Last time I spent most of the session looking at how pottery developed from Palaeolithic times, through the Stone and Bronze Ages, to the Classical world of the Greeks and Romans. Despite absentmindedly missing out a chunk or two of my original presentation I ran out of time, and was not able to look at the later stages of the Roman Empire and what happened after that. So, I now propose to recap a bit of Roman Red Gloss Pottery, and take it from there.

Here is a slide from the last presentation

Roman pottery – Samian Ware

- Samian ware appears to be a generic term for a particular style of pottery which was made in a few identifiable places within the Roman Empire

  NB there's no such place as Samia, so the name is a mystery
- Another way to describe Samian Ware is Roman Red Gloss Pottery and within this broad category are several other terms used for variations of the style, such as *terra sigillata*, Arretine ware and African Red Slip Ware
- Rather than being formed on a potter's wheel, Red Gloss Pottery was moulded, so that a low relief pattern could decorate the outside surface, and the inside surface could be similarly decorated using a different mould
- As there was no glazing involved, kilns did nor reach particularly high temperatures, but they were very large and industrial in scale

(right – kiln and bowl found at La Graufesenque in Gaul)

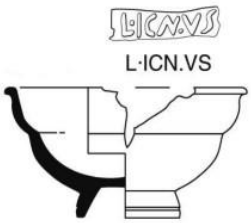
Just to remind you why this style of pottery is called Red Gloss, it is painted before firing with a glossy red slip (a slip is a mixture of fine clay and water). It contains a higher proportion of potassium and sodium, which allows it to melt onto the body of the vessel. When the pottery is fired the surface oxidizes and turns red. Often the vessel was fired twice, first in a reductive environment with oxygen excluded, giving it a black finish; but after being re-fired in a kiln with oxygen, the surface would become glossy red through oxidization.

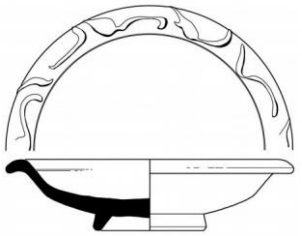
A few of the things which made Samian Ware a game changer are

1. The method of using moulds to form the wares enabled large quantities of consistent quality goods to be manufactured to a standard and highly decorated pattern.
2. Kilns were huge, being capable of firing tens of thousands of items in one go; but not at particularly high temperatures, so not hot enough for glazing.
3. The Romans' ability to do things on a big scale, with corporations known as *publicani* to manage contracts, skilled or slave labour to do the work, and good roads for transport.

Where Red Gloss Pottery was made

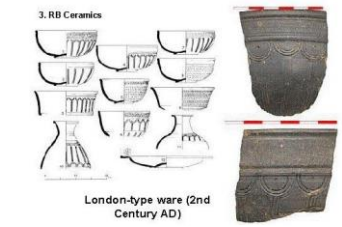
- The first centre at Arezzo in Italy and four in Gaul were described last time in Pottery Pt 1; the last to be established, in the East of Britannia, was an offshoot of Eastern Gaul
- The Samian ware industry centred on Colchester was not hugely successful, as the parent Eastern Gaulish workshop was notthe best in terms of quality
- Colchester wares were often stamped (bottom left) which is useful for archaeologists tracking where it went

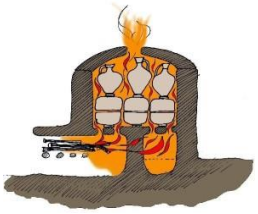




Besides the Red Gloss pottery, imported and home produced, there was a blossoming of pottery production in Britannia during the Roman occupation which was quite different from Samian ware, but benefitting from the newly acquired skills and techniques.

Romano-British pottery types





When the Roman occupation became established in the middle of the 1st Century traditional British potters began to use faster kick wheels and semi-permanent kilns, like the one pictured here. This made production faster and more consistent, and styles emerged which were different from their Iron Age predecessors. By the middle of the 2nd Century distinctive styles were being mass produced, and here are some of them (clockwise from top left):

So-called London-type ware was actually produced in various locations, including Essex, Suffolk, the Nene Valley near Peterborough and London. It copied Samian ware to some extent, but was grey in colour. It had quite high status.

Grey wares came to dominate Romano-British pottery, making up 80% of all pottery found in the Province. It was used for all kinds of cooking and eating.

The name white oxidized is given to a range of lighter coloured vessels, mainly flagons. The finished colouring was achieved by using a white or buff slip. These were made in several locations right up to the 4th Century, which is when of course the occupation ended.

