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...and both are called fine ornamental white china

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# Lund's Bristol Porcelain:

...and both are called fine ornamental white china

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## CONTENTS

Abstract	5
Introduction	5
Wares attributed to Lund's Bristol	6
Method of sample analysis	7
Composition of Benjamin Lund's porcelain wares	7
Discussion	11
Technology pathways from Bow to Bristol	12
Final comment	13
Conclusion	13
Acknowledgements	14
References	14



## ABSTRACT

Two distinct compositional groupings of porcelains either made at Lund's porcelain manufactory, Bristol, or attributed to that concern, are recognised linked by way of a broadly similar glaze composition. One group, characterised by the presence of the embossed name 'Bristol', is of a magnesian-plumbian (Mg-Pb) composition and the second lacking embossing is of the magnesian-phosphatic-plumbian (Mg-P-Pb) to plumbian-phosphatic-magnesian (Pb-P-Mg) type. The glaze composition is a moderate lead glaze with high  $\text{Al}_2\text{O}_3$ , distinct levels of  $\text{MgO}$ , and  $\text{K}_2\text{O} \geq \text{CaO}$ . These results constitute the first clear indication that the Bristol works may have been producing two porcelain types in addition to its reported stoneware. Based on the notion of technological pathways it is argued that Lund's Bristol porcelains represent compositional derivatives from Bow.

**Keywords:** Lund's Bristol porcelain; steatite; soaprock; bone ash; Worcester porcelain; Bow porcelain; porcelain composition



## INTRODUCTION

One of the more enigmatic early English porcelain manufactories is the Lund's (Miller and Lund's) Bristol concern at Bristol. Formerly known as Redcliffe Backs or Lowdins, this pothouse is generally believed to have been in existence from around the date of the soaprock licence awarded to one of its proprietors, Benjamin Lund, on March 7th, 1749 (Gregorian) through to the date of the buyout by Richard Holdship of the Lund's soaprock licence in February 6th, 1752 (Gregorian) and the purchase of stock, utensils, and effects of the factory on February 21st, 1752 (Gregorian). The supply of soaprock originated from the newly discovered deposit at Gew Graze on the north-western margin of the Lizard Peninsula, Cornwall. On October 13th, 1750 Dr Richard Pococke (1704-1765) wrote to his mother from Tavistock, Devon about his visit to the soaprock mine in Cornwall, around October 5th (Ray Jones, pers. comm. October 2010);

*....to see the Soapy Rock, which is in a little opening in the Cliff,..... which is mostly valued for making porcelane, and they get five pounds a ton for it, for the manufacture of porcelane now carrying on at Bristol,.....(fide Mackenna, 1950).*

Consequently it has been assumed that the earliest production at Bristol cannot have been before March, 1749 (Sandon, 1993). Likewise it has reasonably been argued that the earliest sale of porcelain from the Bristol potworks occurred in late 1749 (Sandon, 1993) with the celebrated figures of the Chinese Immortal, *Lu Tung-Pin*, dated 1750. Burt (*in* Spero and Burt, undated) suggests that based on the first recorded advertisement for apprentices in November 1750 and the first known sales advertisement in July 1751, the latest that commercial production began would have been by the first half of 1750. In November, 1750 the well-travelled Richard Pococke visited the Bristol potworks, where he noted that this concern had lately been established by one of the principal manufacturers at Limehouse that failed. Here he observed among other things the nature of the ceramic output from the Bristol concern;

*They have two sorts of ware, one called stone china, which has a yellow cast, both in the ware and the glazing, that I suppose is made of pipe clay and calcined flint. The other they call old china; this is whiter, and I suppose this is made of calcined flint and the soapy rock at Lizard Point which 'tis known they use. This is painted blue, and some is white, like the old china of a yellowish cast; another kind is white with a blueish cast, and both are called fine ornamental white china (fide Mackenna, 1950).*

What is apparent here is that Pococke is describing three ceramic types manufactured at the Lund's Bristol potworks by November 1750. With respect to the first body, Godden (1985) suggests that this was probably nearer a pottery or stoneware than porcelain, whereas in the description of the other two bodies the use of the word "china" as employed by Dr Pococke was used as a comparison with Chinese porcelains imported by the Honourable East India Company.

Spero (*in* Spero and Burt, undated) goes into some detail over Pococke's comments regarding the chinaware, of which he apparently saw two contrasting types being produced. Spero suggests that the answer to this apparent anomaly probably lies in the colour of the glaze. For example Spero notes

that three models of *Lu Tung-Pin*, all marked “Bristoll” and dated 1750 in the collections of the Victoria and Albert Museum, vary in their glaze tone from white, to cream, to a bluish colour. Likewise he records that pieces in the A. J. Smith Collection exhibit a bluish glaze whilst others attributed to Lund’s Bristol, have a colourless glaze. Spero speculates that there may have been an intention that the main underglaze blue production had a slightly bluish glaze, whereas undecorated pieces should appear as white as possible.

