Historic Ceramics Identification

Lindsay Bloch, PhD, RPA
DAACS

Roadmap

- Part I. Introduction
- Part II. Ceramic Materials
- Part III. Glazes
- Part IV. Manufacture
- Part V. Form & Decoration
- Part VI. Summary

Ceramic materials:
-clay types
-glaze types
-forming techniques

I often hear frustration from people learning historic ceramics. And I get it. There are a ton of different types, many of which can look pretty similar, especially fresh out of the ground. It can be overwhelming

What I hope to convey today is the LOGIC of pottery production. There's a reason things were made certain ways, or look certain way when we find them. That's because of the limitations of different materials, b/c of technological changes, etc. You can learn to recognize these characteristics. Then you can logic your way out of some of these pottery puzzles.

I will point to some specific ware types, focusing on those that are most often confused. At the end I'll provide a list of online resources that have great pictures and detailed information.

Some caveats:
-broad strokes, there are exceptions to many of these statements, but when you hear hoofbeats, think horse, not zebra.
-I'm focusing on pottery identification in European or Euro-American contexts, recognizing that the introduction of different types varied worldwide.

-I'm not going to provide too much in the way of firm dates here, because those can also be context dependent.
-Acknowledge that you will have to develop your own expertise based in the particular places and time periods you are focusing on.

Unless otherwise noted, photos are my own, and magnification of photos is 10X, similar to what you would see with a loupe. I will share the slides with you.

Standard Toolkit

- Loupe or microscope (10X or greater)
- Flashlight
- Soft toothbrush
- Tile nippers

See closeup, esp. fresh breaks
Good lighting and determine translucence
Tile nippers for seeing a fresh break if edges are stained or eroded.

Your sense of touch is also an important tool.
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Defining some terms

Utilitarian vs. tableware and teaware

Certain forms easier to produce in certain ways: throwing vs. molding

Got to start at the beginning.
Ceramics are made out of clay, but for many historic ceramics, it's not stuff that's coming straight out of the ground.

Pottery clay must have the appropriate plasticity for a given application: throwing/casting/molding
Clay that is too plastic (fat) will deform in drying and firing. Clay that is too lean (aplastic) will crack and crumble during formation and drying.
A clay good for molding brick may not be suitable for making earthenware.

Differentiation between a clay body and clay- clay bodies are usually a blend of different clays/materials as opposed to a straight clay used for throwing. You'll also hear me call this paste.

Sintered vs. Vitrified

Sintered: clay minerals fused by heat, without melting

Earthenware

Vitrified: clay minerals chemically converted to amorphous glass under high heat

Stoneware and Porcelain

Ceramic Materials: Temperature

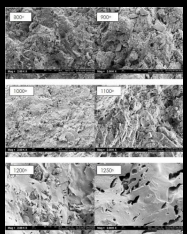
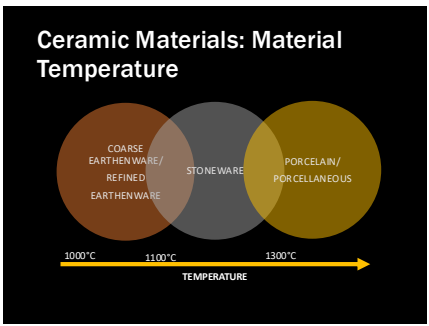


Figure 6. SEM micrographs for the clay fired at different temperatures. Johari, Izwani, S. Said, Badorul Abu, B.H. Bakar, and Zainal Ahmad 2010 Effect of the change of firing temperature on microstructure and physical properties of clay bricks from Benuas (Malaysia). Science of Sintering 42. DOI:10.2298/SOS1002245J.

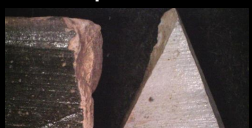
Clay texture changes: sintering and vitrification.
What this means for **porosity, fracturing, glaze**

Temperature at which these changes occur is specific to the clay body. Potters learned how to adjust ingredients to achieve the results they wanted, such as adding a flux to the body to make it vitrify at a lower temperature.



