

A study into Romano-British enamelling – with a particular focus on brooches

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Abstract

This article will look at the evidence for enamelling from the Iron Age in Britain through to the end of the Roman period. Continuity and change between the two periods will be discussed, as will any differences within the Roman period. As brooches are one of the most frequently enamelled categories of find from the period in question, I will concentrate on this find type. I will investigate the development of enamelled decoration on brooches as well as analysing geographical differences in style and form. It is hoped that by looking at all of these aspects, some idea of whether Romano-British enamel shows regional patterns will be gained.

Introduction

As with all types of material culture, studying enamelled objects can inform us about many aspects of life in the Roman period. Small objects such as dress accessories can often reveal the cultural influence of Rome when other aspects of life are often perceived as untouched. Sellye notes that where these objects are found is important. For example, often enamelled 'Roman' objects are found in 'barbarian' areas indicating that frontiers were not always the barriers to the movement of people, objects and ideas that we often perceive them to be (Sellye 1939, 31). In this article, the style and types of enamel used on brooches will be looked at for indications of a peculiar/individual British style as compared to those copied directly from more traditional Roman examples.

Development from Coral

Enamel is classed as a vitreous substance which has been fused onto a metal surface. Most enamel is a lead-soda or lead-potash glass with the addition of colourants and opacifiers. It is applied as a dry frit and fused in an enamelling oven (Hodges 1976, 63). Enamel as a decoration in Britain developed from the use of red coral and then opaque red glass to decorate metallic objects (Johns 1996, 29-30). British examples of coral decoration have been found from across Britain and it was used on brooches (such as at Arras, Yorkshire and Wood Eaton, Oxfordshire) and other small items such as pins (Leeds 1933, 43-44). The early methods of attaching the opaque red glass demonstrate links with the technique of decorating with coral. Small conical or hemispherical studs were secured by a central bronze rivet. A very good example is that of the stud from Bugthorpe in Yorkshire which is decorated with a ring of hemispherical bosses, secured by pins, as the coral would have been (Leeds 1933, 43-44). Figure 1 below shows a staff terminal with a coral stud recorded on the Portable Antiquities Scheme (hereafter PAS) database¹ which illustrates the small studs often used to decorate items of this date.



Figure 1. An Iron Age copper alloy terminal with coral stud set in the top. PAS- LIN-B52293.

It is logical to presume that there would be an overlap in the chronology of usage of the three different materials. Indeed, objects from Flavigny and La Bouvandau illustrate the cross over period between the two decorative techniques as both enamel and coral were used (Smith 1925, 102).

¹ The Portable Antiquities Scheme was set up in 1997 to record archaeological objects found by members of the public. They go onto an online database www.findsdatabase.org.uk which is available for anyone to use, free of charge.

However, establishing a more detailed chronology is difficult as there appears to be little agreement on the approximate dates of use for these three substances. Table 1 below illustrates this problem with dates for the start of the use of coral ranging from c.300 BC to some time after the first century BC. As well as the uncertainty in start dates it is not clear whether Britain followed the rest of Europe. Smith states that coral use ceased c.300– 250 BC on the continent when enamel took its place. However, in Britain it appears to have been used for longer, as the discovery of a bowl or cup decorated with a stud of coral in a La Tene II burial at Colchester, demonstrates (Smith 1925, 101).

Table 1. Illustrating the varying dates assigned to the start of the use of enamel and its decorative predecessors

Author	Date of Writing	Proposed Dates for start of use	Location
Smith	1925	Coral was replaced by enamel c.300–250 BC	Europe (except Germany)
Henry	1933	Enamelling began at the end of 3 rd century BC	England
Sellye	1939	In the La Tene period red coral preceded enamel	?Europe (not clear)
Leeds	1933	Enamel began c.2 nd century BC	Britain
Hughes	1972	Opaque red glass– 1 st century BC (indicating enamel must be later)	Britain
Butcher	1976	Glassy material (substitute for coral) c.400 BC	Celtic contexts in Britain
Bateson	1981	Enamel– 2 centuries before the Romans (i.e. c.150 BC)	Britain

Another problem with looking at the origins of British enamelling is the use of imprecise terminology by authors over the years. As mentioned, the immediate successor to coral was red opaque glass which is different to enamel. It cannot be classed as enamel as it did not fuse onto the surface as enamels do, being held in the cavities by the backing instead (Hodges 1976, 63). However, this opaque glass is often recorded as enamel and when the objects themselves do not survive we have only these inaccurate

records. This confusion means it is not clear exactly when true enamel began to be used.