Having established a not unreasonable model as to two glaze types being produced at Bristol, Spero (*in* Spero and Burt, undated) morphs this model into a two potting, glazing, and painting types with a pair of underglaze blue sauceboats (No. 5: *in* Spero and Burt, undated) differing from their counterparts (Nos. 3 and 4) in being unmoulded, far more clearly painted, and having a thinner smoother and better controlled glaze - distinctly grey in tone. A spirally fluted bowl (No. 14), as with the two sauceboats, is likewise thinly potted and both share a friable, brittle quality, as if more underfired than mainstream Lund’s porcelain. In relation to the spirally fluted bowl (No. 14), Spero records that the darker underglaze blue, thinner potting, and eradication of blurred decoration indicate advances in potting and glazing techniques when compared to the mainstream wares. Spero sums up that the pair of sauceboats and the spirally fluted bowl are conspicuously superior in both their potting and their painted decoration, when compared to the earliest phase of underglaze blue decoration at Worcester in the period 1752-53 and hence Spero suggests that it might seem that some months prior to the “unification” with embryonic Worcester there may have been significant improvements in the Bristol output. This of course leaves begging the obvious question that if Bristol sold its soaprock licence, utensils, and stock in trade to the Worcester partners, why not in addition the associated technology to produce better underglaze blue decoration? This point takes on added significance when it is realised that Benjamin Lund, one of the Bristol proprietors, is recorded in bankruptcy documents dated February 23rd, 1753 as, *now of the City of Worcester China maker*. The implication we draw is that Lund was working at the Worcester china works subsequent to the takeover and hence would have been in a position to advise the Worcester partners as to the “significant improvements in the Bristol output”.

Thus we have two possibilities presented us, which in themselves may not necessarily be mutually exclusive. Firstly the Spero theory that the differences in the two types of Lund’s porcelain are reflected in the glaze type and the second model, also advanced by Spero, that some Lund’s Bristol wares differ on account of significant improvements both in potting and painted decoration, though strangely examples of this group are apparently underfired, appear to be slightly “brittle” in appearance, and are vulnerable to cracking. What is of interest is that in both models Spero fails to consider the very real possibility that compositional differences may be a significant factor.



## WARES ATTRIBUTED TO LUND’S BRISTOL

At another level, porcelain wares attributed to Lund’s Bristol fall into two broad categories. One group consists of sauceboats, cream jugs, and figures of *Lu Tung-Pin*, collectively comprising some 32 extant items (Spero *in* Spero and Burt, undated) and are embossed on their bases with the word ‘Bristol’ or ‘Bristoll’. In the case of *Lu Tung-Pin* at least nine figures are recorded of which seven are undecorated and two streaked in part with underglaze manganese. Seven of these Chinese Immortals are recorded as having been embossed from the mould with the Bristol name and the date of 1750 (Spero, *in* Spero and Burt, undated), while Sandon (1993) records that all nine are from the same mould.

The remainder of the wares lacking the embossed name of Bristol are attributed to this concern based on a number of features as summarised by Spero (*in* Spero and Burt, undated). Spero suggests that judging from surviving pieces, Lund decided to mirror the Limehouse emphasis on underglaze blue wares and in summarising the key features associated with Lund’s Bristol he lists its small size, limited resources, benefits afforded by the soapstone formula, and the precedent set by Limehouse. The tone of underglaze blue is recorded by Spero as ranging from a rich deep colour, with a touch of indigo, to a paler more misty tone. This blue decoration, with a characteristic blurring, is described as less pale than Worcester and less well-defined than either Limehouse or Worcester. Glaze application at Bristol tended to be thicker

than the glaze on porcelain from either of the other two concerns. Translucency varies from pale bluish green, sometimes with specks of greater luminosity, to a greenish yellow or even a straw colour (Spero, *in* Spero and Burt, undated). Interestingly, Spero records that unmoulded sauceboats such as the pair in the A. J. Smith Collection, as discussed below, are opaque to artificial light. Glaze bubbling and areas of tiny black speckling are frequent and Spero records pitting in the glaze.

Sandon (1993) argues that it is press-moulded wares that are embossed with the name Bristol, whereas thrown or turned wares lack this embossing. This explanation does cover much of the Bristol output though there are exceptions, such as a group of press-moulded sauceboats including two in the A. J. Smith Collection (Spero and Burt, undated: No. 5) and one discussed below. All such embossed wares are either in the white or decorated with underglaze blue, except for eight polychrome sauceboats (Spero, 1984) where the embossed name, with one possible exception, has been over-painted, to hide or disguise the name "Bristol". The generally accepted explanation is that these polychrome examples represent wares manufactured at Bristol and subsequently taken to Worcester for painted decoration just prior or following the merger of the two concerns. In contrast the example lacking the overpainting of the Bristol name is regarded as outside decorated.

Of particular note is that a glazed blue and white fragment from the base of a creamboat embossed with "OL" derived from the name "Bristol", was recovered from the lowest levels of the Worcester site factory excavations (Sandon, 1993). Sandon notes that it is hard to believe that any pieces marked "Bristol" were cast from moulds at Worcester and hence it would follow that this creamboat was manufactured (and decorated) at Bristol and transported to Worcester. An alternative view expressed by Ray Jones (pers. comm., October 2010) is that the actual 'Bristol' moulds may have been used initially at Worcester, albeit experimentally.

Sandon (1993) makes a salient point that no unmarked pieces can be reliably attributed to Bristol as the wares made at Worcester early in 1752 will be virtually indistinguishable. We assume that in making this statement Sandon is including shapes, potting methods, and decoration. However we are unsure as to whether Sandon extends this notion to include composition - both body and glaze. Re-

gardless, this leaves uncertain the identity of any porcelains produced at Broad Street, Worcester, if any, and those made at Warmstry House, Worcester from mid 1751 through to early 1752.