These texture changes are evidence of the structural changes happening at the atomic level as clay minerals “melt” and elements recombine.

Material Temperature



Unvitrified body:	Vitrified body:
-splintery/uneven breaks	-sharp breaks
-porous	-non-porous
-stains readily	-resists staining

Because EW remains porous, a glaze is needed to render it impermeable.

Material Temperature

Unvitrified body:
-splintery/uneven breaks
-porous
-stains readily

Vitrified body:
-sharp breaks
-non-porous
-resists staining

Holds true for refined wares as well

Coarse Earthenware

- **Temp:** low (1000-1200°C)
- **Texture:** grainy; often visible inclusions; porous; spalls readily
- **Paste color:** buff, orange, red
- **Forms:** mainly utilitarian

Simplest of the ceramics I'll be talking about today, coarse earthenware was produced all over, from the post-medieval period in Europe onward. Pottery clay suitable for making coarse earthenware is found many places.

Visible inclusions and paste color can be diagnostic. It's always a good idea to pay attention to these attributes when cataloging coarse earthenware. Given that coarse earthenwares were often produced locally or regionally, it's worth paying attention to these characteristics to determine if what you're finding was locally made or imported.

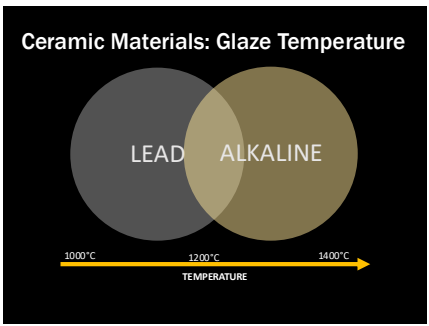
While in the early period used for both tablewares and utilitarian items, as time went on and there were more tableware options, it largely became relegated to important, but utilitarian functions like dairying and food storage. Used for cooking. Look for use wear.

Refined Earthenware

- **Temp:** low (1000-1200°C)
- **Texture:** sandpapery; porous; spalls readily
- **Paste color:** usually white/off white
- **Forms:** tableware

For archaeologists working in the latter 18th century onward, this material type predominates on most archaeological sites.

Porous, this means that a glaze is needed.



Good news, there are some rules that relate to which glazes are present on which materials, which helps us distinguish.

Glazes need to ”fit” on a clay body, shrinking the same amount during firing, firmly attaching to the body, not melting/dripping off.

Glazes are made of network formers and network modifiers. Network formers, such as silica, create the structure. Network modifiers typically act as fluxes, lowering the temperature needed to melt and bond the glaze. Alkali metals and alkaline earth metals are common network modifiers. These include sodium, calcium, potassium, and magnesium.

Lead Glazes

- Low temperature (Earthenwares)
- Glassy appearance
- Fine crazing
- Sits on top of body in cross-section
- "Double" glaze or interior only

Lead, it turns out, does both, melting at low temperature and producing a strong glassy surface.

Types of Lead Glazes

- Lead (basically pure)

Look for: glossy/glassy appearance, smooth surface, clear or slightly yellow appearance

Lead glaze on coarse earthenwares continues into 20th C.
Lead glaze on refined Ews lessens over course of 19th C. but doesn't go away, though more rare to have these primarily lead glazes.

Types of Lead Glazes

- Lead + colorant

Look for: glossy/glassy appearance, smooth surface, translucent or opaque. Sometimes metallic.

Not as common on refined earthenwares

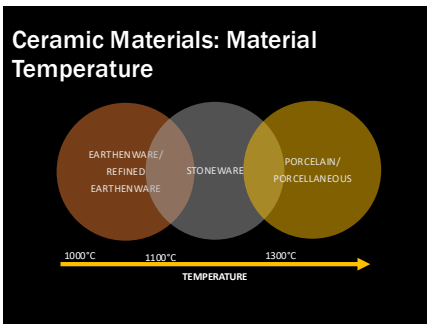
Limited range of colors: mainly greens, browns, and black

Glaze itself is smooth, though surface may be textured beneath.