Iron Age to Roman transition

Coral in the Iron Age was used mainly on small metal items, harness equipment featuring prominently. This continued to be the same for enamel (and opaque red glass) decoration, for example in Batesons' study, out of the 300 enamelled objects of Iron Age date, there were 80 terret rings, 26 bridle bits and 50 other varied pieces classed as harness equipment making up over half of the objects surveyed in total. The PAS database has 3200 items of Iron Age date recorded on its online database (as of 10th February 2009). Out of the 249 enamelled items 58 of these would fit into the harness equipment group, 23.2% of the total, lower than that of Batesons study but still a large proportion. During the Roman period enamel working increased dramatically in volume and the types of objects it was used on changed. The explosion in enamel working in the Roman period can be demonstrated by Bateson's study which could only find 300 Iron Age items compared to 1800 Roman items (Bateson 1981). The PAS data also supports this with only 249 enamelled Iron Age items but 1662 Roman.

By the Roman period the focus of enamelling had moved to dress accessories although other items such as small bronze bowls, seal boxes and studs or mounts were still enamelled. It was still used mostly on small items and even on those did not cover large parts of the surface. The most popular item to enamel was the brooch. In Bateson's study of the 1800 Romano-British enamelled items, over 60% were brooches (1975, 19). On the PAS database of the 1662 enamelled Roman items, 1405 were brooches constituting 85%². These figures are in stark contrast to the Iron Age tradition where only 1% of Bateson's Iron Age items and 7.2% of enamelled items of this date on the PAS database were brooches.

In the Iron Age red was the most common colour of enamel used, reflecting its roots from coral and opaque glass. The popularity of red continued into the Roman period even when other colours came into use. When other colours began to be used, at the beginning of the first century AD, yellow and blue were those which appeared first (Butcher 1976, 43). Even then they were used less often and in smaller quantities than red and were not seen on their own (Bateson 1981, 67). By the end of the first

² When searching for all Roman objects with enamel as a surface treatment. If the search criteria were changed to enamel in the description box then there were 3347 items, of which 2728 were brooches (81.5%).

century and into the second century AD the colour range had extended dramatically to include green, orange, black and white as well as the three original primary colours. Blue then became the most common colour with a combination of red and blue occurring frequently also. In this period it was the norm to have two or three colours used together, single colour usage was not common (Bateson 1981, 68). This change of use of colour can be used to help date objects made in Britain. In the first and second century AD red, yellow, blue, green, white, black and orange were used whilst by the third and fourth centuries this had decreased to blue and white (Bateson and Hedges 1975, 178). Figures 2, 3 and 4 show some of the range of enamelling on items including different colours and designs.



Figure 2. A copper alloy enamelled terret ring. PAS- YORYM-7E7114



Figure 3. A copper alloy enamelled Wirral type bow brooch. PAS- HESH-635488



Figure 4. A copper alloy enamelled plate brooch. PAS- BH-713074

Enamel composition and design

The 1975 study by Bateson and Hedges into 33 enamelled Roman brooches used X-ray fluorescence to determine the colourants and opacifiers used to create the different colours of enamel used. They also wanted to see if they could identify different criteria to determine the origin of the enamel and to this effect some of the brooches were of continental origin (Bateson and Hedges 1975, 178). They found that it was transition metals which were giving the colour to the enamel. Blue, green and red can all be produced by copper depending on its oxidation and co-ordination but blue could also be made by using cobalt. The red opaque glass studied by Hughes (1972) had cuprous oxides in them and the enamel here fitted into this pattern, they can be seen as a continuation of the glass decoration. Equally all the colourants used in the other colours are those commonly used in much earlier glass, for example in Egypt (Bateson and Hedges 1975, 186–7). The most interesting point from this study was that they tested both British and Continental brooches, from the 400 year period of the Roman occupation of Britain. Their results suggest that there were no great differences in the chemical composition of the enamel between Britain and the continent or from the first to the fourth century AD (Bateson and Hedges 1975, 188). Although it was only a small sample, and more work would need to be done to confirm these theories they are invaluable in understanding the story behind the objects.