## METHOD OF SAMPLE ANALYSIS

This research has grown out of a previous extensive study relating to early Bow porcelains and now provides new compositional information suggesting that Benjamin Lund of Bristol was making two distinct porcelain recipe types. Consequently the observations made by Dr Richard Pococke in November 1750 can be substantiated based on compositional grounds. It may be that these two compositional types find further contrasting expression in their potting, painting, and the colour of the glazes applied, but it is their composition which so clearly and distinctly defines these two groups.

Minute amounts of ceramic powder and glaze were mounted in plastic holders, polished, and then carbon-coated using an Emitech K575X Peltier-cooled high-resolution sputter coater fitted with an Emitech 250X carbon coater. Analyses were undertaken at the Otago University Centre for Electron Microscopy using a JEOL JSM-6700F field emission scanning electron microscope fitted with a JEOL 2300F EDS system. Analysis was performed at an accelerating voltage of 25kV. A variety of spot and area analysis was used. Spectra were collected for 120 seconds. The EDS systems resolution and calibration were checked using a X-checker performance monitor (SPI supplies, USA). The Mn Ka FWHM was 130eV.



## COMPOSITION OF BENJAMIN LUND'S PORCELAIN WARES

Benjamin Lund was granted a licence to extract soaprock from Cornwall for twenty one years on March 7th, 1749 (Gregorian). This magnesian-rich material from Gew Graze on the Lizard Peninsula was valued at the significant amount of five pounds a ton according to Dr Richard Pococke. Based on this licence and the subsequent written observations made by Pococke on October 13th and November 2nd, 1750, where he suggested that chinaware produced at Lund's Bristol prob-

ably comprised calcined flint and 'soapy rock' from Lizard Point, it has been assumed that Lund's Bristol porcelain was magnesian in composition. Supporting evidence for the production of magnesian wares at Bristol comes from the analytical work of Eccles and Rackham (1922) where a partial and a more complete analysis of two items, assumed to be of Bristol origin, both demonstrate a high level of MgO - 10.0 and 13.3 wt% MgO respectively.

**The embossed 'Bristol' wares:** Two examples of items embossed with the name 'Bristol' were selected for this study, namely a sauceboat formerly in the Godden Collection (Bonhams, June 30th, 2010: Sale No. 18425, Lot No. 49) (Fig. 1) and a figure of *Lu Tung-Pin* from the Bristol Museum and Art Gallery (Fig. 2). Micro-samples of both porcelain body and glaze were taken and the analytical results are shown in Table 1 (Nos. 1 & 2). For comparison the porcelain composition of a non-embossed sauceboat attributed to Lund's Bristol, as analysed by Eccles and Rackham (1922) (Fig. 3), is also provided (Table 1, No. 9). Inspection of the porcelain composition of the Godden sauceboat and the Bristol Museum and Art Gallery *Lu Tung-Pin* shows close agreement. SiO<sub>2</sub> varies from 66.8 - 68 wt%, MgO from 11.4 - 12.3 wt%, and PbO 10.9 - 13.2 wt%. Of note are the low levels of CaO and Na<sub>2</sub>O, with P<sub>2</sub>O<sub>5</sub> absent in both examples. When compared with the analysis of the E. F. Broderip sauceboat (Eccles and Rackham, 1922: C.857-1920), which lacks the embossed 'Bristol' mark, it can be seen that the paste composition is distinctly different. Both Na<sub>2</sub>O and CaO are higher in the latter whilst PbO and K<sub>2</sub>O are lower. The most significant aspect is the marked amount of P<sub>2</sub>O<sub>5</sub> (2 wt%), assumed to reflect the addition of bone ash to the body of the Broderip sauceboat.

In the case of glaze compositions provided for the two 'Bristol' embossed items (Table 1: Nos. 3 & 4) there is, as with the body compositions, a distinct concordance between the two items. Both are moderate-level lead glazes with 27.7 wt% PbO for the Godden sauceboat and 25.5 wt% for *Lu Tung-Pin*. Both glaze compositions have high Al<sub>2</sub>O<sub>3</sub> contents at 4.2 and 3.5 wt% Al<sub>2</sub>O<sub>3</sub> respectively and distinct MgO contents of 2.7 and 3 wt%. K<sub>2</sub>O is particularly high at 5 and 5.5 wt% while CaO is distinctly low. The glaze composition for both embossed Lund's Bristol items can be readily differentiated from the glaze composition found on Bow phosphatic wares, which are characterised

by high PbO > 40 wt%, distinct levels of CaO and K<sub>2</sub>O with K<sub>2</sub>O ≥ CaO, and negligible amounts of Al<sub>2</sub>O<sub>3</sub>, P<sub>2</sub>O<sub>5</sub>, and MgO (Ramsay et al., 2011).

In summary it is concluded that both body and glaze compositions as given in Table 1 for the two embossed 'Bristol' items are remarkably similar to each other and hence it can be deduced that both ceramic items may have a common factory origin. The presence of the embossed 'Bristol' name establishes that both items can be attributed to Bristol and predicated on this a body and glaze composition used by Benjamin Lund at his Bristol manufactory is established. Broadly the body recipe comprised crushed silica, steatite (-36 wt%), and crushed lead frit.