Types of Lead Glazes

- Tin-Enamel (tin + lead) Look for: matte finish, opaque, missing/spalled glaze, very soft, "M&M coating"

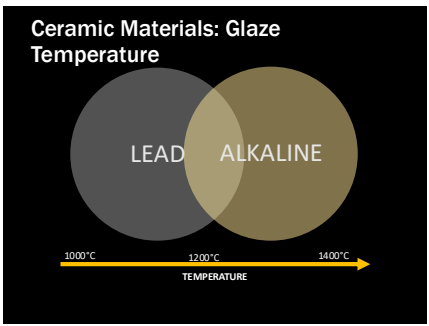
May be known as:
tin-enameled earthenware,delftware, tin-glazed, faience, majolica



As we increase temperature to approach vitrification, we get to stoneware ceramics

Stoneware

- **Temp:** moderate (1200-1350°C)
- **Texture:** dense; vitreous
- **Paste color:** buff, gray
- **Forms:** mainly utilitarian non cooking; some tableware and decorative types



Stonewares require a different glaze that is able to withstand the greater temperature: This glaze is broadly called alkaline glaze because an alkali metal or alkaline earth metal is used as a flux. These include sodium, calcium, potassium, and magnesium.

Alkaline Glazes

- High temperature (Stoneware and Porcelain)
- Glassy to matte appearance
- May have runs, orange peel texture, or pinholes
- "Double" glazed or exterior-only
- Diffuse margin with body

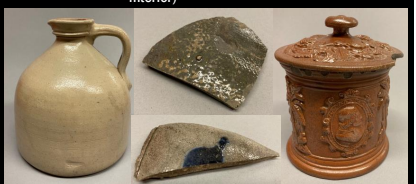
Alkaline glaze is a broad category of glazes. You may be familiar with the term alkaline glaze referencing a specific type from the American South that used wood ash, among other potential ingredients, as a flux, as seen in this jug. Ash glazes are a type within a broader category of alkaline glazes.

Alkaline Glazes

Types of Alkaline Glazes

- Salt glaze

Look for: orange peel texture, glassy surface, glaze only on exterior (may be thin on interior)

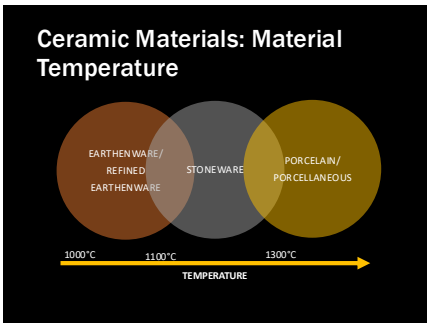


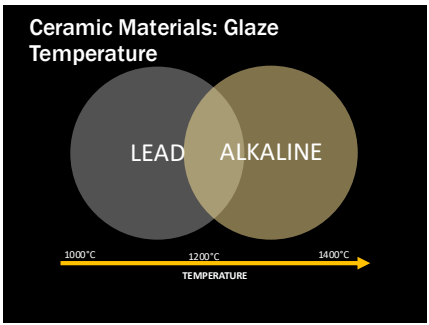
Types of Alkaline Glazes

- **Alkaline flux + opacifier:** Bristol Glaze and Zinc Emulsion.

Multiple types may be present on same vessel, often combined with Albany slip

These include sodium, calcium, potassium, and magnesium.


