parker of Suthwarke, fore stuffe of lyn- nene cloth and fustens, and fore the warkemaneshipe of a gestron of maylle, Armorer. } Item, the same tyme my master gafe to an ar- more fore the same gestrone, and fore makyng and fa- cyonyng of the same2nd September 1469The mayle man. } Item, the same day my lord paied to Godfrey uppone he Northe for makenge of xiij. jackets of mayle, and makenge clene, and for the goldsmythes werke to the same, Item, the same day my lord paied to 146830th September 1468Of the bregander maker xviij. peyere, and therof he ad in herneste, Fol. 109.b30th September 1468John Nytre. } Item, paid for a harnes complet for hym, and an estriche fether,15th October 1468John Nytre. } Item, paid for a harnes complet for hym the same day, and an estriche fether,5th October 1468Item, paid to the brygandere maker for j. pere breg., Item, fore a pere of breganders,

Book Three

33	1 st April 1481	The first day of Apryl, my Lord boght of Harman Stolle is sone x. peir brygandines, apece	xij.s.vj.d. vj.li.v.s.
34	4 th April 1481	Item, to John Hoonte to by stuff to dresse harneis	ij.s.
35	5 th April	For brygandines	vj.li.v.s.
	1481	For splentes	l.s.viij.d.
36	7 th April 1481	Whereof paid to Harman Stolle for xxv. salates ij.s. a piece l.s. And for xij. standartes	X.S.
37	9 th April 1481	George,Armurer The ix. Day of April, my lord paid for xij. standartes of mayle, iij.s. a piece	xxxvj.d
42	10 th April 1481	George,Armurer Item, to George Armurer for dressing of the salate of my lordes	xvj.d.
44	14 th April 1481	John Sherle, Armurer Item, for steynyng and betyng of a standart with a white lyon Item, for betyng of v. tromptez baners} Item, to hym to drynke	x.s. xxvij.s.viij.d. viij.d.
46	15 th April 1481	George, Armurer Item, my Lord paid for ix. Gussets, . a piece	x.d. ix.s.iiij.d.
47	16 th April 1481	Harman Stolle is sonne Item, to him for vj. peir brygandines	iij.li. xv.s.
58	29 th April 1481	John Hoonte The xxix. day of April, I toke John Honte to pay for an hau- berjeon for Hans Vanbrusel	vj.s. viij.d.
223	28 th July 1482	The Bregander maker.} Item, the xxviij. day of July, paid to Perse Devans, brygander maker, in party of payment uppon the making of a pere breganders for my Lord And so he hath resseyved in all	xiij.s.iiij.d. xiij.s.iiij.d.

Book Four

304	22 nd October 1482	Item, for iij qrtes oyle for to scower harnesse	x.d.
335	14 th April 1483	Item, he paid for a doss. of bokelleys Item, for ij.c. off armyngnayle of on sorte Item, for iij.c. of armyngnayle of a nother sorte	iiij.d. ij.d. iiij.d.ob.

335 (Cont)		Item, for iij.c. of armyngnayle of a nother sorte	xij.d.
393	16 th May 1483	Item, to the caryer for he brynging of my Lordes gowne, and his salett,	vj.d.
418	Monday 29 th July 1483	Trevelyon.} Wherof ys payde to Schele, for Thomas Trewe- lyones costes here at London, when he was seke, and for Schellys, wherfor was leyde a peyer of brygondynes.	Summe xx.d.
425	11 th August 1483	Harness.} Item, my lorde payde to the armerer of Flaun- deres apon his leger harness	vj.s.viij.d.
473	16 th October 1483	Fyrst, to Edward Danyell for hernes Item, to Krewett for hernes Item, to Bdocke for hernes	viij.s. xij.s. viij.s.
477	19 th October 1483	Item, to Fynsent, Armerer	xvjij.s. viij.d.

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