**Bristol wares lacking the embossed 'Bristol' mark:** During routine sampling and chemical analysis of a number of items attributed to Lund's Bristol we became aware of a contrasting body composition associated with a group of wares lacking the embossed 'Bristol' name, but nevertheless reasonably attributed to Lund's Bristol based on stylistic and decorative features. This group includes a 'problem' sauceboat in the Lund's Bristol style (Bonhams, June 2010: Sale No. 18425, Lot 52) (Fig. 4), a shell pickle dish (Bonhams, June 2010: Sale No. 18425, Lot 50) (Fig. 5), an ivy leaf pickle dish attributed to either Lund's Bristol or early Worcester (Phillips, May 10th, 2000: Sale No. 30,924, Lot 551) (Fig. 6), and a shell pickle dish attributed to Lunds' Bristol or Broad Street, Worcester (Bonhams, October 3rd, 2007: Sale No. 15509, Lot 129) (Fig. 7). Their body and glaze compositions are given in Table 1 and for comparison the analysis of the porcelain body of the E. F. Broderip underglaze blue sauceboat (Eccles and Rackham, 1922: C.857-1920) is also given.



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7

**Fig. 1.** Sauceboat in underglaze blue. Lund's Bristol magnesian-plumbian soft-paste porcelain. Embossed 'Bristol', c. 1750-51, L. 8 1/4" (21 cm). Formerly in the Geoffrey Godden Collection (Bonhams, June 30th, 2010, Sale No. 18425, Lot 49). Photograph by W. R. H. Ramsay.

**Fig. 2.** Figure of *Lu Tung-Pin* in the white. Lund's Bristol magnesian-plumbian soft-paste porcelain. Embossed 'Bristol 1750', H. 5 1/8" (17.5 cm). Bristol City Art Gallery and Museum. Photograph by W. R. H. Ramsay.

**Fig. 3.** Sauceboat in underglaze blue. Lund's Bristol magnesian-phosphatic-plumbian soft-paste porcelain. Unmarked, c. 1749-50. Donated to the Victoria and Albert Museum by E. F. Broderip (C. 857-1920). Photograph by Dr W. Jay.

**Fig. 4.** Sauceboat in underglaze blue. Lund's Bristol magnesian-phosphatic-plumbian soft-paste porcelain. Unmarked, c. 1749-50, L. 8 3/4" (22.3 cm). Formerly in the Geoffrey Godden Collection (Bonhams, June 30th, 2010, Sale No. 18425, Lot 52). Photograph by W. R. H. Ramsay.

**Fig. 5.** Shell pickle dish in underglaze blue. Lund's Bristol magnesian-phosphatic-plumbian soft-paste porcelain. Unmarked, c. 1749-1750, L. 3 1/2" (8.8 cm). Formerly in the Geoffrey Godden Collection (Bonhams, June 30th, 2010, Sale No. 18425, Lot 50). Photograph by W. R. H. Ramsay.

**Fig. 6.** Ivy leaf pickle dish in underglaze blue. Lund's Bristol magnesian-phosphatic-plumbian soft-paste porcelain. Unmarked, c. 1749-50, L. 4" (10 cm). Formerly in the Watney Collection (Phillips, May 10th, 2000, Sale No. 30,924, Lot 551). Photograph by W. R. H. Ramsay.

**Fig. 7.** Shell pickle dish in underglaze blue. Lund's Bristol magnesian-phosphatic-plumbian soft-paste porcelain. Unmarked, c. 1749-50, L. 3" (7.2 cm). Formerly in the S. & I. Sutherland Collection (Bonhams, October 3rd, 2007, Sale No. 15509, Lot 129) and subsequently the Crane Collection. Photograph by W. R. H. Ramsay.



TABLE 1: PORCELAIN BODY AND GLAZE CHEMISTRIES FOR SELECTED LUND'S BRISTOL AND WARMSTRY HOUSE PORCELAINS

	Body and glaze compositions for embossed 'Bristol' wares				Body and glaze compositions for wares lacking an embossed 'Bristol' name											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
SiO <sub>2</sub>	66.8	68	60.5	58.3	60.8	58	57	62.3	67.6	60.7	71	55.8	49.3	52.3	58.6	49.4
TiO <sub>2</sub>	0	0	0	0	0	0	0	0	nd	0	0	0	0	0	0	0
Al <sub>2</sub> O <sub>3</sub>	3.6	3	3.5	4.2	2.8	3	2	3.3	4.6	2.4	3.8	5	3	4	6	2.7
MgO	11.4	12.3	3	2.7	11.5	7	8	10	13.3	15	12.2	1.5	1.7	1.7	1.3	2.7
MnO	0	0	0	0	0	0	0	0	nd	nd	0	0	0	0.3	0	0
FeO	t	0	0	0	0	0	0	t	nd	0.5	0.4	0	0	0.3	0.1	0
CaO	0.5	1.3	0.5	1	10	8	10.5	8.7	2.6	10.9	1.7	2	1.5	1	3	1.3
Na <sub>2</sub> O	0.5	1	1	1.2	2	0.3	0.3	1.7	1.6	2.2	1.5	4.2	0.3	0.3	3.7	1.3
K <sub>2</sub> O	4.4	3.3	5.5	5	2	3	3	3.3	1.15	1.6	3.4	3.2	3.8	5.3	4	2.6
P <sub>2</sub> O <sub>5</sub>	0	0	0	0	7.1	7	10.5	6	2	6.7	0.3	0	0.3	0.3	0.1	0
PbO	13.2	10.9	25.5	27.7	3.5	14	9.5	4.5	8	0	5.8	28	40	35	23.3	39
SO <sub>3</sub>																1.2
	100.4	99.8	99.5	100.1	99.7	100.3	100.8	99.8	100.85	100	100.1	99.7	99.9	100.5	100.1	100.2