Ceramic Materials: Material Temperature
EARTHENWARE / REFINED EARTHENWARE
STONEWARE
PORCELAIN / PORCELLANEOUS
1000°C
1100°C
1300°C
TEMPERATURE


Ceramic Materials: Glaze Temperature
LEAD
ALKALINE
1000°C
1200°C
1400°C
TEMPERATURE

Porcelain and Porcellaneous

- **Temp:** high (1350-1450°C);

-porcellaneous (1200°C +)

- **Texture:** dense; vitreous; translucent
- **Paste color:** pale gray, white
- **Forms:** mainly tablewares

Shown here is : “true porcelain” or Chinese porcelain on the left, with a faint gray/blue tinge. In the center is English bone china. This is porcelaneous, fired around 1200, but bone ash added as a flux to make the body mature at that low temperature. Compared to the others it is slightly more ivory in appearance, and b/c lead glaze is softer than alkaline glaze, it will stain. Doesn’t preserve as well in the ground as other porcelains. On far right is hard paste porcelain, the European closest thing to Chinese porcelain. It tends to be a brilliant white.

Lightbulb

Types of Alkaline Glazes

- **Feldspathic/ felspathic: "true porcelain", AKA Chinese porcelain or hard paste**

Look for: smooth shiny glaze, often with tiny pinholes

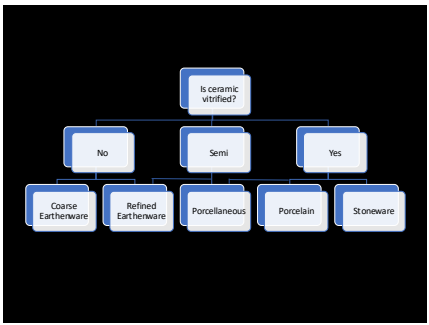
Types of Alkaline Glazes

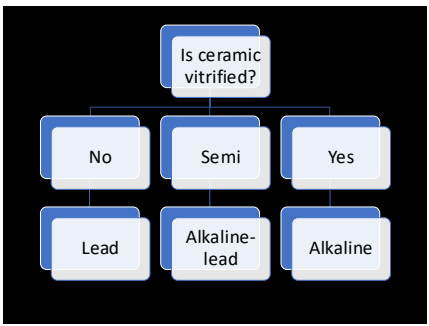
- **Alkaline-lead: 19th C. refined EW and porcellaneous, AKA semi-vitrified wares**

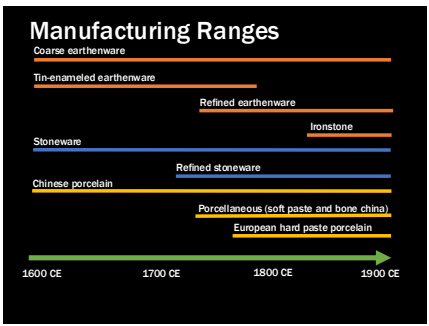
Look for: Less shiny than pure lead, larger crazing patterns, gray/blue bubbly pooling

These examples are ironstone but you will also find it on bone china. The gloopier glaze sometimes had calcium added to make it a more stark white color, but as a mixture of alkaline and lead, is somewhat softer than pure alkaline.

Often poor preservation.

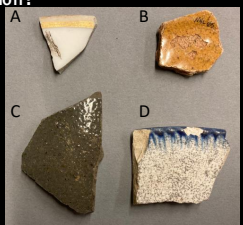

Is ceramic vitrified?
No
Semi
Yes
Coarse Earthenware
Refined Earthenware
Porcellaneous
Porcelain
Stoneware


Is ceramic vitrified?
No
Semi
Yes
Lead
Alkaline-lead
Alkaline



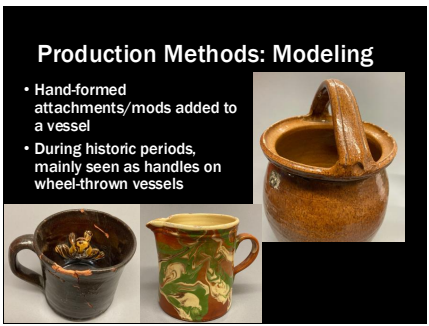
These are approximate, reflecting both when they were made and when they could be expected to be found in assemblages in North American contexts

Identify each of the following ceramic materials. What attributes guided your decision?



Early use for many things, later mostly hollow forms.