Black burnished wares were essentially grey, but burnished to a dark gloss by rubbing. The centres for making this type of pottery were Dorset, around Poole Harbour, and later East Anglia.

Clay containing shell fragments was used to produce coarse pottery for storage jars. Manufacture of this ware occurred in the Nene Valley, Lincolnshire, the Midlands, Bedfordshire and Suffolk. By the way, you might have noticed that all the locations appear to be in the lowlands of the south and east. I suspect this is due to the availability of the raw material.

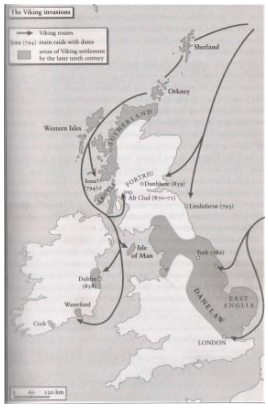
Towards the end of the Roman occupation of Britannia the main centre for pottery had moved to Oxfordshire and Hertfordshire, where a range of red wares was produced. The core material might be grey, orange or even purple, but with a slip applied which oxidized to a reddish-brown.

Nene Valley as a pottery centre

- The Nene Valley near Peterborough has already been mentioned a couple of times, and appears to have been one of the most important centres for Romano-British pottery over three centuries, until it was challenged by Oxfordshire in the 4th Century
- A large industrial complex started by copying beakers from the Rhineland decorated with a black slip, then diversified into various coloured items like those on the right
- In addition to the usual range of earthenware for eating, drinking and storage, Nene Valley workshops specialized in mortars (as in pestle and mortar), an everyday item which most households would require for everyday use (bottom right)
- *Mortaria* found in Britain are distinctly Roman since they were only used in Roman times, and more have been found in Britain than in the rest of the Empire
- Mortars were not only made in the Nene Valley, but also in St Albans, Colchester and Norfolk

Pottery in pre-medieval Ireland and the Western Isles

- Ireland was never part of the Roman Empire, and was culturally uninfluenced by it, apart from any imported luxury goods which found their way there
- Ireland, with Britain, was the last bastion of the Bell Beaker Culture, and the only influence which might have changed this was the Vikings
- Any googling of ancient Irish pottery soon shows that the Irish Celtic identity never entirely went away and still prevails today
- The Western Isles, formerly known as the Hebrides and now as Na h-Eileanan an Iar, are situated on the main sea routes linking Ireland, the Isle of Man, and the Northern Isles of Orkney and Shetland
- The Vikings would appear to have stifled any advances in pottery in the regions where they were dominant



Ireland was never part of the Roman Empire... Travel and trade were by sea and river, mostly, so being a separate island from Britain was no reason why Celtic Ireland should have developed much differently from other European cultures.

Ireland, with Britain, as the last bastion of the Bell Beaker Culture, and the only influence which might have changed this was the Vikings. The fact is that the Vikings did not go in for pottery, but preferred to use natural materials like wood for plates, bone or horn for drinking vessels, and soapstone for cooking pots. Pottery that was made tended to be simple, made by coiling and fired in a pit.

I would have liked to see signs of a distinctive new Irish pottery style during the period when Ireland's neighbours in Brittany and in Britannia were learning new skills from the Romans, but the cultural isolation of Hibernia meant that things seemed to stay pretty much the same; and the Vikings did nothing to help.

The Western Isles, formerly known as the Hebrides… and the Northern Isles of Orkney and Shetland. They would have known about Orkney Grooved Ware, for example, since that has been found in Southern Britain and would have passed through the Isles on its way south.

The evidence suggests that there was no distinctive Hebridean style, and one study says that "*hand-made pottery continued to be made there until the middle of the 19th century. Narrow-mouthed globular pots of various sizes were in general use, not only for containing and for cooking food but for churning, during many centuries after wheel-turned, glazed ware was being used in many parts of Scotland"*.

What about Anglo-Saxon pottery?

- Anglo-Saxon pottery tends to be friable and coarse, particularly in relation to earlier Roman wares. Pots were made using simple thumb, pinching and coil-building methods which had changed little since the Stone Age
- Raw clay was mixed with water using a spatula or by treading it with bare feet. Sand or broken shell was added to help the pot withstand the huge changes in temperatures during firing and to stop the pot cracking or exploding. The pots were then fired in pits or clamp kilns
- Pots were generally plain and functional and used not just for cooking and storage but also in burial rituals, since cremated remains were placed in purpose-made urns; decoration tended to be straight or curved lines and stamping
- Some types of Anglo-Saxon pottery from the 9th to 11th centuries can be named, such as Ipswich Ware, Thetford Ware, St Neots Ware and Stamford Ware (bottom right)

Stamford Ware was off-white, very fine, light firing fabric. It was wheel-made and fired in kilns, so a significant advance on what I described just now regarding Anglo-Saxon pottery generally. It is also the first appearance of glazed indigenously produced pottery in England since the Roman period. Glazed from 875 AD, no other major glazed ware emerged in this country until the 12th century. Lead glaze (which I'll say more about later) was applied with a brush, and produced vessels in a range of colours, including pale yellow, orange, pale green and blue.