From Bateson and Hedges' work we know that the enamel composition across the Western Roman Empire and throughout the period of Roman occupation of Britain was broadly similar; but were the designs used similar also or was there local variation in style? Henry suggests that enamelling originates in the Caucasus and Persia and came to Britain from the continent being established by the La Tene II period in the South of England (Henry 1933, 76). Although the dates for this are under doubt (see

Table 1 above) this movement of the technology might suggest that we could expect a correlation between British and continental enamel as they have the same origin. Indeed in the late Iron Age similar pieces are found in Britain and across the continent, for example the harness fitting from Carlisle which is very similar to that at Stradonitz (*ibid*, 81).

Bayley and Butcher state that in enamelling some differences can be seen between Britain and the continent. For example they think that both millefiori (see Figure 5) and inset spots are continental techniques which were not used in Britain. However, there was a design which used reserved metal spots in Britain (see Figure 6), it is possible this is a pseudo morph of the spots seen on the imported items (Bayley and Butcher 2004, 212). Variation can occur from Britain to the continent but also within the different regions of Britain. Henry studied the style of enamelling across Roman Britain and arranged the different styles into schools, e.g. the South East school (Henry 1933, 84). Macgregor did the same sort of exercise for material (enamelled and not) of late Iron Age date in central and northern Britain (1976). Both these works show that there was variation in the styles used within Britain.



Figure 5. A copper alloy enamelled plate brooch using millefiori technique.
PAS number LVPL-4824A4



Figure 6. A copper alloy enamelled brooch using reserved metal spots.
PAS number LIN-612206

Some of the variation in style of enamelling across Britain can perhaps be explained by the way new styles were introduced into Britain. Anything coming from the Continent would appear in the South East first and then filter across the country, possibly through imitation as well as the movement of original items. When a technology, idea or style is copied, it is very rare for the copy to be exact. Often the bronze smiths or potters had not seen these items being made, they only had a finished article to copy. This would have led to variations, as they did not know the techniques used. The more steps you are from the source of the original, the more opportunity there is for variation, rather like a game of Chinese whispers. A good example of this is the reserved metal spots which appear to be imitating the continental inset spots.

Evidence for workshops

Little evidence for enamel workshops has been found throughout the time period and geographic area. This is partially due to the fact that the equipment used for enamelling is the same as that used for the manufacture of other small metal items and therefore it is difficult to differentiate between the two activities. Like other crafts of the time, it is likely that enamelling depended on the skill of the individual craftsmen rather than on elaborate equipment (Butcher 1976, 50). The best indicators for the process are raw or scrap enamel, along with unfinished or poorly made enamelled objects. Scrap enamel can be mixed together and melted down again to be re-used so this may explain why little is left for archaeologists to find.

There are some sites known which fall out of the time and geographical period which this article covers but they are important to our understanding of enamelling processes and show what evidence would be expected to remain of enamelling workshops. The first in date is the hilltop fort of Mont Beauvray (otherwise known as Bibracte) which is thought to date, from coin finds, to the 1st century BC, about the time of Caesar's conquest. The evidence consists of scrap material and partly made/ discarded objects. Other processes were taking place at this site and so it is difficult to distinguish enamelling tools and hearths from metalworking. Here the enamelling was at a very early stage of development as it took the form of decorative studs and bosses which were grooved and then covered in a shell of enamel, red being the colour used (Butcher 1976, 59).