More expedient than molding, but takes longer to learn.

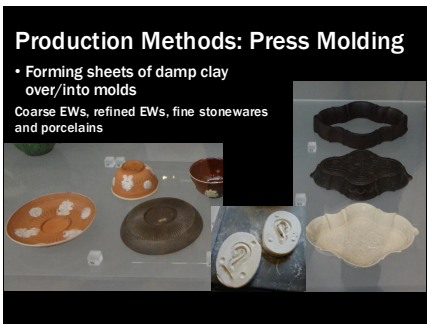


Wheel throwing and modeling
Another example is a modified lip on a jug

With throwing and modeling, the primary tools are hands. You are likely to see finger prints, finger impressions at attachment points, and more irregularities; i.e., vessels out of round, variable thickness.

Generally with molding. What to look for: mold seams. Shapes that couldn't be made on wheel, most flat forms.

Rise of molding over course of 18th century as factories develop in England and elsewhere in Europe. Industrialization. People employed at only one stage of the process, rather than earlier where commonly one person or a few people would do everything from preparing the clay, making the vessel, decorating and firing it.



Can put clay inside or outside a mold.
Hump mold- laying clay over to produce flat/ish form.

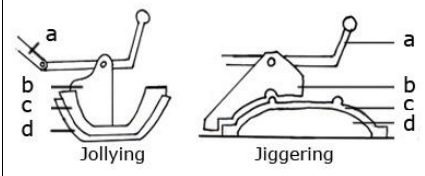
Production Methods: Jigger and Jolly

- Use of mold and die, with wheel or lathe

Refined EWs and porcelains

Becomes common along with other engine-turned methods at end of 18th century and continues to the present day.

Production Methods: Jigger and Jolly



ceramicdictionary.com/en/j/653/jiggering-and-jollying

Production Methods: Slip Casting

- Liquid clay (slip) poured into mold

refined stonewares, refined EWs and porcelains

Victoria and Albert Museum

b/c working with liquid, it can capture very fine detail in a mold.

Over time, there was a general shift away from more labor intensive but more intricate manufacturing, to more expedient manufacturing that didn't rely on expertise.
You can see here the change in method for these two plates. Clearly related in style, but interior one is earlier. Much more detail. It is also thinner. The outer plate has a simpler molded design and is thicker/sturdier. Eventually even the molding goes away and there is just a plain band of cobalt blue added.

Often forms were tied to contemporary forms in other materials. For example, this Chinese export porcelain teapot mimics a silver form.

Here is an example with bowls and cups.

The common shape for punch bowls and tea bowls, with a simple straight footring appears earlier than the London shape, which has a carination and a rounded everted footring.
It's all related, these changes in form are also tied to changes in technology. With rise of jollying, it becomes easier to produce and standardize these more complex forms.

Applied Decorative Techniques

- Slip- liquid clay + colorant applied under glaze

Look for: opaque, visible in cross section, can feel under glaze.

Applied Decorative Techniques:

- Factory Made Slipware (Annular)
- Look for: regular banding in opaque colors, geometric
- On refined earthenware (creamware or pearlware)

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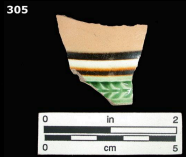
305



Relationship to wash

Cobalt blue most common color. Imitation of Chinese porcelain. Plus cobalt more stable than other colorants

Different color combinations date to different periods.
On left, poly warm with the olive green and mustard yellow, is earlier, from late 18th to early 19th, found on pearlware bodies and occasionally others.

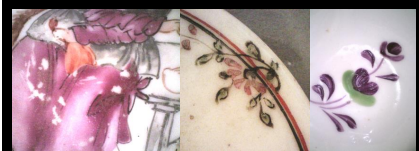
On right, poly cool with bright pinks and lime greens, and black, is mid 19th and found on whitewares and ironstones.

Only certain colors work under the glaze. They either discolor, bleed, etc. So when you see certain colors, it's an indication that you're looking at overglaze painting.

