UNDER, OVER, AND IN THE MIX:  
A practical guide to telling the difference between types of polychrome decoration on English earthenware figures

Introduction

Abstract It is not always easy to identify the many different techniques used for decorating ceramics. After all, most materials are silicates pigmented with metallic oxides, with slight variations in composition, application method, and firing procedure. This poster aims to show the differences – both visual and chemical – among three decoration types: colored glazes, underglazes, and overglaze enamels.

Staffordshire figures are a unique group of earthenware figure sculpture and were popular collectible items in England and America during the 18th and 19th centuries. Taking after decorative traditions at porcelain factories such as Meissen and Sévres, Staffordshire potters created their own market by manufacturing luxury sculptures in pale-bodied earthenware, making them affordable to the working class. Potters tried to achieve the best and brightest colors possible for their figures, during a time of much experimentation with color recipes.

The Winterthur collection of Staffordshire figures is the largest of its kind in an American museum, representing the full range of decoration techniques known to English potters at the time. This collection consists of approximately 270 figures, with dates ranging from 1740 to 1900, spanning the rise and fall of figure production in Staffordshire. Having such an extensive and representative group of objects in one location presented a unique opportunity for in-depth study and technical research.

Colored glaze

Colored glazes are one of the earliest kinds of figure decoration, beginning in the second half of the 18th century and were made popular with the invention of liquid glaze and pearlware. They consist of small amounts of metal oxides ground and dissolved in a lead glaze. They are applied to a bisque body by brush and are glass-fired at 1030°C.

How can we tell? VISUAL
• Glossy surfaces
• Colors pooling in recesses of folds and drapery
• Areas of exposed bisque body where brush could not reach
• Limited colors possible

How can we tell? CHEMICAL
• Ions are dissolved in glassy matrix
• Limited number of ions creates color:
  - green (Cu²⁺), blue (Co²⁺),
  - brown (Mn³⁺), yellow (Fe³⁺),
  - purple (Mn⁴⁺ and Co⁴⁺),
  - black (Mo⁶⁺, Fe⁴⁺ and Co⁴⁺)

Overglaze enamel

The development of enamels at the end of the 18th century allowed for an even greater color variety on figures. The range of colorsants continued to expand throughout the 19th century. Many of the recipes followed Continental European technologies, but in some cases, Staffordshire enamels represent entirely new innovations.

Enamels are essentially low-fired colored glazes that consist of metal oxides ground with a medium, applied to a bisque body by brush, and dried completely. They are then dipped in lead glaze and fired at 1050°C.

How can we tell? VISUAL
• Textures vary from matte to glossy
• Bubbling from firing is common
• Always occurs over the glaze
• More susceptible to surface abrasions, delamination, and flaking
• Great variety of colors including brilliant pinks, reds, turquoise, oranges, etc.

How can we tell? CHEMICAL
• Mixtures of metal oxides and lead or borax fluxes
• Pigments can be dissolved or dispersed
• e.g. orange enamels after ~1820 contain dispersed lead (II) chromate (PbCrO₄) as the colorant

Underglaze (Pratt colors)

Underglaze Pratt colors were developed in Staffordshire in last decade of the 18th century to expand the decorating color palette beyond colored glazes and underglaze oxides already in use – the “new” colors consist of oxides able to withstand high glass-firing temperatures.

They contain concentrated amounts of metal oxides ground with a medium, applied to a bisque body by brush, and dried completely. They are then dipped in lead glaze and fired at 1050°C.

How can we tell? VISUAL
• Glossy surfaces
• Mixtures of color particles often visible under the glaze
• Total glaze coverage from dipping
• Palette contains blue, olive greens and browns, muted oranges and yellows

How can we tell? CHEMICAL
• Mixtures of concentrated pigments create color
• Pigments are dispersed color compounds (not dissolved)
e.g. green underglaze contains a mixture of cobalt blue (Co₉O₄), Naples yellow (Pb₃Sb₂O₇) and lead-tin yellow (Pb₂SnO₃)

Mystery blue?

A second type of blue overglaze decoration appears in the mid-19th century, primarily used to decorate the jackets on figures.

What do we think?
• Colorant is cobalt (Co²⁺)
• Glossy, rich blue color that appears to be in glass matrix
• Possibly applied over top of glazed/fired surface and passed through small oven to let color sink into glaze layer, before applying other enamels.

Acknowledgments

References