The second site is the ring fort at Garranes in County Cork, Ireland. Its main period of activity and occupation was the early sixth century AD although earlier and later finds have been identified. At this site, a

considerable number of objects were discovered which suggest the presence of a manufacturing workshop carrying out enamelling as well as metalworking. Out of one layer, identified as a debris deposit, came 55 bronze objects, a variety of glass beads and fragments, 27 clay mould fragments, 39 complete crucibles as well as over 2500 fragments and numerous iron implements such as shears and pincers (O'Riordain 1942, 86–135). Inside some of the crucibles were found accretions, indicating glass and enamel manufacture (*ibid*, 135) as well as certain fragments of glass which 'appear to have been intended for use as enamel' (*ibid*, 120).

In Britain, Bateson lists 7 sites as 'probable', 13 as 'possible' and a further 7 as 'doubtful' enamel workshops (Bateson 1981, 102–7). Unfortunately, even those listed as 'probable' manufacturing sites have only a few items, for example Wilderspool (modern day Warrington), which has only one crucible and a few fragments of moulds (Williams 1994 163–33), there is nothing on the scale of Bibracte (Mont Beauvray). Most of the sites Bateson discusses have evidence of metal working as well, (Dinas Powys, Colchester, Traprain Law (Bateson 1981, 102–3)) thus supporting the theory put forward by Butcher that enamelling took place in the same workshops as bronze working (1977, 43). This lack of direct evidence for enamelling makes it more difficult to see the development of enamel in Britain as generally only finished items are found and they cannot often be traced back to their place of manufacture.

Case Study- Brooches

As brooches were one of the most commonly enamelled items in Roman Britain and my dissertations main aim is to study a specific enamelled brooch type, I have chosen to focus on brooches in this article. It is hoped that by looking at large collections of brooches patterns of enamel use will be seen. Brooches have been extensively studied and have been quite closely dated³; this means that by looking at which types are enamelled we might start to see broad dates for enamel development. I will be using three datasets- Richborough, Stanegate and the PAS. A brief explanation of each of these datasets is needed to understand why they are relevant and useful to this study.

A large study of around 3,500 brooches from Richborough was undertaken by Bayley and Butcher (2004) and has proved invaluable in our understanding of brooch manufacture, composition and decoration in England. There are various types of applied decoration used on Roman brooches, Bayley and Butcher list these as; enamel, tin, glass, silver

³ However it must be remembered that although we can give start dates for production it is very difficult to say when they ceased to be used or made.

overlay, gilding, riveted on, brass overlay, niello and inlay. From the 3, 500 brooches they studied, 1228 had one form of decoration. 566 were enamelled, 46% of all decorated brooches highlighting the popularity of enamel. This catalogue will be used as an example of southern brooch types and enamelling practices.

Margaret Snape produced a catalogue of all the known Roman brooches found on the sites along the Stanegate frontier in 1993. Although the assemblage is smaller than that at Richborough (845 brooches) it is nonetheless a very useful dataset and provides us with a sample of Northern Romano-British brooch use on military sites. Comparison with the Richborough catalogue will provide insight as to whether there is a north/south divide in enamelling on brooches.

The final dataset to be used will be the Portable Antiquities Scheme data. This is data collected from all over England and Wales from stray finds, mostly by metal detectorists⁴. These finds mostly come from rural areas and not from sites. As such it offers a contrast to the other two datasets as it is national and from completely different areas to excavated material, looking at the areas where the vast majority of the population would have lived. There are 11, 788 brooches on this database which provides a large dataset to give an overview of brooch use, right across England and Wales.

Table 2 below shows the numbers of brooches we are dealing with and the percentages which are enamelled. Richborough had a higher percentage of enamelled brooches at 16% whilst the Stanegate sites and the PAS data were broadly similar, 13% and 12% respectively. The PAS data was gained by searching under 'surface treatment is enamel' on the online database.