Applied Decorative Techniques

- Painting- Overglaze (enamel)

Look for: crisp lines, rough/dull spots in paint, flaking paint, noticeable texture above glaze, ghosting



Applied Decorative Techniques

- Painting- Overglaze (enamel)

Gilding and luster are applied over glaze

Also gilding. Ghosting

Almost always underglaze.

Some early refined earthenwares and porcelains, and some late porcelains have overglaze transfer. This suffers from same issues as overglaze painting.

Applied Decorative Techniques: Printing vs. painting

Can be difficult to tell the difference, as many designs were directly imitating hand painting.

Applied Decorative Techniques: Printing vs. painting

Applied Decorative Techniques: Printing

- Earliest: overglaze
- Most common: blue underglaze
- Mid-late 19th C.: pastel colors, black, brown, enameling

Summary

Coarse Earthenware

- **Temp:** low (1000-1200°C)
- **Texture:** grainy; often visible inclusions; porous
- **Forms:** mainly utilitarian
- **Glaze:** lead
- **Production mode:** wheel thrown
- **Decoration:** slip

Refined Earthenware

- **Temp:** low (1000-1200°C)
- **Texture:** sandpapery; porous; spalls readily
- **Forms:** mainly tableware
- **Glaze:** lead; later alkaline-lead
- **Production mode:** molded
- **Decoration:** painting (under/over), printing, factory-made slipware

Creamware, as expected, has a creamy yellow color
Pearlware can have a bluish tint.
Whiteware may be more stark white
Ironstone often a bit more grayish white. Or a stark white.
But these colors can be very difficult to tell. It helps to have a white piece of paper to set sherds against. I also go by shape, thinness, and decoration, and glaze qualitites, as I'll discuss.

For archaeologists working in the latter 18th century onward, this material type predominates on most archaeological sites.
It can be very difficult to distinguish these types, so rather than relying just on color, I tend to look for other clues.

-This includes temporally specific decoration
-sherd thickness/mold quality
-glaze clarity, thickness, and color
-vessel form and shape.

Refined Earthenware
white refined earthenwares

	Molding	Painting	Printing
Creamware			
Pearlware			
Whiteware / Ironstone	Highly varied; (less crisp, ironstone geometric)		

Images: Florida Museum Digital Ceramic Type Collection

Stoneware

- **Temp:** moderate (1200-1350°C)
- **Texture:** dense; vitreous
- **Forms:** mainly utilitarian
- **Glaze:** Alkaline
- **Production mode:** wheel thrown, molded
- **Decoration:** slipped or painted (under), sprig molding

Porcelain and Porcellaneous

- **Temp:** Moderate to high (1200-1450 °C)
- **Texture:** dense; vitreous; translucent
- **Forms:** mainly tablewares
- **Glaze:** Felspathic (true porcelain); lead (porcellaneous)
- **Production mode:** molded
- **Decoration:** painting (under/over), printing

A. Overglaze painted creamware. Color is somewhat dull and eroded. Refined earthenware body. Color palette more common for overglaze.
B. Slipped coarse earthenware (marbled). Thick glassy glaze with opaque decoration underneath
C. Underpainted Chinese porcelain. Cobalt color is somewhat diffuse. Different intensity of the color tells me it was hand painted rather than printed. No stippling.
D. Molded and transfer printed refined earthenware. Visible breaks in the pattern, stippling, complex design without diffusion.

Recommended Digital Resources:

apps.jefpat.maryland.gov/diagnostic/index.htm

www.floridamuseum.ufl.edu/histarch/ceramic-types/

www.daacs.org/about-the-database/daacs-cataloging-manual/

apps.jefpat.maryland.gov/diagnostic/HistoricCeramicTypesChart.pdf

historicjamestowne.org/collections/artifacts/material/

belowthesurface.amsterdam/en

Contact

Email:
lindsaybloch@gmail.com
Web:
temperedarchaeology.com
Instagram:
@maniarchaeology