1. Porcelain body *Lu Tung-Pin*, embossed 'Bristol'. Bristol Museum and Art Gallery - see Fig. 2
2. Porcelain body, embossed 'Bristol' sauceboat, Godden Sale (Bonhams, June 30th, 2010: Sale No. 18425, Lot 49) - see Fig. 1
3. Glaze composition *Lu Tung-Pin*, embossed 'Bristol'. Bristol Museum and Art Gallery - see Fig. 2
4. Glaze composition, embossed 'Bristol' sauceboat, Godden Sale (Bonhams, June 30th, 2011: Sale No. 18425, Lot 49) - see Fig. 1
5. Porcelain body sauceboat, Godden Sale (Bonhams June 30th, 2010: Sale No. 18425, Lot 52) - see Fig. 4
6. Porcelain body pickle dish, Godden Sale (Bonhams, June 30th, 2010: Sale No. 18425, Lot 50) - see Fig. 5
7. Porcelain body ivy leaf pickle dish, Watney Sale (Phillips, May 10th, 2000: Sale No. 30,924, Lot 551) - see Fig. 6
8. Porcelain body pickle dish, Sutherland Sale (Bonhams, October 3rd, 2007: Sale No. 15509, Lot 129) - see Fig. 7
9. Porcelain body, E, F, Broderip sauceboat (Eccles and Rackham, 1922: C.857 - 1920) see Fig. 3
10. Sherd body (W12) from the lowest level of Warmstry House (Owen, 1998)
11. Mean composition of six mid-to late-1750s to mid-1770s Dr Wall sherds, Worcester (Owen, 1998)
12. Glaze sauceboat, Godden Sale (Bonhams, June 30th, 2010: Sale No. 18425, Lot 52) - see Fig. 4
13. Glaze pickle dish, Godden Sale (Bonhams, June 30th, 2010: Sale No. 18425, Lot 50) - see Fig. 5
14. Glaze ivy leaf pickle dish, Watney Sale (Phillips, May 10th, 2000: Sale No. 30,924, Lot 551) - see Fig. 6
15. Glaze pickle dish, Sutherland Sale (Bonhams, October 3rd, 2007: Sale No. 15509, Lot 129) - see Fig. 7
16. Middle zone of glaze coating to sherd (W12) from the lowest level of Warmstry House (Owen, 1998)

nd - *not determined*  
t - *trace*

The porcelain bodies of all five items are characterised by the variable but distinct presence of phosphorus ranging from 2 wt% P<sub>2</sub>O<sub>5</sub> in the Broderip sauceboat (Table 1: No. 9) to 10.5 wt% in the ivy leaf pickle dish (Table 1: No. 7). CaO is positively correlated with P<sub>2</sub>O<sub>5</sub> suggestive of the presence of bone ash in the body whilst the prominent levels of MgO ranging from 7 - 13.3 wt% indicates the likely use of soaprock. This would suggest that variable amounts of soaprock were used in the recipe of some 20 - 40 wt%. The relatively low levels of Al<sub>2</sub>O<sub>3</sub> probably reflect the presence of aluminium in the soaprock used rather than a discrete kaolinite clay fraction as suggested by Owen (1998). Simeon Shaw (1837) records soaprock obtained from Mullyan Churchtown and from a vein near Lizard Point, Cornwall and he provides an analysis of silica (44%), alumina (10%), magnesia (24%), and water (22%). PbO is variable in the ceramic items analysed ranging from 3.5 to 14 wt% and both Na<sub>2</sub>O and K<sub>2</sub>O are variable in concentration. The key feature which links this group of non-em-

bossed porcelains is the marked presence of phosphorus in their body, which we suggest indicates the use of bone ash.

Glaze compositions show variable levels of PbO (23.3 - 40 wt%), small but persistent levels of MgO (1.3 - 1.7 wt%), distinct levels of K<sub>2</sub>O (3.2 - 5.3 wt%), and elevated levels of Al<sub>2</sub>O<sub>3</sub> (3 - 6 wt%). The major discordance is in the levels of Na<sub>2</sub>O with high Na<sub>2</sub>O in the Godden sauceboat (4.2 wt%) and low levels in two of the pickle dishes (0.3 wt%). On comparing the glaze compositions with the two embossed 'Bristol' items there is reasonable concordance between the two groups. PbO is a little lower in the embossed wares yet overlapping with the Sutherland pickle dish (23.3 wt% PbO) and MgO is slightly higher. Overall there is reasonable agreement in glaze compositions between these two groups with the exception of the high PbO level in the pickle dish (Table 1: No. 13; Fig. 5) and it is conceivable that all were glazed at the same concern.

Based on porcelain composition it would appear that two recipe types were produced by Benjamin Lund at Bristol. One type is a magnesian body, assumed to represent the use of steatite. Whilst found associated with two embossed 'Bristol' items we cannot claim that all embossed porcelains are of this recipe. The second body type comprises a mixed magnesian-phosphatic body assumed to reflect the use of both steatite and bone ash, and so far found on non-embossed wares. Glaze compositions on both bodies show reasonable concordance and it is proposed, based on our current imperfect knowledge of glaze compositions, that both groups originated from the same manufactory.