English Medieval pottery style

- Surrey Whiteware
  - Cheam
  - Kingston
  - Tudor Green
  - Border ware
- Yorkshire Ware







The Middle Ages in England did see a succession of recognizable pottery styles (as shown). These were all glazed and practical, but rather predictable, and any exciting change had to wait until the 16th Century. It was at this point that I realized that the wheels had come off my basic plan for this talk. I finished Part 1 having only got as far as the Romans, so I confidently assumed that there would be plenty to say about British pottery in the succeeding centuries. Not so, since Anglo-Saxon and English medieval pottery appears to have few surprises, and that of other parts of the British Isles even less. Plan B, therefore, would involve going back to see what was happening elsewhere.

Why the story of British pottery takes a not so wellearned break at this point

- With the demise of Romano-British potteries the manufacture of earthenware reverted to the way it had been before
- Materials other than clay were being increasingly used for household utensils; precious metals, pewter, wood, horn or bone for drinking vessels and tableware, requiring only plain coarse earthenware for storage jars etc
- This was especially significant in areas without a ready supply of clay, such as upland areas away from the South, East and Midlands
- The introduction of some lead glazing in the 9th century was locally significant, but not widespread, and it was the same situation in most other parts of the former Roman Empire for hundreds of years
- The exception was in the East where Byzantine pottery kept alive Roman techniques and styles
- The next positive shift in the development of pottery came with improved kiln technology and glazing techniques
- Innovations once again came from the East

Stamford Ware was the last and maybe the only example of Anglo-Saxon and Middle Age pottery to have any reputation at home and overseas, and survived the Norman Conquest for a hundred years or so. Otherwise, the story of pottery in that period is rather uninspiring. It is also regrettable that I have found no significant material about pottery outside the clay bearing regions of England, so find myself saying nothing about other parts of the British Isles.

Pingsdorf Ware

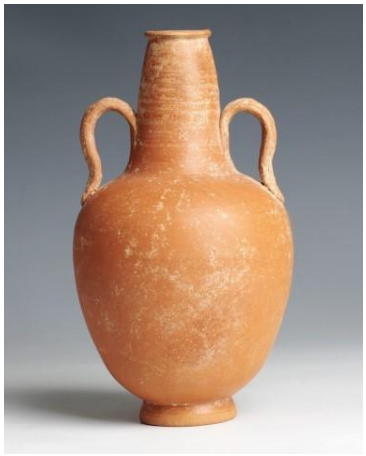
- Exports to England started during the 10th century, and the Norman Conquest made it more difficult, but the proximity of shipping routes across the North Sea meant that some pottery still found its way to S and E England
- It was tempered with quartz and fired at a high temperatures which made it particularly hard, and almost like stoneware
- The fabric tended to be light in colour, with shades of white, yellow and olive. The distinctive feature was its painted decoration, often red on the light background

During the early Middle Ages, Stamford Ware was a contemporary of Pingsdorf Ware from the Rhine Valley region of Germany and the Netherlands. Both Stamford and Pingsdorf products were shipped across the North Sea, or at least have been found on both sides of the North Sea, but they were very different type of pottery. The English product had the advantage of being glazed, whilst the Rhenish product had its own particular style of decoration.

Pingsdorf Ware was so successful that it continued to be made for 400 years. It was not itself a huge innovation in pottery style or methods, and it was unglazed. Glazing is actually the key to later developments in pottery, and we need to look to the East to see what was happening.

The introduction of glazing

- The two main purposes of glazing in pottery are (i) to make the vessel impermeable for holding liquids, and (ii) to add decoration if required
- Glazes may be either clear or coloured
- The word vitrify comes from the Latin word for glass, as does the French *verre*, and the word glaze is clearly from the same root
- Different minerals in a glaze can produce a whole palette of colours for decoration
- The difference between underglaze, overglaze and inglaze decoration
- Fully glazed and vitrified pottery was not widespread until Roman times, although glazed stoneware was being produced in China 1000 years before



To recap a bit on what I said about glazing last time, here is an earlier slide. Above about 1600 C clay vitrifies and becomes an amorphous glass. If a pot is coated with a glaze before firing the heat fuses the glaze to the body of the pot. Glazes normally contain a flux, usually a metal oxide, which slightly reduces the temperature at which vitrification occurs, and in this way the outer surface of a pot can become impermeable without the whole body of the pot having to be fully vitrified. Historically, lead oxide has been the most commonly used flux. It produces a clear glaze which can be tinted by

impurities or additives. Other oxides like those of copper, iron, manganese and cobalt produce their own distinctive colours.