Table 2. Showing the numbers of brooches enamelled from each dataset

Author	Site	No. of brooches	No. of Brooches enamelled	Percentage enamelled
Bayley and Butcher	Richborough	3500	566	16
PAS	National	11, 788	1405	12
Snape	Stanegate Sites	845	111	13

Table 3 below shows the types of brooch found in Roman Britain and whether they are enamelled or not. The groups used are mostly those of Snape, (1993, 9), although the dates given to each type have been

⁴ 68% of objects were reported by metal detectorists from 2005-6

modified using data from Bayley and Butcher (2004) to make them more accurate. It is hoped that the following tables and graph will show patterns between types which were enamelled or not, and the dates they were made. The changes in dating mean that not all of the Snape groups ran in chronological order, to solve this I have given the groups my own numbering system and put them into date order. I have split up the Snape Type 2 into two groups as the brooches in this group have very different characteristics, particularly when it comes to enamel. Also Snape 1.9 (Polden Hill) has been put together with Dolphin and Harlow as it is now thought they were made at a similar date.

Table 3. Showing the dates for each brooch group

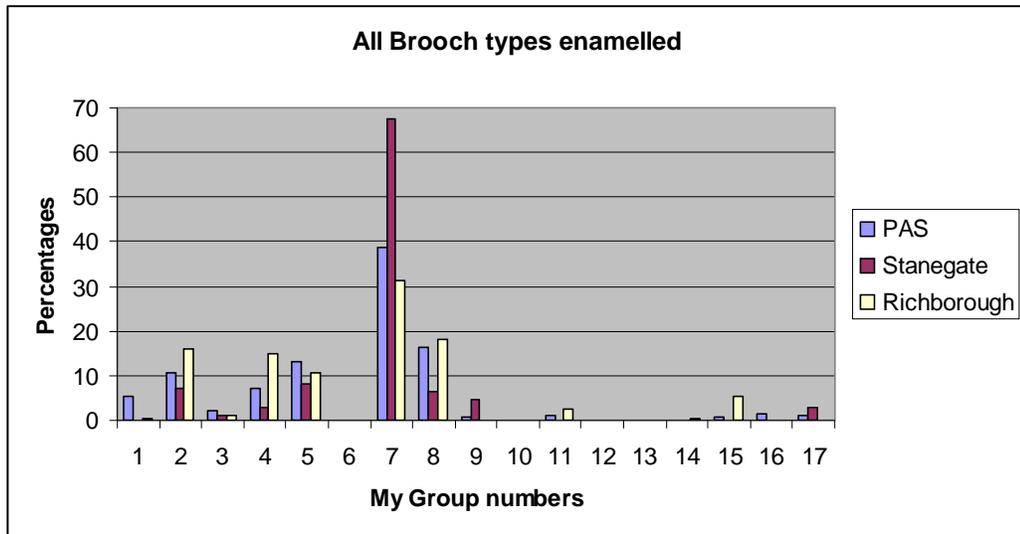
My group number	Snape Group number	Type of Brooch	Date	Enamelled
1	1	First century group	1st century	No
2	3	Headstud and derivatives	c. 75– 150 AD	Yes
3	1.9, 2.1 and 2.2	Polden Hill, Harlow and Dolphin	c. 75– 175 AD	No
4	2.3 and 2.4	South-western enamelled and Severn	c.75– 175 AD	Yes
5	4	Trumpet and derivatives	c.75– 175 AD	Yes
6	6	Fantailed	Late 1 st – 2 nd century	varied
7	10	Simple enamelled plate	c.75– 250 AD	Yes
8	14	Representational and symbolic	c. 75– 400 AD	Yes
9	12	Disc with central projection	c. 100– 200 AD	Varied
10	11	Applied repousse sheet	c.100– 200 AD	No
11	5	Knee brooch and derivatives	c.150– 250 AD	No
12	8	P-shaped (including crossbow)	c.200– 400 AD	No
13	15	Gilded disc and gem	c.200– 400 AD	No
14	16	Penannulars	c.100 BC– 400 AD	Rarely
15	7	Miscellaneous	varied	Varied
16	9	Fragmentary	varied	Varied
17	13	Unclassified discs	Varied	Varied