## DISCUSSION

Presented in this account are two compositional groups of porcelains. One group, having a magnesian composition, is confidently ascribed to Lund's Bristol and the second group, attributed to that concern based on decorative and visual features, is characterised by a mixed magnesian-phosphatic composition. The composition associated with the embossed wares is very similar to the mean Dr Wall composition determined by Victor Owen from sherds dating from the mid-1750s to the mid-1770s (Table 1: Nos. 11 & 16) although the PbO content in the Lund's Bristol duo is significantly higher. This general concordance in composition between embossed Lund's Bristol porcelains and post mid-1750s Worcester is strongly indicative of a compositional pathway linking the two concerns and demonstrates that the magnesian formulation employed by Benjamin Lund in one group of his china wares was broadly replicated at Worcester subsequent to the buyout by Holdship in early 1752. It is tempting to speculate that this magnesian Bristol group dates from the late 1750s.

The second group (non-embossed group) comprising a mixed magnesian-phosphate composition may predate the magnesian group and if so would date from the inception of the manufactory through to the late 1750. Of note is a now overlooked report by Wallace Elliot (1929; p. 18) where he records that A. J. B. Kiddell tested one of Mr Caldwell's *Bristoll*-marked Chinese figures and it proved to be definitely phosphatic. Magnesium was apparently not also looked for.

Possibly the most notorious member of the non-embossed group is the unmoulded, underglaze

blue sauceboat (Bonhams, June 30th, 2010: Sale No. 18425, Lot 52). This item has been extensively commented on and photographed (Godden, 1985, 2004; Bonhams, 2010). To our knowledge at least seven comparable unmoulded sauceboats in underglaze blue have been recorded with four accepted as genuine and three, including this example, being described as 'wrong'. Supposedly genuine examples include a pair in the A. J. Smith Collection at the Bristol Museum and Art Gallery (Spero and Burt, undated: No. 5), one sold at the Watney Sale (Phillips, 1999: Lot 139), and one sold by a London dealer (Spero, 1996: No. 36) and attributed to earliest Worcester. Descriptions of these sauceboats are vague as to obvious visual differences separating those accepted as genuine and those not. One of these 'wrong' sauceboats was consigned to Phillips and rejected by Sandon in 1981 (Bonhams, 2010). A second appeared at a Christies sale on July 12th, 1982 and was attributed to Lund's Bristol 1749-51, while the third (the one under discussion) was sold by a London dealer to Geoffrey Godden in 1980 on the basis that it was unlikely to be 'period' (Bonhams, 2010). Reasons supplied by Bonhams as to why this third sauceboat is not 'period' include its underfired appearance, crazed glaze, and sharp blue painting. Strangely, Phillips (2000: Lot 550) attributes a crazed pickle dish to either Lund's Bristol or early Worcester noting that crazed examples, although rare for either factory, indicate underfiring. In a similar fashion Spero (*in* Spero and Burt, undated: No. 13) depicts a Lund's Bristol small vase where the decoration is described as clearly executed. Of the seven unmoulded sauceboats, three are accepted in the literature as Lund's Bristol, one as earliest Worcester, and three as 'problem' wares.

Based on the composition of both body and glaze of the Godden sauceboat sold by Bonhams in June, 2010 (Table 1: Nos. 5 & 12), it is apparent that no 'faker' would have had the knowledge 30 years ago, let alone 100 years ago, to have been able to reproduce the highly distinctive body and glaze compositions of this sauceboat, which are broadly mirrored in the three associated pickle dishes and whose body composition also finds reasonable parallels with the E. F. Broderip sauceboat (Table 1: No. 9). This analytical information only became available to the authors in August 2010 after the sauceboat was sold at the end of June. Consequently we can confidently ascribe this 'problem' sauceboat to the group of non-embossed wares attributed to Lund's Bristol. This single example

emphasises the importance of compositional data in concert with visual perceptions of early English porcelains (Ramsay and Ramsay, 2007b).

In the case of the Watney ivy leaf pickle dish (Phillips, 2000: Sale No. 30,924, Lot 551) it was attributed in the sale catalogue to either Lund's Bristol or early Worcester based on the nature of the underglaze painting. The body and glaze composition of this ivy leaf pickle dish (Table 1: Nos. 7 & 14) suggests that its attribution falls within the compositional range of wares attributed to Bristol and not that of Dr Wall at Worcester.

Of late it has become fashionable to ascribe unusual pieces of porcelain to earliest Worcester, if not Broad Street itself. A case in point are the two brilliantly potted and decorated, underglaze blue tureen stands in the collections of the British Museum (Dawson, 2007: Nos. 1 and 2) dated to 1751 on the basis that they are unlike most 18th Century Worcester porcelain. It seems to us that if Worcester were able to achieve such standards so early in its life then there would have been little need to buy out Benjamin Lund and Lund himself, would have had more compelling reasons to buy out the Worcester partners. The feature that links all of these postulates has been a reluctance to include composition in the discussion as to attribution and dating. In particular, the key research paper which offers us the best clues as to the type of wares produced from the outset at Warmstry House relates to material recovered from the lowest level of that excavation (Owen, 1998). These analytical results have been essentially ignored for the last decade. It is this reluctance to address the critical determinant - composition, which has held up significant progress in our understanding of early English porcelains.