Glazing was being practised in China three thousand years ago, but was not known in the Middle East and parts of the Roman Empire until the 1st Century BC. Glazing was never a feature of Samian ware nor its spin-offs, so the art of glazing was effectively lost when the Empire disintegrated, and revived when lead glazing started to be used, which in Britain was in the 9th Century.

Imperial rivalries and the arrival of tin-glazed pottery

- Byzantium and the Caliphates were adversaries, but cultural advances were still shared, more especially scientific, mathematical and medical ideas from the Islamic side; one such advance in ceramics was tin-glazing, which was first discovered in Iraq in the 9 th Century
- Tin-glazing enabled more detailed and precise decoration
- The map shows how easily ideas could spread around the Mediterranean world, and from there to the rest of Europe
- Cyprus became a Greek centre for pottery in the early Middle Ages, while Moorish Spain produced fine examples of ceramic art, known as Hispano -Moresque, which continued after the *reconquista*

The title of this slide is not meant to suggest that the rivalry between the Byzantine Empire in Constantinople and the Umayyads and their successors in Damascus was all about pottery. It just points to the fact that this was the period in which big developments occurred in pottery, and it could be seen in the ceramic art, first in the Caliphates and later in the Christian north. The two rival empires (or in the case of the Islamic empires a succession of them) together stretched from the Middle East to the far end of the Mediterranean Sea, with only a small part of the Mediterranean coastline not adhering to one or the other.

Tin-glazing enabled more detailed and precise decoration. So what is so special about tin-glazing? Tin glaze is in fact lead oxide with a small amount of tin oxide added. One disadvantage of normal lead glaze is that the colours tend to run during firing, which makes it more difficult to obtain a very detailed decorative image. Whereas a pure lead glaze is translucent, a tin glaze turns out opaque and white. This provides a surface which can be painted by brush or other ways, with the detail remaining clear after firing. The normal process was to apply the tin glaze to a previously fired and hardened pot, bowl, plate or other vessel. Then, over this coating, other coloured glazes were used for painting the design by brush onto the white surface, and the whole was then re-fired. Initially the colours used were obtained from the oxides or dioxides of metals like cobalt, copper, iron, manganese and antimony. As mentioned before, the advantage of tin glaze over lead is that it does not run when fired, and so the pigments do not blur; the disadvantage is that, like in fresco painting which is executed on fresh plaster, you can't make any alterations as you go along, and have to get it right first time.

Early tin-glazed examples

- Early Islamic


- Early Byzantine


Hispano-Moresque style

- The Moorish potters of Medieval Spain were responsible for a class of pottery known as 'Hispano-Moresque' and 'lustreware'; the style started in Malaga in the south, and after the defeat of the Moors some of these potters moved north and flourish around Valencia
- One thing which made this style distinctive was a fusion of Visigothic elements, floral motifs and the occasional Christian inscription or emblem, with the bold and intricate patterns of the Islamic world
- The process used to make this pottery was all new
- In short, this complex, hybrid form of art was created from the intermingling of Muslim and Christian cultures and is quite unique
- Hispano-Moresque pottery was a casualty of its own success; as everyone wanted it the quality inevitable suffered. The style, however, was being copied elsewhere in Europe, which led directly or indirectly to three important developments in ceramics – Maiolica, Faience and Delft


The process used to make this pottery was all new. Surfaces were meticulously embellished by hand using brushes loaded with a vivid blue pigment obtained by crushing cobalt glass. After firing a copper oxide mixture was applied over the already-fired tin- and cobalt-based glazes before heating a third time at low temperature in a kiln starved of oxygen. This produced a distinctive lustrous sheen, which is where the term lustreware came from. The effect varies from a pale yellow iridescence in early pieces to a coarser, copperish iridescence in later work. Early designs are Islamic: the tree of life, palm motifs, and Arabic inscriptions, for example. Later designs combine Islamic and Italian Renaissance motifs. Misspelled or intentionally illegible Arabic inscriptions indicate that the work was eventually taken over by Spanish Christian craftsmen.