Table 4. Showing percentages of brooch from each group which is enamelled

My Group	Snape Group	PAS	Stanegate	Richborough
1	1	5.2	0	0.4
2	3	10.7	7.2	15.9
3	1.9, 2.1 and 2.2	2.3	0.9	0.9
4	2.3 and 2.4	7.1	2.7	14.8
5	4	13.2	8.1	10.8
6	6	0.1	0	0
7	10	38.9	67.6	31.1
8	14	16.2	6.3	18
9	12	0.7	4.5	0
10	11	0	0	0
11	5	1	0	2.5
12	8	0	0	0
13	15	0	0	0
14	16	0	0	0.4
15	7	0.6	0	5.3
16	9	1.4	0	0
17	13	1.2	2.7	0

By separating the brooches into these same groups, it allowed comparison between the three datasets as to the percentages of enamelling in each group. Table 4 and Graph 1 show this data. The PAS data and the Richborough data had to be sorted through in order to be put into the groupings. This was not a problem with the Richborough brooches as they all had full descriptions and some sorting had already been done by the authors. However there were issues with the PAS dataset as not all the brooches had an image or a full description so assigning each brooch to a specific type was difficult for every brooch.

Graph 1 comparing the percentages of each enamelled brooch group from each dataset



Discussion of data

Graph 1 above shows the percentages of each brooch type which is enamelled. As the groups have been arranged in chronological order, the changes across the graph also reflect changes over time, Group 1 being the 1st century AD and Group 14 reaching into the 5th century and onwards. Groups 15, 16 and 17 can be ignored when looking at chronological change as these groups were not assigned dates. The graph shows that the three datasets are broadly similar with few enamelled brooches dating after the 3rd century (except the plate brooches which can be later). The main peak in enamelling is in the simple plate brooches which were most common in the 2nd century AD. The peak is much higher for the Stanegate assemblage than the other two, reflecting the smaller range of brooch types enamelled in this area. These brooches offered enamellers/ brooch makers a greater opportunity and much more scope for enamelling in different patterns. Selye thinks that the flourishing of enamel did not occur until the second half of the 2nd century (1939, 34). This graph shows that perhaps this actually happened slightly earlier in the 2nd century.

Despite the broad similarities there are some differences and this is mostly to do with the different brooch types used in these areas. For example at the Stanegate sites there is a high percentage of penannular and cross bow brooches, to be expected due to the military nature of the sites (Fowler 1960, 171). The majority of these brooches are not enamelled and so this has an effect on the numbers. Richborough, being a site with much earlier Roman occupation has a larger percentage of the earlier types (Group 2 in particular), which are also not often enamelled. It is also very firmly in the South of Britain and so has a larger percentage of Group 4 types than on the Stanegate, as they have a much more southern distribution.

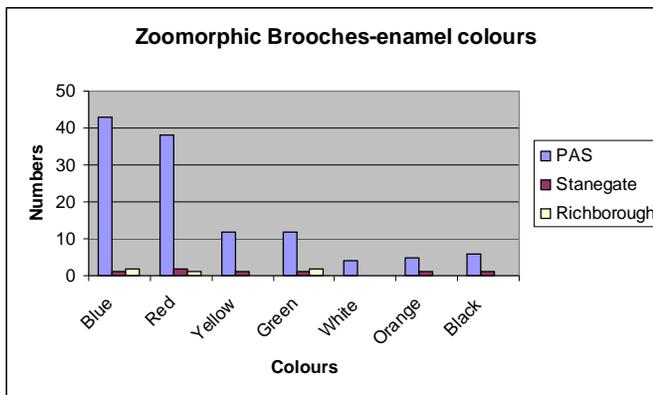
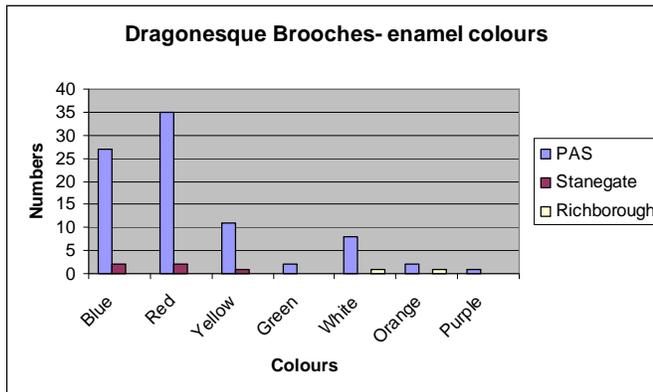
Overall the pattern shown by Graph 1 demonstrates that from these three datasets; which represent military, urban and rural Roman Britain, there seems to be a broad similarity in the dates enamel was used and the brooch types it appears on. This is an important comparison to make as the people living in these areas are very different and other parts of their lives do not have these same similarities. For example, many parts of rural Britain appear untouched by Roman occupation if building styles are discussed. The variations between the three sets seem mostly to be caused by their location although the nature of the activity also has some bearing.