In the recent Bonham's sale of the Crane Collection an early pickle dish previously sold at the Sutherland Sale (Bonhams, 2007: Sale No.15509, Lot 129) is described as possibly Lund's Bristol or Broad Street, Worcester. What is immediately apparent with this small pickle dish is the clarity of its painting, its crazed glazing, and the inferred underfiring of the body - all features previously used to suggest that the un moulded sauceboat (Table 1: Nos. 5 and 12; Fig. 4) was possibly a 'fake'. Chemical analysis of both body and glaze of this pickle dish (Table 1, Nos. 8 and 15) demonstrates close compositional features with the non-embossed Lund's Bristol group. Its body comprises MgO

10 wt%, P<sub>2</sub>O<sub>5</sub> 6 wt%, CaO 8.7 wt%, PbO 4.5 wt% and compositionally it falls in the magnesian-phosphatic-plumbian body type (Owen, 2007). The glaze is a moderate lead glaze (23.3 wt% PbO) with a high level of Al<sub>2</sub>O<sub>3</sub> (6 wt%) and a distinct amount of MgO (1.3 wt%), features that broadly are in accord with the glaze compositions found on the embossed Lund's Bristol porcelains (Table 1).

In the case of earliest Worcester, either Broad Street or pre-mid 1752 Warmstry House, we have currently two ways of attributing wares to this early period. The first is by guesswork and the second requires us to compare the porcelain item's composition (body and glaze) together with stylistic considerations to sherds recovered from the lowest level at Warmstry House (Owen, 1998). Of the five bulk sherd compositions reported by J. V. Owen, none compares closely with the composition of the pickle dish given in Table 1 (Nos. 8 & 15). The nearest composition reported by Owen is W12 (Table 1: Nos. 10 & 16) but this sherd has PbO below detection level and slightly higher MgO (15 wt%). The glaze composition shows a number of subtle differences (Table 1: No. 16) including higher PbO, lower Al<sub>2</sub>O<sub>3</sub>, and the presence of sulphur reported as SO<sub>3</sub> (1.16 wt% SO<sub>3</sub> in the middle of the glaze and 0.92 wt % SO<sub>3</sub> at the inner glaze margin). Based on current compositional data we suggest that this underglaze pickle dish (Table 1: Nos. 8 and 15; Fig. 7) can reasonably be attributed to Lund's Bristol.



## TECHNOLOGY PATHWAYS FROM BOW TO BRISTOL

A further aspect to arise from our work relates to the notion regarding the influences (decoration, form, and composition) on Benjamin Lund and the Bristol concern. A recurrent theme in current literature is that Benjamin Lund, one of the possible former principals of Limehouse, used Limehouse as his model for the establishment of the potworks at Bristol. It has been argued that in three particular respects production at Limehouse stood apart from both contemporary Bow and the Chinese importations; an innovative use of moulded ornamentation, a series of models associated with silver forms, and almost certainly, the first use of soaprock on a commercial scale, probably introduced only during the final stages of the factory's brief existence.

In our opinion such notions possibly reflect the ‘millstone’ around the thinking on early English porcelains inflicted by the dated Bow *New Canton inkwells* of 1750 and the second Bow patent of 1749. So dominant have these two features been in supporting the belief that Bow commenced in the late 1740s (Christies, 2010: Sale No. 7880, Lot 56) that there has been a significant reluctance to recognise the importance of Bow, its early date of inception, and its influence on other English concerns both stylistically and compositionally. This takes on added significance when it is realised that based on the argument that Bow first patent porcelains (‘A’-marked wares) were produced by the Bow proprietors commercially by about 1743 (Daniels, 2007; Ramsay and Ramsay, 2007a, 2007b; Ramsay et al., 2001, 2003) Bow must have been in existence by the early 1740s at the latest and hence would have predated the inception of Limehouse by at least several years, if not a decade! In addition there is a range of recipe types used at Pomona, Limehouse, and Lund’s Bristol, which are clearly derivative from Bow (Ramsay et al., in prep). As with compositional pathways and associated time-frames so too with stylistic and decorative derivations.

The claim by Bimson (2009), quoting Honey (unreferenced) that one of the George II soapstone busts may have been given as a gift to William Cookworthy from the founder of the Lund’s Bristol factory in acknowledgement of his help and advice on the use and sources of soapstone, is in our opinion without foundation as follows:

- Based on this work on Lund’s Bristol and Ramsay et al., (in prep), the technology pathway for the use of steatite (and bone ash) can be traced from Lund’s Bristol, to Limehouse, thence to Bow, and then back to John Woodward and his ceramic firings in the 1720s using Cornish soapstone;
- there is no known link that we are aware of between William Cookworthy and the use of Cornish steatite or soapstone;
- whilst Cookworthy did procure a soapstone bust of George II *from the manufacturers*, most likely when he was in London in early July 1745, as will be argued in a forthcoming publication by Daniels, Ramsay, and Ramsay, that bust had no association whatsoever with Lund’s Bristol; and

- in 1748 William Cookworthy was a ceramic nobody and was in no position to advise anyone on making porcelain, steatitic or otherwise.