About Maiolica

- The name *maiolica* (or majolica) was first used by Italians to describe latemedieval and renaissance ceramics which arrived first as exports from Malaga and Valencia via the island of Mallorca(Majorca)
- It was the refined, white-glazed pottery of the Italian Renaissance, adapted to all objects that were traditionally ceramic, such as dishes, bowls, serving vessels, and jugs of all shapes and sizes
- Maiolica was not a small-scale product but an industrialenterprise
- In the 16th century a second, clear glaze was added to produce a brilliantly shiny surface and enhanced the colours of the decoration
- In the same period a full range of colours became available
- By the 17th century production had declined, though the so-called *bianchi di Faenza*, lightly decorated white wares made in Faenza, continued the tradition




It was the refined, white-glazed pottery of the Italian Renaissance, adapted to all objects that were traditionally ceramic, such as dishes, bowls, serving vessels, and jugs of all shapes and sizes. As well as practical pottery it was made for show, prestige or devotion. I can't imagine any of these themes being eaten off or subsequently washed up in the scullery.

Maiolica was not a small scale product but an industrial enterprise. Maiolica is distinguished by the white, opaque glaze of tin oxide. Tin was an expensive imported substance, which made maiolica a far more expensive commodity than ordinary pottery. Great care was taken to refine and shape the local clays, which varied considerably in colour and weight. A maiolica workshop would have consisted of about eight workers, each with a special task, such as gathering fuel, preparing and firing the kilns, preparing the raw clay, throwing or moulding it into shapes, mixing and applying the glaze, and decorating it with ceramic pigments. All worked under the leadership of a master potter, who in most cases would have owned the workshop.

In the sixteenth century a second, clear glaze was added... A tin-glazed surface is smooth and shiny but not brilliant. In an evolution similar to that which led from fresco and tempera painting to oil painting this further coat made all the difference.

In the same period a full range of colours became available. These included blues, greens, yellows, oranges, white, black, and brown, and several tones of lustre colours such as ruby red, pink, yellow, and reddish brown.

By the 17th century production had declined... The Spanish started making the same style of tin-glazed pottery in the New World, and some from Mexico, known as *talavera*, is quite famous. Terminology is one of the banes of pottery classification, and in Italy, as in Spain, this form of lustreware was called maiolica. Outside Italy, however, wares similar in manufacture and technique but not in style of decoration were called other things, one being *faïence*.

Faïence

- The name faïence is probably derived from the French rendering of Faenza, the city in Italy most associated with maiolica production during the Renaissance
- Faïence is also associated with Morocco, and there has indeed been French and Spanish influence in that country
- The difference between maiolica and faïence is hard to define in terms of decoration
- Little faïence for domestic use was manufactured after the early 19th century because of the popularity ofcreamware(white English lead-glazed earthenware) andporcelain, both of which were more durable

The name faïence is probably derived from the French rendering of Faenza... Italian maiolica inspired the production of similar wares in France and then in Germany during the 17th and 18th centuries. France in particular produced great quantities of superior faïence tableware. Among the best-known French varieties are Marseille faïence , Moustiers faïence , Nevers faience, Rouen ware, and Strasbourg ware. In Germany, faïence was made at such centres as Nürnberg, Hanau, Frankfurt, Hamburg, and Stockelsdorf. German wares in the 18th century tended to be influenced by the Rococo-decorated wares of France.

Faïence is also associated with Morocco... But we shouldn't forget that tin-glazed pottery was being made in Morocco before the Moors in Iberia made an industry of it there. So the potters of France could not really tell the potters of Morocco how to do their job, though the faïence style of decoration became fashionable in Morocco, a century before the French colonized it.

The florid patterns and pictures of maiolica were carried on in faïence, particularly in French baroque designs. But as the 18th century progresses the fashion grew for something simpler and cleaner.

Top row 17th C, bottom row 18th C

These are some examples of French faïence, in date order showing a move away from baroque fussiness. From the top left clockwise, Lyons early, Nevers x 2, Rouen x 2, Moustier.






The fourth major development in tin-glazed pottery after Hispano-Moresque, Maiolica and Faïence is Delft. This originated in the Netherlands, where the name comes from, but became a big thing also in England and Scotland. It is more usually associated with the traditional Delft blue decoration, but used other colours as well. The common factor is the opaque white background provided by lead and tin oxide glazing.