As well as looking at the numbers of each type of brooch enamelled, the colour used is very important. I wanted to see if within Britain the use of colour suggested any regional differences. Certain brooch types are more common in certain areas; does this affect the colours used? To do this I chose zoomorphic plate brooches as my case study. There are two different groups within zoomorphic plate brooches, the dragonesque and the others. The dragonesque type brooch is most commonly found in the North of Britain. The other forms of zoomorphic plate brooch (horse and rider, bird, fish etc) are more common in the South of Britain. Dragonesque brooches retain more of the Celtic (British) art style compared to the other zoomorphic brooches which are much similar to examples found on the Continent (more Roman style). It is hoped that by looking at the different colours used in these two geographically (and stylistically) separate groups that perhaps distinctions between the North and South in their enamelling practices may be seen.

Table 5 shows the different numbers of each group and the numbers enamelled

Type of Brooch	PAS	Stanegate	Richborough
Dragonesque- all	111	8	1
<i>Dragonesque enamelled</i>	57	2 ⁵	1
Other Zoomorphic plate	149	6	4
<i>Other Zoomorphic enamelled</i>	98	4	3

Graphs 2 and 3 showing the different colours used on the two types of brooches



⁵ Not all details were given for each brooch, only 2 stated they had enamel but only 1 stated it did not.

The above graphs and tables show that although the two groups of brooches have different distributions geographically and that their styles vary, the colours used in their enamelling are actually very similar. In both types blue and red are by far the most popular; red being slightly higher for the dragonesques and blue slightly higher for the other zoomorphic types. There is then a spread of the other colours with no real variation between the two types. This is surprising as the different distributions of these two distinct types would indicate that some deliberate choice is being made in what is manufactured and used in these areas. Perhaps the colours used were not as important compared to the style of the brooch. There is not time in this article to discuss the complicated topic of functionality versus symbolism in personal items but this is an important issue. Why were certain brooch types used more in some areas, and how much of a role did colour play in this choice?

Conclusion

In this article I have looked at the origins of enamelling in Britain and how it developed from its simple roots. We have seen that this is a topic which has had little investigation and that there is no definite dating system known for the changes from small pieces of coral through to elaborate polychrome enamelling. The dating becomes slightly more secure when we reach the Roman period as more evidence is available; however there is still scope for much more study⁶. There is also sparse evidence for the production of enamelled objects which hinders our detailed understanding.

The case study of the brooches highlights that enamelling, although present in Britain before the Roman occupation, did not fully develop until the late 1st century AD, reaching its peak in the 2nd century. It appears to be a broadly similar pattern across Britain, although no doubt further, more in-depth study would reveal regional patterns. The different distribution of the dragonesque compared to the other zoomorphic plate brooches did not seem to be matched by the use of different colours of enamel. Overall regional differences in enamelling are not as great as might be expected from the differences in other aspects of Romano-British life. It may be that more distinct stylistic regional groups of enamelled items, whether they are brooches, terret rings or seal boxes, need to be looked at in contrast to this general trend which has been discussed here.

⁶ A PhD is currently being undertaken at Cardiff which should greatly enhance our understanding of the Iron Age to Roman transition in enamelling techniques.

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