This contribution supports the contention of Owen (2007) that the five-fold classification of early English porcelains developed by the pioneering work of Eccles and Rackham (1922) has become too constricting with numerous examples now emerging which are recalcitrant with regard that classification. The first major questioning of this five-fold classification seems to have been by Freestone (1996) when he recognised the presence of a high-clay formulation in the ‘A’-marked porcelains as represented by high  $\text{Al}_2\text{O}_3$ . Since then a number of papers on the composition of a wide range of wasters and sherds from various archaeological sites in England has been published by Owen and co-workers. This work over the last decade has culminated in a revised classification of English and American soft-paste porcelains (Owen, 2007). Our contribution recognises the importance of a major group of porcelains whose composition contains the presence of both phosphorus and magnesium and by inference the use of bone ash and soaprock. This combination has to our knowledge not been recognised by English ceramic connoisseurs, although Owen (1998: No. W12) reported a sherd having this broad composition but lacking PbO from the lowest level of the waster pile from Warmstry House (Table 1). In addition Watney (1973: Fig. 55A) illustrates a small basket described, without substantiation, as steatitic with a small amount of bone ash. This he attributes to Chaffers, Liverpool. Subsequently (Watney, 1997: 11) reports that mainstream Chaffers’ porcelains are steatitic although a number show about 1% phosphate, especially those decorated with the *Jumping Boy* pattern. The tracing of this distinct recipe type through various factories is currently being pursued and it can be shown to have its origins in earliest Bow, possibly dating from the 1730s but most certainly from the very early 1740s (Ramsay et al., in prep). The overarching conclusion we reach is that it is not until the correct chronology of any particular porcelain manufactory and its associated recipe types are elucidated that discussions on derivative styles and decorative idioms can have relevance.



## FINAL COMMENT

In conclusion we comment on the output and range of compositions attributed to Lund's Bristol, which was supposedly operating during so short a space of time. The necessary technology required to produce two contrasting porcelain types coupled with a reported stoneware recipe might possibly have been outside Benjamin Lund's ceramic technical abilities, if any. Burt (*in* Spero and Burt, undated) makes the very reasonable comment that in the current absence of unambiguous documentary or physical evidence of soapstone being used at Limehouse, it would be interesting to know how Lund, with all his financial difficulties, would have had the confidence to apply for a soaprock license unless he had had the opportunity to experiment with it prior to the establishment of his works in Bristol. Finally it is Burt again (Burt, *in* Spero and Burt, undated) who makes the prescient observation that chemical analysis of the porcelain body may in the near future be able to turn speculation into certainty.



## CONCLUSIONS

Two porcelain body types are recognised for Lund's Bristol. The first is a magnesian-plumbian (assumed steatitic) body and the second is a magnesian-phosphatic-plumbian (assumed steatitic-bone ash) body. Both types are linked with a broadly comparable glaze type comprising moderate PbO, high Al<sub>2</sub>O<sub>3</sub>, distinct MgO and K<sub>2</sub>O ≥ CaO. The magnesian formulation can be ascribed confidently to Lund's Bristol by virtue of the presence of the embossed 'Bristol' name. The second recipe type (magnesian-phosphatic-plumbian) is attributed to this manufactory based on the associated wares, whose decorative features are attributable to Bristol. The presence of two types of china produced at Lund's Bristol, as proposed in this contribution, finds support in the writings of Richard Pococke of November 1750.

Within the Bristol non-embossed group are included two pickle dishes which have been attributed to either Lund's Bristol or to Broad Street - earliest Worcester. Their general conformity in body and glaze compositions with other members in this Bristol group and their compositional discordance with sherd compositions recovered from Warm-

stry House and with compositions determined for Dr Wall porcelains of the mid 1750s supports a Lund's Bristol attribution. Likewise within the Bristol non-embossed group is a non-moulded sauceboat in underglaze blue. Although widely regarded in the literature as a 'fake', its body and glaze compositions demonstrate concordance with other members of this group and it is argued that it represents an underfired example derived from Lund's Bristol. The recognition of a magnesian-phosphatic recipe type might appear to be a newly identified composition for English porcelains although we note that both Watney and Owen have reported its presence. Likewise the identification of the use of steatite (+/- bone ash) at Lund's Bristol is highly suggestive of a compositional pathway extending from Worcester, back through Bristol, through Limehouse and Bow, and thence back to John Woodward of the Royal Society of London and his experimental firings of the 1720s. We suggest that such compositional or technical pathways are more likely to transcend inferred stylistic linkages.



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## *Lund's Bristol Porcelain:*

...and both are called fine ornamental white china

This monograph on the porcelains from Lund's Bristol recognises two recipe types in addition to a porcellaneous (Si-Al) stoneware, namely a magnesian-plumbian (Mg-Pb) body and a magnesian-phosphatic-plumbian (Mg-P-Pb) body. The use of both inferred soaprock and bone ash by Benjamin Lund is documented and based on the concept of technology pathways a compositional linkage is traced backwards from Worcester, through Lund's Bristol, to Limehouse, and thence to Bow and then to earlier experimental porcelain firings using Cornish soapstone in the 1720s by John Woodward, Secretary to the Royal Society of London. Although it is now close to a decade since it was demonstrated that Bow by 1743 was producing highly sophisticated, commercial, hard-paste porcelains, there is still a strong desire in ceramic circles to cling to the notion that commercial production based on a bone ash recipe alone did not commence at Bow until around 1747. This approach to early Bow is here identified as the *millstone syndrome*. In contrast it argued, predicated in part on work by Pat Daniels, that Bow was operating in the 1730s utilising a range of recipe types, some of which find their subsequent expression at Limehouse, Pomona, and Lund's Bristol. It is concluded that compositional pathways are more likely to transcend factory linkages inferred from stylistic considerations.