One of the triggers for the success of the Dutch blue style and its trademark designs was Chinese porcelain. In the 16th century Chinese porcelain had been imported into Europe mostly by the Portuguese through Macau, but in the 17th century the Dutch East India Company became the dominant trading force in the Far East. I think it would be useful at this point to look at Chinese porcelain at that particular time in history before saying more about its influence on delftware.

Porcelain re-cap

- The Chinese had been making porcelain for well over a thousand years before Renaissance Europe saw any of it, and there were many different styles and techniques used throughout this period
- The term 'porcelain' defies precise definition
- The secret appears to be in the material used, which was kaolin (otherwise known as china clay) mixed in various proportions with porcelain stone or petuntse
- In the 15th and 16th centuries China was in the Ming Dynasty most of the time, so it was the period when Ming vases were made (see examples on right)
- In trying to emulate Chinese porcelain the Dutch potters of the 17th century came up with something that was not porcelain but something quite different

The full story of Chinese porcelain would be a subject in itself. The time when Portuguese and Dutch traders began to buy it coincided with a deliberate strategy on the part of the Chinese to increase production for export, and also to incorporate some foreign ideas into their designs.

The term 'porcelain' defies precise definition. To a European it is a collective term comprising all ceramic ware that is white and translucent, no matter what ingredients are used to make it or to what use it is put. To the Chinese ceramics are identified by the firing temperature, with their porcelain being lumped in with our stoneware in the high temperature category. The Chinese expect what we would call porcelain to be fine, translucent and have a ringing sound when pinged.

The secret appears to be in the material used… porcelain stone or petuntse, a powdered mixture of mica- and feldspar-type rock, further feldspar and quartz. The kaolin (the name incidentally comes from a Chinese place name) produces a good white body, but requires higher temperatures than porcelain stone in order to vitrify.

*In the 15th and 16th centuries China was in the Ming Dynasty…*One innovation during this period was the use of cobalt blue for decoration, but in a way which kept the lines in the decoration clean and crisp. Normally cobalt blue would run when fired, but by combining with manganese this tendency was reduced – though the colour became less bright.

In Delftware the white body and clear blue decoration were the result of tin-glaze rather that kaolin clay and manganese. And the resulting earthenware was not as strong and translucent as porcelain. It was, however, very popular and successful with those people who could not afford a Ming vase.

- During the early 17th century, it was extremely fashionable amongst well-off Europeans to own Chinese blue and white porcelain, which was beyond the capability of potters in Europe or anywhere else to make
- Seeking an alternative in order to keep up with high market demand, potters in Delft in The Netherlands instead made tin-glazed pottery with milky opacity very similar to porcelain, which was then painted in the blue and white oriental style
- The impetus for producing something to look like porcelain really occurred from 1620, when for internal reasons the supply from China dropped off
- Although Delft manufacturers often designed their products using the shapes and patterns of Chinese porcelain, they also experimented with their paintings, creating new and original Dutch scenes and styles
- It wasn't long before these experimentations led potters to try out using a variation of colours in their designs

Delft and delftware

As we have seen, porcelain needed key ingredients like kaolin which simply were not available in Europe at the time. China clay from Cornwall and elsewhere was only identified and exploited later in the century.

The use of marl, a type of clay rich in calcium compounds (used by the Ancient Egyptians, you may remember), allowed the Dutch potters to refine their technique and to make finer items. The usual clay body of Delftware was a blend of three clays, one local, one from Tournai in Belgium and one from the Rhineland. Potters began to coat their pots completely in white tin-glaze, instead of only the surface to be painted, using ordinary clear glaze for the remainder. They then began to cover the tin-glaze with clear glaze, which gave depth to the fired surface and smoothness to cobalt blues, ultimately creating a good resemblance to porcelain. I think we are all familiar with the traditional Dutch emblems – windmills, sailing boats, canals and bridges, etc.

Underglazing was used to achieve different shades and effects. Red was a particularly difficult colour to make; an unpainted space was left during the first firing of the pottery, and the red was applied afterward and fired at a lower temperature. Similarly, gilding was found on the finer specimens and required a further firing.

The term Delft has stuck to include modern day ceramic products which are not remotely the same as the tin-glazed earthenware of the 17th century

‘Delft’ wall tiles today

I have mentioned previously that I once had a ceramic tile business. One of my more interesting and occasionally successful ranges was hand-painted wall tiles in the Dutch style. Customers were encouraged to have their own designs painted on them, which might include their house, their horse, or even their dog.

English, Irish and Scottish Delftware

- The name ‘Delftware’ is generally recognized to mean not only pottery made in Delft, but other cities across Europe as well. These included London, Bristol, Liverpool, Glasgow, Dublin, Hanover, Rouen and other Dutch cities which were also producing this type of pottery throughout the 18th century
- English tin-glazed pottery was the first to start in Britain in the mid-16th century, with craftsmen coming over from the Netherlands as religious refugees; it went under the name ‘galleyware’
- A Dublin delftware pottery was established during the 1730s, and for around 40 years produced pottery very similar to that of England
- The first notable industrial pottery in Scotland was only established in Glasgow in 1748
- Around 1800, demand declined due to poor economic circumstances and the growing popularity of mass-produced English creamware, which was cheaper, stronger and superior in terms of usability

Flemish potters settled in Norfolk to escape religious persecution, and potteries specializing in tin-glazed earthenware (though not necessarily Dutch in style) later flourished in the London area from about 1610. They served a wide segment of 17th century society, with the highest demand coming from the gentry, rich tradesmen, and members of flourishing guilds. Increased market demand stimulated the emergence of potteries in Brislington near Bristol, and throughout the British Isles. When the Delft influence became dominant in the 17th century the decorative themes were in some ways similar to the Dutch, but with a distinct English twist – a mixture of royal motifs and rustic simplicity. The two examples on the right show what I mean by that.

The Dublin pottery was not, unfortunately, commercially successful and closed in 1774. Nevertheless, a wide range of delftware objects was made in Dublin, including plates, bowls, baskets, barrels, and extensive dinner services.

By first notable pottery in Scotland I mean the very first real industrial pottery anywhere in that country. It started making tin-glazed delftware, but this was soon out of fashion and was replaced by creamware, which I will come to shortly. A great deal of Scottish pottery was exported to America, because one of the factory's founders was a Governor of Virginia.

I have now mentioned 'creamware' a few times, and it is in fact going to be the next main topic for this talk, once I have said something pertinent on the subject of Cornwall and china clay.

What are Kaolin and Kaolinite (two definitions)?

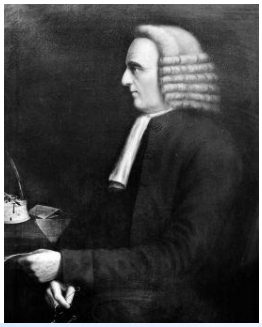
1. Kaolinite $Al_2Si_2O_5(OH)_4$ is a layered silicate mineral, with one tetrahedral sheet of silica (SiO_4) linked through oxygen atoms to one octahedral sheet of alumina (AlO_6) octahedra. Rocks that are rich in kaolinite are known as kaolin or china clay.

2. Kaolin, also called china clay, is a soft white clay that is an essential ingredient in the manufacture of china and porcelain and is widely used in the making of paper, rubber, paint, cosmetics, toothpaste, insecticides, whitewash, and many other products. Kaolin is named after the hill in China (Kaolin) from which it was mined for centuries. Samples of kaolin were first sent to Europe by a French Jesuit missionary around 1700 as examples of the materials used by the Chinese in the manufacture of porcelain.

In its natural state kaolin is a white, soft powder called kaolinite, consisting of crystals ranging in size from about 0.1 micrometre to 10 micrometres. In nature it usually contains varying amounts of other minerals such as muscovite, quartz, feldspar, and anatase. It is often necessary to bleach the clay chemically to remove impurities like iron, and to wash it with water to remove other minerals in order to prepare kaolin for commercial use.

Like other clays (as described in the earlier talk) kaolin becomes plastic when wet, and the shape is retained. With larger percentages of water, the kaolin forms a slurry, or watery suspension. The amount of water required to achieve plasticity and viscosity varies with the size of the kaolinite particles and also with certain chemicals that may be present in the kaolin. In addition to China, kaolin is now mined in many countries around the world. In Europe it was first mined in England, Saxony (where Meissen comes from), France and Bohemia

Discovery of china clay in Cornwall



- William Cooksworthy, born 1705 in Devon, was an apprentice chemist, who took a particular interest in the materials used to make porcelain, which was beginning to be made in quantity in Europe

- China clay had been discovered in Virginia and was being imported from there, but Cooksworthy decided to find more local supplies. Having discovered deposits of china clay in the Breage and Tregonning Hill areas of Cornwall, he set up a pottery in Plymouth, where the first hard paste porcelain was manufactured in the United Kingdom. Hard paste porcelain is the term generally used for wares fired at a high temperature, first successfully done in Meissen in 1708

- Cookworthy was the inventor of a particular process for manufacturing ceramics using china clay and he continued to purchase his raw materials from quarries in Cornwall. The secrets for making porcelain were coming out of the bag. The only problem was that most people couldn't afford it

English Creamware

- The large resources of china clay were being exploited at the same time as the potteries of Staffordshire and the English Midlands expanded, and they helped each other
- Chelsea 1743 (merged with Derby in 1770); Royal Crown Derby 1750; Royal Worcester 1751 ; Wedgwood 1759 ; Spode 1776 ; Mintons 1793 ; Royal Doulton 1815
- The first real innovation was by Josiah Wedgwood, who built on work done earlier by a business partner and developed creamware as his main product
- Wedgwood then made a change and introduced Pearlware
- Developed in the 1750s the practice of using transfers instead of painting for the decoration of creamware made mass production and consistency of quality a big selling point
- Enamelling was another way of decorating creamware, and involved making a pigment from finely powdered coloured glass, applying that to the body, usually as an overglaze on an already fired product

The potters of Skara Brae gave us grooved ware, but there is really only one area where this country produced anything innovative which was internationally recognized, and that is the English creamware and bone china, which came one after the other in the 18th century.

The china clay quarries and the potteries were not quite dependant on each other. Both creamware and bone china rely on materials other than kaolin, and the Cornish quarries had other uses for their clay and other markets they could satisfy. This slide shows the main companies and the dates of their foundation.

During his innovations, Josiah Wedgwood threw out all his coloured glazes, and for a period of fifty years he concentrated on his creamware, a lead-glazed earthenware decorated simply by means of transfers. He improved it by adding china clay and powdered granite from Cornwall to both the body and the glaze. This made the colour lighter, and gave the finished product a brilliance which was quite new. Needless to say, other manufacturers adopted his methods eventually.

English creamware was very successful both at home and abroad. With its lower cost, greater strength and chip-resistance it soon eclipsed Faïence in Europe over the second half of the 18th century. The Dutch called it *Engels Porselein*, although it did not claim to be porcelain, the Italians called it *Terraglia Inglese*, and the French *Faïence Fine.*

Pearlware was made by adding cobalt to the glaze, and making the body material slightly grey. The result (pictured on the right) proved very popular, and more or less overtook creamware.

As far as transfers were concerned trademark design range or a complete set to a personal specification could more easily be made. Transfers could be either underglaze or overglaze. The difficulty with underglaze application was that the colours would run during firing, as it was lead glaze not the tin version that was used for creamware. The general principal was to make a mould of the design, like a printing block, with oil smeared on the raised pattern. This oily pattern was transferred onto paper. Glaze powder was then dusted onto the paper where it adhered to the pattern left by the oil, and the transfer applied to the vessel. Re-firing at a low temperature fused the glazes together and fixed the pattern. In the 1780s Josiah Spode developed a way of transferring a blue surface to a vessel as an underglaze. This enabled him to launch the very successful Spode Blue Italian range

Enamelling could prove quite expensive if a number of colours were involved (see picture)

Bone china in the 18th,19th and 20th centuries

- It was Josiah Spode who, between 1789 and 1793, perfected a recipe for bone china which is still essentially the recipe used today: 6 parts bone ash, 4 parts china stone and 3.5 parts china clay
- Hard past porcelain v. soft paste porcelain
- Bone china is a soft paste porcelain containing a minimum of 30% of phosphates (bone ash), with some feldspar type rock and kaolin in various proportions
- You can put bone china in the microwave







Experimentation with cattle bone had begun in Bow in London, but Spode developed this and made it work better. The Bow pottery had been trying to imitate Chinese porcelain, which was not Spode's intention.

The distinction between hard paste and soft paste is technical and rather unromantic, but crucial in distinguishing between on the one hand the kaolin-rich porcelain of China and of Meissen, William Cooksworthy, and the Bow pottery, and on the other the bone china of the English Potteries. Hard paste porcelain is the so-called true porcelain as made by the Chinese, with kaolin and petuntse as their main ingredients, and fired at very high temperature, usually around 1400 °C. Soft paste porcelain contains less kaolin and with a variety of stone additives, and is fired at a lower temperature of around 1200 °C. Both vitrify and become translucent.

For bone china, cattle bone is degelatinized and incinerated, then crushed and milled to a fine powder. The rock ingredient is almost invariably rich in feldspar and quartz, and the kaolin is there to provide plasticity. The result is the strongest and thinnest kind of ceramic, resistant to chips, and white and translucent. Manufacture of the world's bone china was almost exclusively carried out by English companies in Staffordshire and the Midlands. This remained the case until the end of the 20th century but, with supreme irony, the world's biggest manufacturer of bone china now is China.

John Whiteman, July 2021